The Presentation and Examination of DNA Evidence Adduced During Adversarial Trials

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The hopeful refrain of 'We're almost there' seems, at last, to have become 'We're finally there'.

Abstract

This study examines the presentation and examination of DNA evidence in the English Criminal Courts, from the perspective of forensic experts. The methodology involved qualitative analysis of expert perception and opinion, through interview.

Much activity has concerned the contribution of faulty expert evidence to miscarriages of justice, however forensic experts have been largely ignored as sources of valuable data. This study is original in specifically examining their experience.

Criticisms of expert evidence in the English courts are commonly described as having their origins in detrimental effects of the adversarial trial system, however the position supported by this study is that many claimed detrimental effects are based on misunderstanding of the workings of adversarial procedure.

The study examined experts' perceptions of challenges they faced in the presentation and examination of DNA evidence, including their duty to offer objective and unbiased opinion. The study determined that whilst experts may give 'unbiased' opinion, 'impartiality' was practically difficult to achieve because of the different roles played by prosecution and defence experts. Furthermore, a lack of clarity regarding the responsibilities implied by the requirement of remaining 'unbiased' meant that experts put different interpretations on their duties in this regard. This study concludes that the policy objectives underlying the concept of 'unbiased' should be examined, with a view to better defining appropriate expert responsibilities.

The study investigated experience within court. Interviewees reported similar experiences to those faced by forensic experts reported in previous studies. However, evidence in this study supports the proposition that DNA evidence is qualitatively different from older forensic identification techniques. First, the complexity of DNA evidence magnifies many known trial 'pathologies' in terms of presentation and examination. Second, it is fundamentally different in that its probabilistic nature means that experts are forced to present it in a rigorously scientific manner. In this way, not only does DNA represent a new paradigm in forensic identification, but it must inevitably force existing tensions between the law and scientific evidence into the open.

This study found experts to be generally passive in supplying the demands of the judicial process. This has included passivity in the face of legal rulings on how complex DNA evidence should be presented. From an evidential

perspective, this is indubitably a judicial responsibility. This study supports the proposal, however, that steps must be taken to engage scientific experts in the scientific aspects of these determinations, if the ‘new paradigm’ of DNA evidence is not to be diluted.

The Government must take a lead in co-ordinating expert bodies towards an integrated approach to complex evidence such as DNA, in the inevitable anticipation that future forensic technologies can only be more complex still. It may do this without infringing the over-riding interests of the adversarial system of justice.

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Chapter 1
Introduction

1.1 Objectives and Summary of Study

This study examines the presentation and examination of DNA evidence in the criminal courts of England and Wales (hereafter 'England'), from the perspective of the forensic experts who provide it. The methodology employed involves qualitative analysis of expert perception and opinion, with data generated by semi-structured interview with twenty-five experts with relevant qualifications and experience.

Criminal courts are ever more reliant on scientific expert evidence, and yet, at the same time, concerns regarding such evidence have been ever increasing. Concerns regarding expert evidence in general have a long history. As long ago as 1901 it was observed that '… logically the expert is an anomaly (from which) serious practical difficulties arise'.[1] These concerns, particularly regarding scientific expert evidence, have steadily increased since that time, manifesting themselves in significant academic activity,[2] governmental reports[3] and commissions,[4] chartered body publications,[5] proposed[6] and actual (if secondary) legislation,[7] developments in common law,[8] and, not least, media reports. Paradoxically, these

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[1] Learned Hand, 'Historical and Practical Considerations Regarding Expert Testimony' (1901) 15 No. 1 Harvard Law Review 50, in Paul Roberts (ed), *Expert Evidence and Scientific Proof in Criminal Trials* (Ashgate, 2014).

[2] For example, Edmond, Gary and San Roque, Mehera, 'The Cool Crucible: Forensic Science and the Frailty of the Criminal Trial' (July 2012) 24 No. 1 Current Issues in Criminal Justice 51.

[3] For example, Science and Technology Committee, *Forensic Science on Trial* Seventh Report (HC 2004-2005) (HC Forensic Science Report).

[4] For example, HMSO, *Report of the Royal Commission on Criminal Justice* (Cm. 2263, 1993).

[5] For example, Royal Statistical Society, *Communicating and Interpreting Statistical Evidence in the Administration of Criminal Justice*: 1-4.

[6] Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325, 2011) Appendix A: Draft Criminal Evidence (Experts) Bill (Law Commission Expert Evidence Report).

[7] For example, Criminal Procedure Rules 2015, pt 19.

[8] For example, *R v Dlugosz* [2013] EWCA Crim 2.

concerns have increased as the scientific rigour of the evidence has increased.

The over-arching aim of this study is to deepen understanding of the forensic expert's role and experience in the adversarial criminal trial process. By using as its focus DNA profiling, the most scientifically rigorous forensic identification tool,[9] this enables the spotlight to be directed at the experience of forensic experts themselves, and not to complicate this, more than necessarily, with discussion of the scientific validity of the underlying evidence. Despite the significant intellectual effort expended on the subject of expert scientific evidence, the perspective of the forensic expert has been largely ignored. This study sets out to demonstrate, therefore, not only a new perspective upon the debate, but also one which is uniquely valuable in that it is required, by law, to be unbiased.[10]

The central aims of this thesis concern scientific, and specifically, DNA, evidence in the criminal court. To fully understand the expert's position, however, it will be necessary to explore further than the court-room itself, and to look at events leading up to trial. Few cases actually go to trial, primarily due to lack of sufficient evidence or pre-trial guilty pleas,[11] however it should be noted that events, pre-trial, both condition the trial, and, more importantly, are conditioned by the nature of the trial: although the investigation of crime is outside the scope of this study, prosecutors must ensure that DNA evidence collected during the investigation was correctly managed; prosecutors must gather and construct the DNA evidence based on common law rulings on its presentation in court; complex rules dictate procedures whereby prosecution counsel must disclose details of their case, including DNA evidence, to the defence, who may offer rebuttals, and have certain disclosure rules of their own; rules concerning expert evidence allow courts to order pre-trial meetings of experts to discuss scientific evidence, and to clarify issues at dispute. On the basis of these judicial conditions, the trial has been described as simply the 'presentational surface' of the entire underlying criminal prosecution, it being described as a 'sociological truism'

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[9] National Research Council of the National Academies, *Strengthening Forensic Science in the United States: A Path Forward* (National Academies Press, 2009) (NRC Report) 7.

[10] Law Commission Report (n 6) para 2.9; Criminal Procedure Rules 2015, pt 19.2.

[11] Ministry of Justice, *Judicial and Court Statistics 2011, Criminal Court Statistics Quarterly, England and Wales, October to December 2014*.

that the evidence presented, and the verdict reached, is heavily dependent on myriad contingencies in the pre-trial process,[12] and both exist within the context of each other.[13] In any case, it may be convincingly argued that the trial is the judicial process 'written small' and the judicial process is the trial 'written large'. As stated by Duff, '[I]t is the theory of the criminal trial that ought to guide theoretical work on the rest of the criminal process.[14]

This study is defined by the adversarial nature of the criminal trial in the English court. Opposing prosecution and defence parties lead and cross-examine evidence to support their respective cases. The expert witness is in a special position in that they are required to provide unbiased testimony, in the service of the court, no matter which party has instructed them.[15] Most concerns surrounding scientific evidence are centred on claimed detrimental effects of the adversarial system itself. These detrimental effects may be summarised as being, first, claims of bias on the part of the expert witness, and, second, the result of various 'trial pathologies', that is, individual 'dysfunctions' in the presentation and examination of DNA evidence.[16]

It should be noted that many proposals for reform of these purported detrimental effects involve circumvention of adversarialism to some degree.[17] However, this current study does not set out to be a critique of adversarialism, but, instead, regards it as the context in which expert testimony must be understood in the English courts.

The considerations listed above suggest a number of lines of investigation within this study. Regarding bias: assuming, for a moment, that experts intend to remain unbiased, this study aims to shed some light on the degree to which the environment of the adversarial trial, and assumedly partisan opposing parties, impact upon that intention. Furthermore, and if, such an

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[12] Paul Roberts, 'Introduction', in Paul Roberts (ed), *Expert Evidence and Scientific Proof in Criminal Trials* (Ashgate, 2014) xiv.

[13] Antony Duff and others, 'Introduction: Towards a Normative Theory of the Criminal Trial' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 10.

[14] ibid 17.

[15] Law Commission Expert Evidence Report (n 6) para 2.9; Criminal Procedure Rules 2015, pt 19.2.

[16] Mike Redmayne, *Expert Evidence and Criminal Justice* (Oxford University Press 2001) 198-205; Oriola Sallavaci, *The Impact of Scientific Evidence on the Criminal Trial: The Case of DNA Evidence* (Routledge 2014) 33.

[17] Oriola Sallavaci, *The Impact of Scientific Evidence on the Criminal Trial: The Case of DNA Evidence* (Routledge, 2014) 33.

adverse effect is identified, then how expert witnesses attempt to balance their testimony, and how effective they perceive their actions to be. Not least is what experts understand by the term ‘unbiased’. It should not be forgotten, too, that the assumption that an expert’s testimony must be unbiased in order to effect a just outcome, has been challenged.[18] This study will attempt to draw some conclusions as to whether any adverse impacts of the adversarial system on the expert’s attempts to give unbiased testimony do indeed have an adverse impact on justice.

A second strand of investigation within this study concerns the various ‘trial pathologies’ referenced above. This term refers specifically to a model, defined by Nelken, which attempts to classify philosophies regarding the inter-relationship between law and science.[19] As an example, the trial pathology approach might suggest that a hypothetical problem, caused by the current presentation method for DNA evidence, could be resolved simply by altering that presentation method. The current study seeks to identify experts’ perceptions of pathologies that may distort their ability to testify as to DNA evidence, strategies that they use to attempt to overcome the challenges presented by such pathologies, and whether they believe these to be effective.

In his model, Nelken described alternative models to describe the inter-relationship between science and law. In addition to ‘trial pathology’, he also described the models of ‘competing institutions’ and ‘incompatible discourses’.[20] The ‘competing institutions’ model suggests legal and scientific systems to be equally powerful institutions in battle, each using their own methodologies to discredit the other. The ‘incompatible discourses’ approach describes science and law as parallel, but incompatible, knowledge and communication systems, in which law harnesses science to its needs within court, but only succeeds in generating ‘hybrid artefacts… with ambiguous epistemic status’, meanwhile outside of court must give way to a greater general credibility of the scientific method.[21]

These models suggest both a caveat on the lines of investigation described above, and an additional line of investigation. First, regarding a caveat:

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[18] Redmayne, Expert Evidence (n 16) 198-220.

[19] David Nelken, ‘A Just Measure of Science’ in Michael Freeman, Helen Reece (eds), *Science In Court* (Ashgate, 1998) 14-18.

[20] ibid.

[21] ibid 16.

simple analysis of findings, along the lines of the 'trial pathology' model, might temptingly suggest simple 'fixes' to any problems identified. The 'competing institutions' and 'incompatible discourses' philosophies might suggest, however, that such problems might be structural, and more deeply rooted.

The third line of investigation suggested by the above, is the question of how science and law interact in the adversarial trial, whether they are indeed 'competing' or 'incompatible' according to Nelken's models, and, if conflicts arise, how these are accommodated.

On the one hand it has been argued that the science-law relationship has failed,[22] that courts have 'privileged the wrong type of heuristics in their attempts to engage with scientific… knowledge',[23] and even that the forensic community should retrench to their own positions of strength.[24]

On the other hand, it has been suggested that forensic science has a special status on the basis that it is applied form of science subservient to the law, and cannot succeed unless it can adapt scientific knowledge to legal requirements.[25] Although, somewhat extremely, it has been suggested that 'most scientists view the legal system much as humans view reptiles, with about equal parts horrified fascination and profound disgust',[26] others have argued that the discourses of law and science are less incompatible than popularly supposed (or, at least, less simplistically distinguished).[27]

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[22] Edmond, Cool Crucible (n 2); Edmond and others, 'Admissibility Compared: The Reception of Incriminating Expert Evidence (i.e., Forensic Science) in Four Adversarial Jurisdictions' (2014) 3 University of Denver Criminal Law Review 31-109.

[23] Edmond G, 'Legal Versus Non-Legal Approaches to Forensic Science Evidence' (2016) 20.1 International Journal of Evidence and Proof 3, 3-5.

[24] Gary Edmond, Mehera San Roque, 'Actual Innocents? Legal Limitations and their Implications for Forensic Science and Medicine' (2011) 43 Issue 2-3 Australian Journal of Forensic Sciences 177.

[25] Paul Roberts, 'Paradigms of Forensic Science and Legal Process: a Critical Diagnosis' (2015) 370 Philosophical Transactions of the Royal Society B 1, 3 (Paradigms).

[26] Peter W. Huber, *Galileo's Revenge: Junk Science in the Courtroom* (Basic Books, 1993).

[27] Paul Roberts, 'Renegotiating Forensic Cultures: Between Law, Science and Criminal Justice' (2013) 44 Studies in History and Philosophy of Biological and Biomedical Sciences 47.

The landmark case of R v *Doheny,*[28] in which the so-called '*Doheny* direction' as to the way in which DNA evidence should be presented was prescribed, has been represented as a victory of common sense and sound legal principles over the statistical approach, that is to say law over science.[29] Indeed Evett described some commentary on *Doheny*[30] as 'having an air of triumphalism' on the part of the 'legal establishment'.[31] On the other hand, Redmayne commented that the zealous scientific view of the same case could have been described as 'Bayesianity' (a reference to the specific statistical approach unsuccessfully attempted by the defence).[32] Interestingly, it has been suggested that a central ground be steered, and that it would be a 'hasty and excessively pessimistic conclusion' by those of a Bayesian disposition to interpret *Doheny* as a 'victory for the dark forces of ignorance over the light of science', given the jury's responsibility of injecting common sense.[33]

It might be argued that, notwithstanding philosophical arguments regarding the similarity or otherwise of the fields of law and science, the actual players within these fields do not generally suffer any doubts as to the nature of their discipline: the viewpoint of the law is that DNA evidence is like any other expert evidence, and its admission as evidence and evaluation in court will be conducted according to common law precedent and statute, with the objective of reaching a just determination; the viewpoint of the forensic scientist is that what they report is 'fact', even if the fact that they report is qualified in terms of a probability and stated error rates (these are still 'factual'). Conflicts between these approaches are evident (for example, the question of what probability constitutes 'reasonable doubt').

Commentary such as that described above, does, at least, suggest competition between legal and scientific discourses.

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[28] *R v Doheny* [1997] Cr App R 369.

[29] For example, M Lynch and others, *Truth Machine: The Contentious History of DNA Fingerprinting* (The University of Chicago Press, 2008) ch 6: 'Science, Common Sense and DNA Evidence'.

[30] *Doheny* (n 28).

[31] IW Evett, 'DNA Profiling: a Discussion of Issues Relating to the Reporting of Very Small Match Probabilities' (2000) Criminal Law Review 341, 354-355.

[32] Redmayne, Expert Evidence (n 16) ch 4.

[33] Roberto Puch-Solis and others, 'Assessing the Probative Value of DNA Evidence: Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses' (Royal Statistical Society, 2012) para 7.17 (RSS Report 2).

DNA evidence has been heralded as a new paradigm. In addition to the strands of investigation detailed above, this study also aims to draw some conclusions as to whether DNA evidence does indeed provide a special case.

This study aims to shed some light upon how forensic experts see the relationship between their forensic evidence and the strictures of the trial process. It aims to draw conclusions as to whether any trial pathologies, as discussed above, might be more plausibly understood as caused by fundamental incompatibilities between law and science in the court room. It aims to understand the degree to which forensic scientists 'are willing to adapt scientific knowledge to legal requirements'.[34] Not least, it also aims to determine whether DNA profiling does indeed form a special case.

Although the aims of this study are modest, in that they seek to open a new perspective on the debate regarding scientific evidence in court, the consequences of unresolved challenges may be serious: erroneous DNA evidence has been implicated in miscarriage of justice, and has the potential to cause further miscarriage of justice in the future.

1.2 Study Context

Two major contexts define this study. The first is the fact of the adversarial trial system exercised in the criminal courts of England, and the second is the focus on DNA profiling evidence. These will be briefly outlined here, and the relevance to this study detailed.

Damaska defines the pure adversarial trial as proceedings structured as a dispute between two sides in a position of theoretical equality before a court which must decide the outcome of the contest; the parties themselves should establish that a contest exists, and its boundaries; evidence is exclusive to the party adducing it; the adjudicator's role is to ensure that the parties abide by the established rules, and would intervene only if one party objected to conduct by the other party; only the parties themselves are interested in the outcome of the trial.[35]

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[34] Roberts, Paradigms (n 25).

[35] MR Damaska, 'Evidentiary barriers to conviction and two models of criminal procedure: A comparative study' (1973) 121 University of Pennsylvania Law Review 506.

In contrast to the adversarial system, most of continental Europe has historically adopted an 'inquisitorial' approach to trial,[36] in which (for example, in France) a 'juge d'instruction', is appointed, whose responsibility is to carry out an investigation of the case, to include both prosecution and defence cases, and culminating in a trial, also seen as part of the investigation. They are therefore expected to arrive at a determination by their own efforts, rather than by the arguments of opposing parties.[37] This is in contrast to the adversarial system in which it is argued that the truth is more effectively discovered by having two prejudiced researchers starting from opposite points of view, and so less likely to miss anything than the impartial researcher starting from some point between.[38] In its purest sense the inquisitorial trial itself is a final examination of documentary evidence (seen as being more reliable than oral evidence), and not a confrontation between the accused and the prosecution.

It has been noted that, although adversarial and inquisitorial systems remain distinct, 'the borrowings between the two have been so extensive that it is no longer possible to classify any of the criminal justice systems in Western Europe as wholly adversarial or wholly inquisitorial'.[39] The English adversarial system differs from Damaska's paradigm in many ways, not least in that an outside party, in the form of the state, has a key interest in the trial, however, it has been suggested that the modern English criminal trial system represents the most adversarial of trial systems.[40]

In the English trial, witnesses are called by prosecution and defence counsel to answer questions, and are subsequently cross-examined by opposing parties. It is the role of the judge to rule on questions of law, and a jury to draw inferences from the evidence placed before the court. The principle of oral testimony, regarding events directly experienced by witnesses, is central to the English criminal trial, being described as having 'taken deep root in

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[36] R Auld, *Review of the Criminal Courts of England and Wales: Report*. (Stationery Office, 2001) ch 11 para 1.

[37] Kate Malleson and Richard Moules, *The Legal System* (4th edn, Oxford University Press, 2010) paras 1.29 – 1.30.

[38] P Devlin, The Judge (Oxford University Press, 1979) 61.

[39] R Auld, *Review of the Criminal Courts of England and Wales: Report*. (Stationery Office, 2001) ch 11 para 3.

[40] J McEwan, *Evidence and the Adversarial Process: The Modern Law* (2nd Edition Hart Publishing, 1998) 2.

the common law psyche',[41] partly being a natural product of the process of live examination and cross-examination,[42] but also underlying a belief in the greater reliability of oral evidence from witnesses of fact.[43] The laws of evidence render inadmissible 'hearsay' evidence (that is, testimony regarding facts not directly observed by the witness),[44] and, generally, opinion evidence.[45] However, although opinion evidence offered by ordinary witnesses is inadmissible, experts may assist the court in drawing inferences by offering their opinion.[46]

Criticisms of expert evidence in the English courts are commonly described as having their origins in detrimental effects of the adversarial trial system.[47] It will be appreciated, therefore, that the adversarial process forms a defining context for the role and perceptions of the expert witnesses in this study. Criminal Procedure Rules state that the court may order the appointment of a single joint expert at court,[48] however, whether this happens in practice or not, prior to the trial, experts are instructed by prosecution or defence parties, and are associated exclusively with that party. It will be recalled that, despite this, experts, by law, must remain unbiased, this duty over-riding any obligation to party by whom they are paid.[49] As stated above, a main line of investigation within this study is the nature of adversarial pressures that experts perceive to impact upon them, however it should also be emphasised that the very nature of the adversarial environment conditions all the findings within the study, from which it is inseparable.

It is important to briefly address the question of how the courts treat expert evidence. It may not be surprising that, given the concerns regarding expert evidence mentioned at the outset, there has been significant legislative consideration regarding its admissibility and use. Proposed primary legislation codifying the admission of expert evidence, drafted as part of the Law Commission's Report on Expert Evidence in Criminal Proceedings in

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[41] Paul Roberts & Adrian Zuckerman, Criminal Evidence, (2nd edn, Oxford University Press, Oxford 2010) 291.
[42] J McEwan (n 40) 2-3.
[43] Roberts and Zuckerman (n 41) 294-295.
[44] McEwan (n 40) 228-233.
[45] RE Emson, *Evidence* (4th edn, Palgrave Macmillan, 2008) 301.
[46] HC Forensic Science Report (n 3) para 146.
[47] Redmayne (n 16) 198-205; Sallavaci (n 17) 33.
[48] Criminal Procedure Rules 2015, pts 19.7 - 19.8.
[49] Criminal Procedure Rules 2015, pt 19.2.

2011,[50] was rejected by the Government, however, amendments to part 19 of the Criminal Procedure Rules[51] effectively incorporated some of its main provisions.[52] (It should be noted that during the empirical part of the current study, the part of the Criminal Procedure Rules dealing with expert evidence was part 33. As part of the redrafting of the 2015 Criminal Procedure rules, renumbering resulted in this part becoming part 19. Unless the distinction is significant, all references in the current study use the numbering in the 2015 Criminal Procedure Rules). It has been suggested that 'judicial tendency might be converging with the Law Commission's preferred approach', even in the absence of legislation.[53] However, even given part 19's claimed 'codification' of that approach into secondary legislation, it has been suggested that trial judges may not be willing to become "gatekeepers" for expert evidence, and (the judges):

> … confronted say with complex scientific evidence contested by experts on both sides, will prefer to take the traditional path of leaving the jury to decide between them.[54]

In summary, the common law approach to admissibility of expert evidence remains, arguably, in its pre- Law Commission Report state, one of laissez-faire.[55] This is a significant, but, arguably, simplifying, contextual aspect of this study: stated perhaps over-simplistically, parties are free to adduce DNA evidence to their own advantage unfettered by exceptional legislative hurdle.

The other key defining context of this study is the use of DNA profiling evidence. DNA evidence has a special significance when compared to older forensic techniques, such as fibre, ear print and shoe mark analysis, and has been described as the 'gold standard' of scientific evidence.[56] For, unlike older techniques, DNA profiling is soundly rooted in rigorous scientific

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[50] Law Commission Expert Evidence Report (n 6) Appendix A: Draft Criminal Evidence (Experts) Bill.

[51] Criminal Procedure Rules 2015, pt 19.

[52] Ian Dennis, 'Tightening the law on expert evidence' (2015) Criminal Law Review 1,1-2.

[53] T. Ward, "Expert Evidence and the Law Commission: Implementation Without Legislation" [2013] Criminal Law Review 561.

[54] Dennis (n 52) 1-2.

[55] Law Commission Expert Evidence Report (n 6) para 1.8.

[56] M Lynch, 'God's Signature: DNA Profiling, the New Gold Standard in Forensic Science' (2003) 27 Endeavour 93.

discipline.[57] It is undisputed, scientifically, that a complete DNA profile (that is, an entire individual's genome) is unique to an individual (except for identical twins), and that, even though only a selection of DNA 'markers' are forensically analysed, this still enables individual identification at a very high resolution (with statistically accepted 'match probabilities' of many billions to one).[58] Even the established standard of fingerprinting has never been scientifically shown to provide individual identification, even on a probabilistic basis.[59] On this basis, DNA profiling has been described as a 'new paradigm' in forensic science.[60]

DNA evidence provides a sharp tool for examining the role of expert evidence in the judicial process because, on the one hand, it is the only forensic identification technique to epitomise *scientific* proof within the court,[61] but, on the other, it does not epitomise *legal* proof.[62] It is therefore potentially possible in this study to separate the admission and evaluation of scientific evidence in the court, from considerations regarding the reliability of the underlying science itself.

DNA does not offer legal proof for the simple reason that, like all evidence it, must be examined within the context of the case, and, for this reason, there are many ways in which DNA evidence may be (and is) challenged.

Not least of the challenges is that, because of the rigorous scientific basis for DNA evidence, it is explicitly probabilistic. Some of the legal challenges caused by this probabilistic nature will be outlined below, however, at the outset, it should be noted that earlier identification techniques (including fingerprinting) were significantly different in that they purported individualisation. DNA profiling, perhaps paradoxically, cannot do that.

As mentioned above, despite its solid basis, DNA evidence in the criminal trial has been the cause of much controversy and research, forensic, legal,

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[57] Mike Redmayne, 'Appeals to Reason' (2002) Vol 65 No. 1 The Modern Law Review 19, 24.

[58] RSS Report 2 (n 33) para 1.2.

[59] Simon A Cole, Suspect Identities: A History of Fingerprinting and Criminal Identification, (Harvard University Press, Cambridge Massachusetts 2001) 259-286.

[60] MJ Saks and JJ Koehler, 'The Coming Paradigm Shift in Forensic Identification Science (2005) 309 Science 892.

[61] RSS Report 2 (n 33) para 1.1.

[62] RSS Report 2 (n 33) para 1.4.

scientific, philosophical and empirical.[63] Forensic, for example, regarding the way in which potential errors in collection and analysis are controlled and allowed for; legal, for example, regarding common law requirements as to how DNA evidence should be presented, and the extent to which the expert witness may offer an opinion as to the meaning of the evidence; scientific, for example, regarding the way in which DNA evidence should be accurately presented; philosophical, for example, regarding what level of probability corresponds with guilt beyond reasonable doubt; empirical, for example, regarding whether the judge, prosecution and defence counsel, and jury do indeed understand statistical evidence 'correctly', particularly where other, non-statistical (even contradictory) evidence must be weighed alongside it. Note, however, that the basic science underlying DNA individualisation is not challenged.

Regarding the general understanding of DNA evidence: studies have consistently shown that people make systematic (indeed, predictable) logical and mathematical errors when evaluating quantitative data, as well as errors based on their subjective expectancy.[64] Not least of the problems that have faced the court are the very low 'random match probabilities' (currently 1 in a billion as standard) quoted for DNA matches. This has led to major challenges in the form of fallacious reasoning – a match probability of 1 in 3 million does not indicate that the chances of innocence are 1 in 3 million – the so-called 'prosecutor's fallacy'.[65]

Despite the fact that this erroneous thinking was the cause of a number of successful appeals in the early days of DNA, such as *R v Deen*[66] and *R v Doheny*[67] (in which both judge and expert made such an error), the transposed conditional may appear in many subtle forms, and has continued to be identified in recent cases.[68] In any case, despite the fact that the judge,

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[63] R McNally, M Lynch, 'Science, "Common Sense" and DNA Evidence: a Legal Controversy about the Public Understanding of Science' (2003) 12.1 Public Understanding of Science 83.

[64] For example, J Schklar, 'Juror reactions to DNA evidence: Errors and expectancies' (1999) 23 Law and Human Behavior 159.

[65] A Semikhodskii, *Dealing with DNA Evidence: a Legal Guide* (Routledge Cavendish, 2007) 112.

[66] *R v Deen* (1994) The Times, 10 January.

[67] *Doheny* (n 28)

[68] Charles EH Berger and others, 'Evidence Evaluation: A Response to the Court of Appeal Judgment in R v T' (June 2011) 51 Issue 2 Science & Justice para 4.3.

counsel, and indeed forensic expert are cognisant of this fallacy, and, presumably, ensure that it is not explicitly stated within court, arguably, there seems little reason not to believe that a jury may still apply this erroneous thinking implicitly.[69]

The House of Commons Science and Technology Committee 2005 Report, Forensic Science on Trial (hereafter 'Forensic Science on Trial Report'), highlighted the continuing lack of knowledge and training on both the part of lawyers and judges.[70] In practice, judge, expert witness, defence and prosecution counsel have all been shown to make errors, variously scientific, logical and legal. For example, in *R v Hoey*,[71] criticisms were made variously of the defence,[72] and prosecution (in the case itself). In *R v Deen*, both judge and expert were criticised for erroneous reasoning in the form of the 'prosecutor's fallacy'.[73] .

As described in the next chapter, many studies have been done on the way in which judges, jurors, counsel, and indeed experts, understand and process probabilistic evidence. Erroneous modes of thinking (distinct from logical errors such as the 'prosecutor's fallacy') are known as cognitive biases and may be complex and far reaching. A particularly important source of irrational thinking has been identified as 'confirmation bias', a well-documented fallacious mode of thinking in which there is a tendency to seek evidence supporting the investigator's initial pre-conception.[74] In a report by the UK Forensic Regulator into the wrongful arrest, charge with rape, and detention of Adam Scott, it was determined that a forensic test result pointing away from Scott's guilt was ignored as being an error.[75] In the Australian case of Jama,[76] Farah Jama was convicted on a charge of rape. This was despite the fact that Mr Jama had not visited the city in which the crime took place, and had alibi witnesses to say that he was elsewhere. He

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[69] Redmayne, Expert Evidence (n 16) 58.

[70] HC Forensic Science Report (n 3) para 178-182.

[71] *R v Hoey* [2007] NICC 49 (20 December 2007).

[72] B Costello, M Fenhalls, 'Working with DNA evidence', The Law Gazette, 4 September 2008.

[73] *Deen* (n 66).

[74] Peter Gill, *Misleading DNA Evidence: Reasons for Miscarriages of Justice* (Elsevier, 2014) 10.

[75] ibid 21-26.

[76] Frank HR Vincent, 'Report: Inquiry into the Circumstances that led to the Conviction of Mr Farah Abdulkadir Jama' (Victorian Government Printer, 2010).

did not appear on CCTV at the crime scene location (a nightclub), nor were his fingerprints found anywhere there. All this evidence was discounted in the jury's mind in favour of positive DNA evidence, which, in fact, had been caused by laboratory contamination. Professor Gill characterised this case as one in which:

> 'The errors were compounded by scientists, police investigators, lawyers, and the judge to such an extent that there was manifest failure at all levels of the criminal justice system.'[77]

'Trial pathologies' affect evidence of all types, however by concentrating on DNA evidence, the current study aims to shed light on those pathologies specifically caused by the *admission and use* of scientific evidence, as opposed to the *reliability* of the science upon which that evidence is based. As noted above, truly scientific evidence is necessarily complex. This study aims to draw some conclusions as to the challenges courts may face as this type of evidence becomes inevitably more complex.

Recent cases have thrown up fresh areas of controversy, notably expert testimony as to advanced DNA techniques, in which probabilistic evidence can no longer be reliably produced, and expert evidence comes back to, arguably, subjective opinion. Professor Gill has raised concerns regarding recent cases such as *R v Weller*,[78] in which the court apparently approved expert subjective opinion regarding DNA evidence, unsupported by scientific assessment,[79] and *R v Dlugosz*,[80] in which the subjective opinions of the expert were ruled even to take precedence over scientific method.[81]

These developments are significant, as they would imply that even the most rigorous scientific method has boundaries, beyond which reversion to potentially fallible subjective belief must occur. This would appear to be a retrograde step in the development of any 'gold-standard' forensic test, such as DNA profiling. The view of those closest to this potential legal development, that is, the forensic experts, will be addressed in this study.

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[77] Gill (n 74) 29.
[78] *R v Weller* [2010] EWCA Crim 1085.
[79] Gill (n 74) 59.
[80] *Dlugosz* (n 8).
[81] Gill (n 74) 124.

1.3 Importance of the Study

Although the aims of this study are modest, the objective is to contribute in a small way to a much more important issue. At a procedural level, the issue is the admissibility of expert evidence in court; at a practical level, the issue is the way in which DNA evidence is presented and examined in court; but, at a much more important level, erroneous scientific evidence has been a contributing factor to, indeed, on occasion, a cause of, miscarriage of justice.

This study does not address miscarriage of justice directly, however, it is pertinent to consider the bigger picture to which this study aspires to contribute in a small way.

In the 1970s, there were a series of high profile miscarriages of justice, including those known popularly as the Birmingham six,[82] the Maguire seven,[83] the Guildford four,[84] as well as the case of Judith Ward.[85] The Runciman Royal Commission on Criminal Justice, set up in up in March 1991 to investigate the causes of a number of these, and other, miscarriages,[86] identified many factors contributing towards miscarriage of justice in these high profile cases, however, they had at their heart undisclosed, flawed or misrepresented forensic evidence.[87] Specifically, convictions were based on erroneous expert opinion, presented by 'impressive' scientists, whilst at the same time doubts by defence experts were discounted.[88]

In a number of more recent cases, the expert evidence itself was directly the cause of miscarriage of justice. The Law Commission Report into expert evidence of 2011, took, as its start point, four cases in which the jury apparently relied on expert testimony which later turned out to be erroneous.[89] The report opined that these cases may be the tip of a larger

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[82] *R v McIlkenny* (1991) 93 Cr App R 287.

[83] *R v Maguire* (1992) 94 Cr App R 133.

[84] *R v Hill* (1989) The Times, 20 October.

[85] *R v Ward* (1993) 96 Cr App R1.

[86] HMSO, *Report of the Royal Commission on Criminal Justice* (Cm. 2263, 1993) (Runciman Report).

[87] Carole McCartney, *Forensic Identification and Criminal Justice: Forensic Science, Justice and Risk* (Willan Publishing, 2006), xix.

[88] Gill (n 74) 58.

[89] Law Commission Expert Evidence Report (n 6) paras 2.12 – 2.23.

iceberg,[90] and concluded that expert evidence of doubtful reliability is too readily placed before the jury, is too often trusted and deferred to by the jury, and is not effectively challenged at cross-examination.[91] The Criminal Bar Association, quoted within the report, went further, stating:

> '…that the current treatment of expert evidence in criminal proceedings has contributed to a significant number of miscarriages of justice, risks continuing to do so, and requires urgent reform.'[92]

The Forensic Science on Trial Report suggested that flaws in expert evidence were unlikely to have led in isolation to miscarriage of justice, as the legal system was such that serious cases would eventually come to light. However, it added that there was no way of knowing just how many cases overall had been adversely affected, especially given that more minor cases were unlikely to have come to appeal. It also drew attention to the human cost and damage that must be associated with this.[93]

1.4 What we do not know and Originality

In its introductory comments, the Forensic Science on Trial Report stated that flaws in expert evidence were unlikely to have led in isolation to miscarriage of justice, but where there had been problems with expert evidence, this reflected a systems failure, rather than a failure on the sole part of the expert. If it is accepted, for the moment, that systems failure is responsible for the admission and reliance on erroneous expert evidence, then what is not known in certain terms is the nature of that systems failure.

As identified in the Forensic Science on Trial Report, and indeed, the Runciman Report,[94] many different aspects of the judicial process converge to form, what in some cases may be, erroneous conclusions based on erroneous understanding or use of scientific evidence. What is true to say, however, is that, whatever the flow of that information, it finds a focus with and converges upon, the expert witness. This study takes as an assumption

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[90] ibid para 2.26.
[91] ibid paras 1.16-1.21.
[92] ibid para 1.18.
[93] HC Forensic Science Report (n 3) para 176.
[94] Runciman Report (n 86).

that the forensic experts witnesses themselves are an important source of data in addressing this question.

It is possible to conceptualise the nature of the 'systems failure', however, examination of each of the sub-systems of the trial process offers a practical and structured line of investigation.[95] Any dysfunctions identified would equate to Nelken's concept of 'trial pathologies'.[96] On this basis it is possible to be specific about what is not known, or at least, what is not known from the point of view of forensic expert perception and opinion. It is not known how experts for both the prosecution and defence, respectively, become involved in the case; the experts' experience of the interaction between prosecution and defence pre-trial; the experts' observations regarding the use of DNA evidence by opposing counsel; the experts' experience in the court-room, including experiences and observations whilst being examined and cross-examined. It is not known, where experts identify particular challenges in their involvement, whether, and how, experts attempt to compensate, and the degree to which they perceive these behaviours to be successful. Additionally, the adversarial nature of the proceedings, and its influence on avowedly unbiased testimony, forms an unknown factor which may influence all the elements listed above.

At a more conceptual level, much has been written about whether, and how, law and science engage, or whether they are indeed competing or incompatible discourses. What can be said is that we simply do not entirely know. This study, in a small way, hopes to add valuable knowledge to that debate.

As detailed in the literature review in the next chapter, little research has been done into the forensic expert's perspective of the criminal trial process, from either the legal or scientific perspective. To a large degree, then, this study is original, and has the ambition of providing a valuable, if modest, contribution to debate within the area.

1.5 Methodology

It is generally accepted that there is inherent subjectivity within qualitative research, and no observer may assume that they can remain objective.[97]

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[95] HC Forensic Science Report (n 3) para 170.

[96] Nelken (n 19) 14-18.

[97] Carol McNaughton Nicholls, Lisa Mills and Mehul Kotecha, 'Observation' in Jane Ritchie and others (eds), *Qualitative Research Practice: A Guide for*

Some commentators see this as a potential weakness, however, it has been argued that the very presence of, and interaction with, the researcher, is where much of the richness of the data generated lies.[98] Approaches to assuring the validity of qualitative research include, on the one hand, attempting to build controls into the study, and, on the other, to explicitly address the viewpoint and perspective of the researcher, and so to understand the study within that context. Before outlining this study's methodology, therefore, this study's perspective and position will be considered.

Briefly, this study is motivated by a curiosity as to the relationship between law and science. Specifically, the study may be characterised as putting a magnifying glass to a single instance in which law meets science, that is, the forensic scientist presenting probabilistic DNA evidence in a criminal court. The aims of the study, in understanding the experience and perceptions of the unbiased forensic expert testifying in an adversarial court, may be understood in two competing languages, those of law and science, and it is hoped that some small contribution may be made to the debate as to whether science and law find an accommodation, or whether they are indeed 'competing' or 'incompatible' discourses.

It is worth expanding, albeit briefly, upon the radically differing epistemological bases of science and law. Science seeks to describe and predict the natural world, 'discovering' data, the significance of which is determined by researchers, which are then identified, described and analysed. Law, as a discipline, on the other hand, collects events, judgments, statutes, and administrative enactments which have been created by judges, legislators and so forth, and whose significance is determined by its originators.[99] Science progresses, building on previous knowledge, having at its heart a notion of a universal causality. In contrast, although law may develop to reflect the nature of the society to which it pertains, it cannot be said to develop, in a cumulative sense, in terms of a closer understanding of a legal 'universal causality',[100] (although legal

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Social Sciences Students and Researchers (2nd edn, Sage Publications Ltd, 2014) 245-246.

[98] ibid 246.

[99] Edward Rubin, 'Law and the Methodology of Law' (1997) Winsconsin Law Journal 521, 524-528.

[100] ibid.

'naturalists' have sought to claim (or at least 'adopted a metaphor') that the law exists as a natural phenomenon to be discovered).[101]

Pertinent to this study are the different perspectives on evidence exhibited within legal and scientific epistemologies. Consider the following exchange, regarding the reliability of evidence. This was in a US case, during the so-called 'DNA wars' of the early 1990s.[102]

> Expert: … when a paper is published… labs don't normally go out and repeat that work just to show that it is correct… One assumes that the scientists publishing their work have been accurate and honest.
>
> Judge: So there isn't any objective testing of what a person says he's done, it's only based on what he says occurred (?)….
>
> Expert: Yes, that's correct.[103]

Later, when the judge asked how the expert could be certain of the data relied upon, the expert replied that he felt that he could trust the company publishing the results because they employed 'reputable scientists'.

Perhaps scientists do have problems with the legal concept of evidence, however, more important from a judicial point of view is the problem that the law may have in addressing scientific evidence. In this regard it is faced with the fact that science is not just another type of evidence, but an internally rational and powerful epistemology of its own.

The law's objectives are pragmatic, in that they seek to impose an order on the social complexities of the real world, and to determine a certain verdict, within a limited timeframe, at a reasonable cost, in a way that the court can manage, and, at the same time, to demonstrate due process.[104] Its

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[101] Michael Freeman, 'Law and Science: Science and Law' in Michael Freeman, Helen Reece (eds), *Science In Court* (Ashgate, 1998) 2.

[102] M Lynch and others, *Truth Machine: The Contentious History of DNA Fingerprinting* (The University of Chicago Press, 2008) 23.

[103] Frye hearing, 205-207, *New York v Wesley* 140 Misc. 2d 306 (1988), quoted in Jay D. Aronson, *Genetic Witness: Science, Law, and Controversy in the making of DNA Profiling* (Rutgers University Press, 2007) 50-51.

[104] Christine Willmore, 'Codes of Practice: Communicating between Science and Law' in Michael Freeman, Helen Reece (eds), *Science In Court* (Ashgate, 1998) 38-42.

objectives are not intended as an ‘exhaustive search for cosmic understanding, but the particularised realities of legal disputes’.[105]

The rules of evidence and procedure are an apparently rational response to the judicial system’s objective of legal fact finding given these constraints.[106] Whereas ‘substantial truth’ (that is, what actually happened, were that possible to determine) may be reached more readily under a ‘principle of free proof’, in which any logically relevant evidence may be admitted, exclusionary rules of evidence act to countermand certain types of evidence on a policy basis.[107] The rules are complex, however, by these means, they attempt to achieve judicial integrity.

From a practical point of view, admissibility of legal evidence, in the adversarial system, is in fundamental conflict with the way in which evidence in the scientific world would be ‘admitted’. The law excludes evidence which may be perfectly scientifically valid, for example, evidence is excluded where it is judged excessively prejudicial; evidence is not adduced as a whole, but selected by individual parties, who may choose for tactical reasons to emphasise or understate significance, further controlled by the parties’ approach in cross-examination; procedural rules aimed at fairness control disclosure and timing of evidence introduction; lay juries make the final decision, with an explicit requirement not to justify or explain this and, further, unexpected and illogical decisions are accepted; the burden of proof is placed on one party, with a particular standard to be achieved. The outcome of the trial is the legal ‘truth’, of which the court is certain, and the fate of the defendant depends. On the one hand, a scientific truth may differ from this: given enough time, complete evidence and a completely rational analysis process, arguably the ‘real’ truth may be uncovered; however, on the other, it is widely accepted that substantial truth cannot be found, but only re-constructed by subjective judgment and interpretation of evidence.[108]

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[105] *Daubert v Merrell Dow Pharmaceuticals, Inc.* 509 US 579 (1993) 2798, at III.

[106] John D Jackson, 'Managing Uncertainty and Finality: The Function of the Criminal Trial in Legal Inquiry' in Antony Duff and others (eds*), The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 140.

[107] Roberts and Zuckerman (n 41) 179-191.

[108] Heike Jung, 'Nothing But The Truth? Some Facts, Impressions and Confessions about Truth in Criminal Procedure' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 148.

A curiosity was mentioned above, as to whether science and law find an accommodation, or whether they are indeed 'competing' or 'incompatible' discourses. It must be observed, however, that, as far as is possible, this study is about the practical application of DNA evidence in the judicial process. In this regard law and science are not 'equals', for the simple reason that within the trial, the law is in charge: it dictates the process, uses scientific evidence as it sees fit, and decides the ultimate issue on its own terms. Perhaps the question to be addressed, then, is not exactly 'how do law and science work together', but rather 'how does law use science'.

It is important, too, to state this study's 'position'. From the foregoing, it might be assumed that science is somehow 'right', sacrificed in some way to meet the exigencies of the judicial process. However, experience has shown that not only are 'simple' errors possible in science (for example contamination error), but, more fundamentally, commentators have pointed out that many developments of science can be shown to be constructed,[109] or, more radically, even erroneous.[110] Rather, the perhaps 'neutral', position taken by this study is that both the law and science are different, but equally powerful, epistemologies, each with internal rationality.

Moving on to the methodology itself. The methodology applied in this study involved generating data by interviewing experienced and qualified expert witnesses. It has been observed that if one wants to find out something about people's activities, then the best way is to ask them.[111] This study used semi-structured interviews, designed to generate data regarding the research questions of interest. Not only was this practical and effective, but, as detailed in Chapter Three, was designed against a rigorous theoretical stance. The method was not chosen for originality, but rather its sound basis.

The data source chosen, that is, appropriate experts, does display significant originality however, experts appearing to be a largely untapped source of data. Not only is there little literature addressing the expert's point of view, but there has been little academic activity on the part of forensic experts regarding legal aspects of DNA evidence (as opposed to technical aspects).

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[109] Redmayne, Expert Evidence (n 16) 5-17.

[110] JP Ioannidis, 'Why most published research findings are false' (2005) 2(8) PLoS Med e124.

[111] Michael Brenner, Jennifer Brown, and David Canter, 'Introduction' in Michael Brenner, Jennifer Brown, David Canter (eds), *The Research Interview: Uses and Approaches* (Academic Press,1985) 2-3.

For example, in a survey by Walsh of over 6000 articles in international forensic journals between 1990 and 2003, only 0.9 percent of articles looked at legal issues, and only 0.4 percent considered legal aspects of DNA evidence.[112] This is in great contrast to the considerable debate around evidential aspects of DNA evidence seen in legal and criminological journals.

Walsh suggested ideological reasons why the forensic expert might actively disassociate themselves from legal aspects of scientific evidence, suggesting that these are best left to legal and sociological experts. It is possible that things have changed since the publication of Walsh's study, however Walsh's figures certainly indicate that the scientific community has shown little interest in the judicial aspects of DNA evidence (aside from, as detailed in the literature review section, a small pool of academic scientific commentators). Perhaps, simplistically, this is to say that the forensic community expects the legal system to engage with the science, but it is not clear that this has happened. In any case, there is little doubt that the expert community provides a source of rich data, both facts and opinion, relevant to the questions of interest to this study. It was stated, above, that, where there are systems failures in the presentation and examination of DNA evidence, then these focus on, and 'converge' upon, the expert witness. This data source has apparently been overlooked to date in this respect. It is worth underlining: not only do experts apparently not publish regarding their observations and opinions on the presentation of DNA expert evidence, but neither have they been asked to share their views to any great extent.

1.6 Study Outline

Chapter Two contains a review of existing literature. Previous studies of expert witnesses testifying as to DNA evidence are limited. However, of importance as a comparator to the current study, are studies of forensic expert witnesses, and other expert witnesses in general. Brief review is also made of the general experience of other witnesses in court. The chapter reviews commentary regarding the examination of expert evidence, and the presumed 'adversarial safeguard' of cross-examination, and also describes literature concerning special considerations applying to DNA evidence in this regard. The chapter moves on to describe commentary concerning

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[112] Simon J Walsh, 'Legal Perceptions of Forensic DNA Profiling: Part I: A Review of the Legal Literature' (2005) 155 Issue 1 Forensic Science International 51-60.

competence of the judicial players, including judge, jury, counsel, and the position of the expert witness, and describes concerns regarding the potential for cognitive bias. The chapter reviews comment regarding the ‘equality of arms’ between prosecution and defence in the court room, and concludes by reviewing literature concerning the ‘engagement’ of the forensic community with the judicial system.

Chapter Three reviews a number of contextual topics forming the basis for the study. It describes the objectives and nature of the adversarial trial, and explains how the opposing parties of prosecution and defence construct their cases based on evidence. The chapter will explain the rules regarding evidence, its admissibility and disclosure rules. It will go on to explain the specific rules relating to expert evidence, and current relevant controversies surrounding its admissibility. The chapter explains DNA profiling, both from a scientific point of view, and from the point of view of its statistical presentation. Relevant to this are a number of fallacious modes of reasoning, highly relevant to the presentation of DNA evidence at trial. Common law and statutory provisions regarding DNA evidence are outlined, including recent cases which have, arguably, threatened DNA evidence’s status as a new paradigm in forensic identification.

Chapter Four contains a detailed explanation of the methodology employed within the study. Specifically, it explains how the methodology was developed in order to address the questions informing the study, and to ensure that the study was rooted in a sound ontological and epistemological stance. The development of the detailed method (semi-structured interview) is described, including the design of the interview schedule, the interview process, data analysis, and assurance of methodological quality. The chapter also describes how ethical considerations regarding the study were addressed.

Chapter Five addresses the first of the key questions addressed by this study, that is, the potential conflicts arising from the expert’s requirement of remaining unbiased in an adversarial environment. It examines the different ways in which prosecution and defence experts enter the process, and their perceptions of the different pressures acting upon them. The chapter describes the ways in which experts responded to such pressures, in order to satisfy their duty to remain unbiased, and last, but not least, examines the meaning that interviewees placed on the meaning of ‘unbiased’.

Chapter Six addresses the experience of the expert in the trial process itself, looking at events in the run up to the trial, and in the trial itself. The chapter

describes both prosecution and defence experts' perception of their roles and responsibilities through the process. It goes on to describe interviewees' perceptions of the challenges that they faced in their assumed objective of presenting DNA in an effective way so as to ensure that it is correctly examined. It reports interviewees' descriptions of strategies that they applied in order to counter any such challenges, and the degree to which they felt that these strategies were effective.

Chapter Seven addresses a number of issues linked by the common fact that each concerns the interface of science with the law in court. The chapter describes interviewees' reports of the way that DNA evidence is presented in court, and their opinions regarding controversies regarding common law precedents. These precedents include the so-called 'Doheny direction', widely regarded as flawed since its inception,[113] and more recent cases in which subjective opinion regarding DNA has been admitted.[114] The chapter moves on to examine interviewees' perceptions of recent challenges within the courtroom concerning the precedence of forensic experience and the scientific method. Significantly, the chapter concludes by reporting the overall 'engagement' of the forensic scientist with the legal system, from the viewpoint of the interviewees.

Chapter Eight describes findings and conclusions regarding each of the study's objectives and lines of investigation, and aims to draw conclusions as to the impact of the findings.

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[113] For example, Evett, Small Match Probabilities (n 31); Redmayne (n 16) 71-74; Semikhodskii, (n 65) 135.

[114] For example, *Dlugosz* (n 8).

Chapter 2
Literature Review

2.1 Introduction

This study concerns the perceptions of the forensic expert testifying as to DNA evidence in the adversarial court. The adversarial system has been described as the 'main cause of problems for the reception and use of scientific evidence'.[1] The key lines of investigation include potential pressures for bias on the expert in the adversarial system, trial 'pathologies', in terms of individual challenges in the way in which DNA evidence is presented by the expert and examined, and the question of whether, taken as a whole, law and science are able to communicate effectively, or whether they remain, to any degree, incompatible, or competing discourses. This study aims to contribute to knowledge by investigating the perception of the forensic expert throughout this process. To that degree, the literature informing this study specifically concerns the experiences and perceptions of the forensic expert navigating the adversarial system pre-trial, the perception and experience of the expert navigating the presentation of DNA evidence in the adversarial court, and the overall perception and experience of the forensic expert in addressing scientific testimony to a legal world. This conflict has been characterised, from the expert witness perspective as being between the scientific world of collaboration and the legal world of adversarialism,[2] and, at a practical judicial level, a conflict between science, the law, and common sense.[3]

No previous study has been identified which involves in depth interviews with forensic experts in order to generate data regarding their experiences and perceptions in testifying as to DNA evidence. Perhaps surprisingly, the views of forensic scientists on testifying as to DNA evidence, or, indeed, scientific evidence in general, have not been widely sought. Rather

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[1] Oriola Sallavaci, *The Impact of Scientific Evidence on the Criminal Trial: The Case of DNA Evidence* (Routledge, 2014) 33.

[2] Paul Roberts and Chris Willmore, *The Role of Forensic Science Evidence in Criminal Proceedings* (Runciman Report CM2263, Research Study No. 11, Royal Commission on Criminal Justice 1993) 141 (Roberts Study).

[3] M Lynch and others, *Truth Machine: The Contentious History of DNA Fingerprinting* (The University of Chicago Press, 2008) 190; Sallavaci (n 1) 111.

interestingly, consulting the experts themselves has not even been widely considered: as an example, Coen and Heffernan, in an article discussing juror comprehension of expert evidence, when considering research on juries and expert testimony, bemoan the lack of reference to empirical jury research in the Law Commission Report on Expert Evidence (Law Commission Report),[4] but do not mention the dearth of empirical research on the experts' viewpoint.[5] Similarly, Findlay, in his review of studies on juror comprehension, lists prosecutors, defenders, judicial officers, and other stakeholders such as 'police, judges and magistrates, advocates of all types, community workers, corrections officers, legislators etc.,' but, strikingly, again, not expert witnesses as potential sources of data.[6]

Although the current study focusses exclusively on the courts of England, relevant literature comes additionally from the wider adversarial jurisdictions of USA, Canada, Australia and New Zealand. It is certainly not possible to assume that experience within these jurisdictions is directly applicable to the English judicial system, however it has been observed that similar types of scientific evidence are routinely admitted across all these jurisdictions, notwithstanding differences in admissibility rules.[7] Further it may be noted that experience within these jurisdictions has frequently been considered (and on a generally equal footing) in official reports such as the Law Commission Consultation on Expert Evidence (Law Commission Consultation),[8] and the Forensic Science Regulator's Information concerning Legal Obligations for forensic scientists.[9] Moreover, commentators within the

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[4] Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325, 2011) (Law Commission Report).

[5] Mark Coen, Liz Heffernan, 'Juror Comprehension of Expert Evidence: a Reform Agenda' (2010) Criminal Law Review 195, 196.

[6] M Findlay, 'Juror Comprehension and the Hard Case - Making Forensic Evidence Simpler' (2008) 36 International Journal of Law, Crime and Justice 15, 17.

[7] G Edmond and others, 'Admissibility Compared' presented at the Law & Society Conference, June 2011, San Francisco, quoted in Gary Edmond, 'Is Reliability Sufficient? The Law Commission And Expert Evidence' (2012) 16 The International Journal of Evidence & Proof 30 (Edmond, Is Reliability Sufficient?).

[8] Law Commission Consultation Paper, The Admissibility of Expert Evidence In Criminal Proceedings In England And Wales: A New Approach to the Determination of Evidentiary Reliability (Law Com CP No.190, 2009) for example para 2.10 note 8 (Law Commission Consultation).

[9] Forensic Science Regulator, 'Legal Obligations' (FSR-I-400, Issue 3, 2015) for example note 42.

field commonly, if not routinely, consider research across the adversarial jurisdictions as being equivalent and comparable.[10]

Relevant findings from analogous studies are described below. Although each study has different objectives, the aspect that they have in common is the requirement of an expert witness to navigate an adversarial arena. The common elements that arise from this are, first, the perceived effectiveness of the adversarial system in eliciting relevant evidence, including the perceived effectiveness of adversarial safeguards, and, second, the perceived effectiveness of any behaviours described by the experts in order to navigate the process. In terms of comparison, of interest to this study is whether experience reported by experts in the current study is specific to DNA forensic experts, or whether this experience is common to all experts, or indeed to all witnesses.

2.2 Forensic Expert Experience

The Royal Commission on Criminal Justice of 1993 (Runciman Report), was precipitated by a series of miscarriages of justice centring on faulty forensic evidence.[11] It had a specific mandate:

> … in particular to consider whether changes are needed in …
>
> (iii) the role of experts in criminal proceedings, their responsibilities to the court, prosecution and defence, and the relationship between the forensic science services and the police;[12]

It was informed by a number of studies including a 1991 study by Roberts and Willmore specifically on forensic science evidence in criminal proceedings.[13] This study aimed to provide an ‘in-depth account of the collection and presentation of forensic science evidence in criminal

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[10] For example, Simon J. Walsh, 'Legal Perceptions of Forensic DNA Profiling: Part I: A Review of the Legal Literature' (2005) 155 Issue 1 Forensic Science International 51; Edmond, Is Reliability Sufficient? (n 7); The Law Commission and Expert Evidence’ (2012) 16 The International Journal of Evidence & Proof 30.

[11] HMSO, *Report of the Royal Commission on Criminal Justice* (Cm. 2263, 1993) (Runciman Report).

[12] ibid iii.

[13] Roberts Study (n 2), 12.

proceedings', and included in depth interviews with a large number of 'relevant actors' across twenty-seven 'run-of-the-mill' criminal cases, including twenty-three interviews with forensic experts. The Roberts study informs the current investigation in a significant way in that not only did it precede current criminal procedure rules on expert evidence, but also essentially the use of DNA evidence. To be exact, one case did contain DNA evidence, but it was used to establish that body parts came from the same source, and was not used for identification of the perpetrator. The study predated all currently relevant case law on the presentation of DNA. This study therefore presents an important benchmark for forensic expert perceptions of the judicial process, when compared to the current study, given DNA's acceptance as a new probabilistic paradigm in scientific evidence, and concomitant developments in the law regarding expert evidence.

In assessing the challenge of delivering unbiased testimony in an adversarial system, the study reported observations regarding the experts' experiences and behaviours both pre-trial and in the court room. The study determined that scientists displayed the highest integrity regarding their responsibilities to be unbiased, however subtle biases could not be eliminated.[14] Experts, however, found themselves falling into distinctly different roles, for the prosecution providing scientific support for the prosecution story, and for the defence, testing that science.[15] Nevertheless, the study pointed out that experts were, on occasion, drawn into counsel's confusion strategies within the court room itself.[16]

The study determined that forensic experts found themselves subordinate to investigators, and required to examine evidence selected by the investigators to support the prosecution case. Some experts had developed strategies to obtain further exhibits as they thought appropriate. Having said this, prosecution scientists felt themselves to be working in the dark as they did not have access to the defence 'story'.[17]

In terms of cases coming to trial, the study determined that prosecution experts actually gave oral testimony in relatively few cases, reflecting FSS official figures, albeit reported in 1988 of less than one in twenty cases

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[14] ibid 107-108, 137.
[15] ibid 108.
[16] ibid 141-142.
[17] ibid 136-137.

necessitating oral testimony.[18] They reported that defence experts appeared in court even less often.

The study predated the provision for a discussion between opposing experts contained within the Criminal Procedure Rules,[19] however it did describe a number of interactions between opposing experts prior to trial. These appeared mainly to take the form of defence examinations (that is, meetings at which the prosecution expert disclosed prosecution expert evidence to the defence expert), although it also described informal discussions between experts, who were generally associated professionally.[20] The study reported that experts felt themselves constrained in these discussion by adversarial practices, and were, therefore unwilling to commit to discussion of issues at dispute.[21] Specifically, from the prosecution expert point of view, counsel were found to closely control such meetings, and the CPS expected a report on the meeting.[22] It was not surprising that the report found that the defence were very cautious about expert discussions, as they believed it assisted the prosecution to prepare a better case.[23] The finding was supported by an example of ‘leakage’ of a defence argument to the prosecution, and subsequent additional forensic work ordered by the prosecution to counter the argument.[24]

The study discovered that pre-trial conferences between prosecution expert and lawyer were infrequent, so that lawyers were not always able to fully comprehend the evidence, and were consequently unable to present it properly in court.[25] Also, because of a lack of information, the experts sometimes used unofficial strategies to determine more about the case before the trial.[26]

From a defence point of view, the study determined that defence experts were immediately at a disadvantage as they were in a reactive position

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[18] ibid 121.
[19] Criminal Procedure Rules 2015, pt 19.6 (Criminal Procedure Rules).
[20] Roberts Study (n 2) 108-112.
[21] ibid 108.
[22] ibid 108-117.
[23] ibid 112-113.
[24] ibid 109-110, 112.
[25] ibid 57-63.
[26] ibid 62, 136-138.

relative to the prosecution's framing of the debate.[27] They suffered practically because of lack of access to crime scene materials that would be of use to them, and time pressure because of slow prosecution disclosure.[28] From the positive side, however, the study noted that the defence expert had more information about the case.[29] Illuminatingly, the study described the defence as 'individuals working together, exchanging information with freedom', whereas the prosecution was built on institutions working together, with the inevitable administrative difficulties.[30]

Pre-trial, experts reported a tension between the collaborative scientific approach and adversarialism, ('the perverse desire of British justice to obscure the truth').[31] This continued into the court, where experts reported discomfort in the fact that were constrained by counsel's questions in that everything was passed through a 'legal filter', preventing them presenting evidence as they would like.[32] This was exacerbated by the lack of pre-trial communication with 'their own side'.[33] Evidently, whilst both lawyers and experts considered themselves as assistants to the court, each regarded this in a different way.[34]

During cross-examination, experts described a 'conflict-confusion' strategy on the part of the defence, in attacking the science.[35] Experts reported that they had developed their own strategies for protecting their integrity and resisting these tactics, but these were dependent on experience and personal authority and confidence.[36] Some experts felt that it was not their duty to be proactive within the witness box, and that they were serving the court by simply answering their questions.[37] The conclusion was that the picture was very variable across courts, and that 'whilst some experts play the system, others are played by it'.[38]

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[27] ibid 65.
[28] ibid 65-67.
[29] ibid 140.
[30] ibid 140.
[31] ibid 119.
[32] ibid 123-129, 140-141.
[33] ibid 57-63, 138.
[34] ibid 140.
[35] ibid 142.
[36] ibid 129-132.
[37] ibid 130-132.
[38] ibid 129-142.

In a 2008 study in Australia by Wheate, 132 forensic scientists were canvassed upon their experiences in court.[39] Despite the fact that the methodology involved the use of written surveys (albeit with some free text fields), and only thirteen percent of respondents were specialists in DNA, the findings remain relevant in informing the current study.

Whilst interviewees stated that they had a responsibility to remain unbiased, they also pointed out that they naturally fell into roles depending on who instructed them.[40] The prosecution asserts the strength of scientific evidence in support of the case, and the defence looks for flaws.

Within this study, most were concerned at the lack of competence amongst lawyers, with the majority stating that there was either no pre-trial conference with the lawyer, or that the right questions were not asked.[41] This resulted in poor court performance, in their collective view.

Interviewees indicated that they were often not able to state their evidence correctly, due to the prosecution lawyer's questions, stating that this had a detrimental effect on the evidence. Interviewees explained this as incompetence, however it is not clear whether this behaviour was deliberate.[42]

Regarding cross-examination, half of interviewees (presumably for the prosecution) stated that they were badly affected by their interaction with defence lawyers, specifically regarding accusations that their evidence was fabricated.[43] They described the defence behaviour as 'gleeful, rude, sarcastic and offensive'.[44] Some also felt let down by prosecutors who did not use re-examination to object to unfounded personal attacks,[45] and clarify issues where they felt that the defence's cross-examination had raised unwarranted doubts in the jury's mind.[46] Interviewees were frustrated by the way defence lawyers were able to create confusion in the minds of the

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[39] Rhonda Wheate, 'Australian Forensic Scientists: A View from the Witness Box' (2008) 40:2 Australian Journal of Forensic Sciences 123 (Wheate Study).

[40] ibid 130-139.

[41] ibid 126.

[42] ibid131-132.

[43] ibid130-131.

[44] ibid131.

[45] ibid131.

[46] ibid133.

jurors, by their tactics, although they placed the blame equally on the prosecution for not recovering the initiative.[47]

Interestingly, most interviewees stated that, (in contrast to other empirical studies[48]) judges understood expert evidence,[49] and lay juries are capable of comprehending and utilising forensic science.[50] In all of these studies, however, interviewees had no objective way of knowing whether this was true, and certainly not for DNA evidence.

2.3 Medical Expert Experience

A study published in 2013 by Henderson and Seymour included semi-structured interviews with 27 expert witnesses involved in child abuse cases in New Zealand.[51] The purpose of the study was not only to examine how experts experience testifying in an adversarial court, but also, and particularly, whether anecdotal reports of experts mistrusting the courts so much that they refuse to give evidence, were true.[52] On the one hand, the data source was different to that in this study: experts interviewed were medical practitioners giving evidence in both criminal courts and family courts. On the other, the specific lines of investigation were similar to this study, that is, the challenges of presenting evidence within an adversarial system. Of specific interest is the fact that interviewees were asked how they adapted their behaviour to meet those challenges, a line of investigation taken within the current study. This forms an important comparator: it will be possible to determine which strategies employed by the expert are common to experts in general, and which are specific to the expert presenting probabilistic DNA evidence. A key distinction between the Henderson study and the current study must be underlined however: whilst ‘expert’, medical evidence is not ‘scientific’ in the same way as DNA evidence, is presented as an opinion, and is not presented probabilistically. It does not, therefore,

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[47] ibid 133.

[48] For example, Emily Henderson and Fred Seymour, ‘Expert Witnesses under Examination in the New Zealand Criminal and Family Courts’ (The Law Foundation, New Zealand 2013) (Henderson Report).

[49] Wheate Study (n 39) 123, 134.

[50] ibid 136.

[51] Henderson Report (n 48).

[52] ibid ch 1 para 1.

allow examination of the interface of law and science in the same way as is possible in the current study.

Regarding ethical responsibility, experts were clear as to their independent responsibility to the court, even though some stated that they felt an additional responsibility to the victim (here, a child).[53] Despite this, some experts stated that the system of appointment, that is, acting for one party, exerted pressure to become partisan, and in some cases there had been direct pressure by counsel.[54] A general feeling amongst experts was that the adversarial system encouraged partisanship, and that counsel did nothing to lessen the advantage this might give them.[55]

Most of the experts interviewed disliked appearing in court, and described the experience in strong terms, including ‘very, very threatening’, ‘intimidating’, and ‘distressing’.[56] This was especially in their early experience. Many felt that this affected the quality of their evidence.[57] Many interviewees stated that they knew colleagues who were reluctant to appear in court or who had ceased to appear.[58] It should be noted that the special factor of professional reputation is a key influencing factor applying to medical witnesses, especially after the case of *General Medical Council v Meadow* in which a medical practitioner was struck off the medical register for negligent expert opinion.[59]

Interviewees reported perceived barriers to presenting evidence caused by lack of competence of jurors and judges, however the value of this is qualified by the authors on the basis that their opportunity to assess jury competence was limited to observing them, and the judge on the basis that they had limited exposure to them.[60] The fact that they almost never attended court after their appearance added to their limited ability to comment on such aspects.[61]

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[53] ibid ch 2 para 2.1.
[54] ibid ch 2 para 2.3.
[55] ibid.
[56] ibid ch 2 para 2.2.1.
[57] ibid.
[58] ibid.
[59] *General Medical Council v Meadow* [2006] EWCA 1390, [2007] QB 462.
[60] Henderson Report (n 48) para 3.1.1.
[61] ibid ch 3 para 3.3.

Although the competence of barristers was variable, in some cases lack of competence in counsel meant that important evidence was not elicited.[62] Interviewees stated also that it was difficult to correct or fill an omission left by the prosecutor.[63] They also perceived barriers in terms of poor interaction with lawyers.[64] Specifically, they felt that it was essential for the lawyer to be briefed by the expert in order for the evidence to be elicited in court, however reported that this was rarely adequate, and was the major source of complaint.[65] Several mentioned that defence spent more time with their experts.[66] This is an interesting observation: in terms of meta-analysis, this study will look at indicators of a possible 'them and us' mentality, of which this is arguably an example.

Interviewees reported strong views on cross-examination, which they regarded as sometimes obstructive, confusing and misleading, and involving trickery.[67] They described instances of being prevented from giving evidence.[68] Although they described sophisticated behaviours on their part to counter such tactics (including even looking like a witness), generally the interviewees reported lack of control, and powerlessness to correct what they felt were misunderstandings.[69] Interviewees reported that judicial intervention sometimes assisted, however this was variable and sometimes unhelpful.[70]

Interviewees had strong views on 'defence experts', who either fell into the category of respected expert, or 'hired gun'.[71] Interestingly, although some experts bemoaned the fact that some lawyers discouraged contact with the opposing expert, an opportunity they would welcome, others stated that some defence experts, 'particularly these ones who come from overseas' will

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[62] ibid ch 3 para 3.1.3.
[63] ibid.
[64] ibid.
[65] ibid.
[66] ibid ch 3 para 3.3, 69.
[67] ibid ch 3 para 3.4.
[68] ibid ch 3 para 3.4, 77-78.
[69] ibid ch 3 para 3.4, 76-81.
[70] ibid ch 3 para 3.1.2.
[71] ibid ch 4 para 4.1.3.

not ‘change their view, because they have a financial incentive’, further that ‘[T]here are a lot of nutters out there, certainly in the UK and the USA. ’(!)[72]

In addition to expert medical witnesses, a number of other studies confirm the general unwillingness of doctors to appear as witnesses. For example, in the US paper ‘Sexual Assault Nurse Examiners’ Experiences Providing Expert Witness Court Testimony’, Campbell and others reported that medical practitioners were sometimes unwilling to examine rape complainants because they did not want to appear in court.[73] The study polled 110 specialist nurse examiners and found that 58% had experienced problems in court. These included attacks on their qualifications and experience as well as the evidence itself.[74] Some were also frustrated at not being able to express the evidence in the way that they would like because of only being able to respond to questions and a perceived lack of competence by counsel in asking the right questions.[75]

2.4 DNA Expert Experience

A study by Sallavaci in 2014 comprised a review of literary sources, including case reports and commentary, supported by a small number (four) of interviews with prosecution forensic experts, and specifically looking at DNA evidence.[76] Interviewee comments supported the experiences reported within the studies outlined above. Specifically, they reported a lack of communication, with the judicial process in terms of court appearance,[77] with the defence, preventing them from properly assessing the prosecution case,[78] and with their own counsel.[79] In terms of the latter, they reported that sometimes they had no contact with their own counsel until they entered the witness box, and often did not understand the reason for questions, and so did not know what was expected of them in answer.[80] They attributed this to

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[72] ibid ch 4 para 4.1, ch 6 para 6.1.3.

[73] Rebecca Campbell and others, ‘Sexual Assault: Sexual Assault Nurse Examiners’ Experiences Providing Expert Witness Court Testimony’ (2007) Volume 3 Number 1 Journal of Forensic Nursing 7, 7.

[74] ibid 7.

[75] ibid 7-14, 10.

[76] Sallavaci (n 1).

[77] ibid 130-133.

[78] ibid 130-133.

[79] ibid 130-133.

[80] ibid 121-122.

lack of counsel understanding, but their comments do not exclude a deliberate strategic intent,[81] as suggested in the Roberts study.[82] They felt that they sometimes appeared biased because of the questions that they were asked.[83] They also felt that the jury had a real risk of misunderstanding the DNA evidence, and that there was insufficient opportunity to explain it (for example, they quoted the perceived value of being allowed to give a visual presentation).[84] The study suggested that forensic experts are just like any other witness in that they felt at the mercy of the adversarial system and 'the courtroom drama', variously reporting lack of understanding by prosecution and defence counsel and the judge, and feeling, on the one hand, powerless to explain the evidence in the face of the 'wrong' questions, but on the other feeling that they appeared unhelpful if trying to answer correctly in the face of these.[85] These comments were particularly relevant because they were specifically reporting their experience whilst reporting DNA evidence.[86] Interestingly, whilst commenting that improved contact between counsel and experts would be of value, no interviewee was reported as having stated that pre-trial discussion with the opposing expert, as envisaged by the Criminal Procedure Rules,[87] would be of value.

Whilst the study reported that experts sometimes felt they were perceived as biased, a meta-analysis of expert quotations does, at least, suggest, association of the interviewees with instructing counsel: one interviewee reported that they felt that they should not be seen to criticise their barrister,[88] and another stated that, if they were to 'successfully' present evidence on behalf of their counsel, then they needed to know what their counsel's strategy was.[89] Sallavaci did not comment on, or analyse further, these limited comments.

It is worth making one qualification: whereas the current study's sample population did not overlap the sample populations in the other studies detailed in this chapter, it was possible that some of the limited number of

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[81] ibid 120-121.
[82] Roberts Study (n 2).
[83] Sallavaci (n 1) 133.
[84] ibid 173-174.
[85] ibid 121.
[86] ibid.
[87] Criminal Procedure Rules (n 19) pt 19.6.
[88] Sallavaci (n 1) 120-121.
[89] Sallavaci (n 1) 121.

interviewees in the Sallavaci study were represented also in the current study. It may, therefore, not be assumed that any common findings within the current and Sallavaci studies show consistency between groups.

2.5 Lay Witnesses

To take the concept of benchmarking and comparison further: in considering the findings of the current study, it is important to know which experiences of the expert are specific to their situation, and which are, in fact, common to all witnesses.

Appearing as a lay witness is generally regarded as being a trying experience, with witnesses variously describing the process as 'terrifying', 'intimidating', 'confusing' and 'stressful'.[90] However, the historical adversarial principle of orality (despite its defence as allowing the court to observe witnesses' demeanour in confrontation with the accused) has been claimed to adversely affect the witness's ability to recall or present evidence.[91] Additionally, the requirement to answer questions, and not simply present evidence in their own way, has similarly been seen as negatively impacting accuracy of recall (for example, leading to omissions or exaggerations).[92] Despite the different status of lay witnesses, empirical studies of their experiences inform the current study in an important way: it seems safe to assume that, despite their professional training, experts face the same type of challenges as those faced by lay witnesses. The importance of studies relating to lay witnesses are, therefore, important in that they allow a baseline against which expert witnesses' experiences may be understood. As an example, Emson stated that the stress and general unpleasantness of being examined in open court may discourage the lay witness from giving evidence.[93] If this were to be identified as an experience of expert witnesses, then it will be important to consider that this may not be a special effect of expert testimony, but rather a general experience.

Empirical studies of the experience of lay witnesses (including victims) have focussed mainly on special categories of witness, for example child

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[90] Allison Riding, 'The Crown Court Witness Service: Little Help in the Witness Box' (1999) Vol 38 No 4 The Howard Journal 411, 411.

[91] Emson (n 38) 445.

[92] ibid.

[93] ibid.

witnesses, others with special needs and victims of sexual assault.[94] However, a substantial body of indirect data concerning witnesses as a whole exists in the form of the Witness and Victim Experience Survey conducted from 2005-06 to 2009-2010.[95] The survey interviewed all victims and prosecution witnesses in every case in which a charge was laid, within the categories of: violence against the person, robbery, burglary, theft and handling stolen goods, and criminal damage (although excluding crimes that resulted in a fatality, domestic violence and sexual offences). A total of 37,779 interviews was conducted, all with witnesses 18 years of age or older, approximately half of whom were victims and the others prosecution witnesses. Just over half of those surveyed were called to the stand.

Some qualification must be given to the relevance of the findings within this study: these witnesses were interviewed using a standard questionnaire, and the key objective of the study was to ascertain general satisfaction with the trial process, and specifically CJS Witness Services. However, the interview did include specific questions on witness satisfaction both before, after and during the trial, including their treatment when giving evidence. This, and the large sample size, makes the findings relevant.

Regarding witness experience of the adversarial system, although interviewees were not asked whether they felt they had been able to present the evidence that they would have liked, under examination, 85% reported that they were satisfied with the Criminal Justice System.[96] 60% of witnesses reported that they met with the lawyer before entering the court,[97] and 85% were satisfied by the way they were treated by the prosecution lawyer.[98]

Interviewees were also asked about their concerns regarding testifying: 45% were concerned about coming into contact with the defendant, and 32%

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[94] For example, Becky Hamlyn and others, ‘Are Special Measures Working?: Evidence from Surveys of Vulnerable and Intimidated Witnesses’ (Home Office Research Study 283, Home Office Research, Development and Statistics Directorate, June 2004) (Hamlyn Study); Henderson Report (n 48).

[95] Ramona Franklyn, *Satisfaction and Willingness to Engage with the Criminal Justice System: Findings from the Witness and Victim Experience Survey, 2009–10* (Ministry of Justice Research Series 1/12, February 2012).

[96] ibid para 3.1, 22.

[97] ibid para 3.3, 26-27.

[98] ibid para 3.3, 26.

about being cross-examined.[99] 24% felt intimidated by the trial process, and 5% of those by the lawyer.[100]

Regarding engagement with the process, unsurprisingly, witnesses displayed great engagement with the process, with 91% of witnesses knowing what the outcome of the case was.[101] Regarding the engagement of the judicial process with them, interviewees generally reported a high level of engagement before (for example by communication and preparatory materials), during (for example communication regarding expectations), and after (for example follow up).[102] Again, this provides some benchmark against which engagement by the expert with the trial, and trial with the expert may be gauged.

To expand upon the earlier qualification, despite the fact that a large number of witnesses expressed ‘satisfaction’ with the process, the only possible answers were satisfied, dissatisfied, or neither. On this basis, therefore, the question simply tested the question of overall, was the witness more satisfied than dissatisfied. This arguably leaves many potential areas of dissatisfaction untested. The fact that defence witnesses are omitted, similarly leaves a significant data gap.

A more informative study regarding the experience of witnesses in the court room is given by the Home Office Research Study, ‘Are special measures working?: Evidence from surveys of vulnerable and intimidated witnesses’, in which a lower overall rate of satisfaction was reported (69%).[103] Although this study looked at a special sub-set of witnesses (including, for example, victims of sexual assault, children, intimidated witnesses), and, again, the study was done using a standard survey, specific questions were asked about interviewees’ experiences in the witness box. This study interviewed just over 1000 witnesses, most of whom were victims, and looked at experiences pre- and post- measures designed to facilitate the judicial process. About 50% of cases involved Magistrates’ courts, and it is not possible to determine from the study whether experiences were different between these and the Crown Court.

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[99] ibid para 6.1, 42.
[100] ibid para 3.3, 28-29.
[101] ibid para 5.1, 37.
[102] ibid para 2, 9-18.
[103] Hamlyn Study (n 94) xii.

Only a third of witnesses reported having contact with the lawyer before appearing in the courtroom.[104] Regarding their experience in the witness box, 95% felt that the prosecution lawyer had been courteous to them, however only 75% felt that they had had the opportunity to say everything that they would have liked.[105]

Less than 66% of interviewees felt that the defence lawyer had been courteous to them during cross-examination.[106] 57% of interviewees stated that they had not been able to say everything that they would have wanted, either because the lawyer interrupted or cut them off, or did not get a chance to explain.[107] 70% said that cross-examination upset them. Whilst the biggest specific reason given was that they felt that the lawyer tried to suggest they were lying, other factors mentioned included the lawyer trying to confuse the witness, making the witness feel like they were on trial, interrupting, being aggressive, and trying to twist words.[108]

In a study of 65 Crown Court trials by Fielding, relating to violence, all the significant judicial players were interviewed, including witnesses.[109] The starting hypothesis was that the natural human mode of giving evidence was in narrative format, and the aim of the study was to see how this mode coped with the challenge of testimony within the adversarial environment. Fielding interviewed both prosecution and defence witnesses and reports similar findings for both parties.[110] Interestingly, all parties recognised the legitimacy of sometimes hostile cross-examination, but demonstrated difficulty in practice in communicating evidence as they thought proper.[111]

Fielding reported that because of counsel's control of questioning, frequently witnesses were unable to give the evidence that they would like. He gives an example of a doctor who was repeatedly cut-off, however the barrister

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[104] ibid 45.

[105] ibid 50.

[106] ibid 51.

[107] ibid 51.

[108] ibid 53-54.

[109] Nigel G Fielding, 'Lay people in court: the experience of defendants, eyewitnesses and victims' (2013) Volume 64 Issue 2 The British Journal of Sociology 287.

[110] ibid 289.

[111] ibid 288-289.

accused him of not answering the question. When he asked to finish his point, he was answered with an accusation of telling lies.[112]

Another witness view was that they felt that there was important evidence that they were not able to give, because they felt that it was not their place to talk, or that they were guided down a route.[113]

Fielding makes the interesting proposal that the adversarial mode of questioning is at odds with the cognitive mode with which most people provide accounts, and that the impact of this is to impede the validity and reliability of testimony. He suggests that expert witnesses are able to avoid these challenges by training and 'briefing by the legal team advising them'.[114]

2.6 Forensic Evidence in the Adversarial System

The studies reviewed above report strikingly similar findings for witnesses at the 'mercy' of the adversarial system. Both expert and lay witnesses are stressed and intimidated by the process, in which they feel powerless. Their experience is that they are often not able to state the evidence that they'd like to state because counsel do not ask them the right questions. Expert witnesses state that this is partly because of a lack of competence, but more importantly, a lack of contact between the expert and the scientist before the trial. A large number of witnesses state that cross-examination is very stressful, even upsetting, with opposing counsel using aggressive and sometimes abusive tactics with the apparent intention of sowing doubt with, and confusing, the jury. Experience of judicial intervention indicated that this was variable and sometimes unhelpful.

Some professional witnesses report that they have developed sometimes sophisticated methods to respond to what they perceive as unhelpful cross-examination tactics, in an effort to retain their professional integrity and present the evidence in the way that they believed was right. This responsive behaviour appears to be variable, by experience, but interestingly, also by individual experts' perception of their role. Some experts report that they believe their responsibility is simply to respond to questions. By this they discharge their responsibilities.

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[112] ibid 301.

[113] ibid 302.

[114] ibid 303.

Expert witnesses state that they attempt to remain unbiased, but that it can be difficult to do because of indirect pressures (for example being fed selective information), and the fact that they naturally fall into different roles depending on whether they are instructed by prosecution or defence. Prosecution naturally fall into the role of providing support for scientific evidence supporting the prosecution case; defence fall into the role of finding weaknesses with this. Despite assertions that they remained unbiased, simplistic meta-analysis of interviewee comments uncover some examples of 'us and them' perception. None of the studies described, however, explicitly considered the question of whether the generated data suggested actual bias, or at least party association, by experts.

The studies above offer strikingly consistent reports of experience of witnesses in court, but stop short of the specific knowledge necessary to understand how expert witnesses fare when testifying as to the 'revolution'[115] of DNA identification in the adversarial court. Before concluding this review, it is necessary to consider the nature of the arena in which the evidence is to be examined, as well as special considerations regarding the evidence itself. The experience and perceptions of forensic experts cannot be clearly discerned, without understanding the competence of the examining environment.

2.7 Is DNA Evidence Different?

The special nature of DNA evidence, both in substantive terms and in terms of importance to the approach taken in this study, was considered in the Introduction (1.2 Study Context). It will be recalled that the position taken within the current study is that DNA evidence provides a unique lens through which expert evidence may be examined because of its rigorous scientific basis.

This literature review has described studies in which witnesses have described similar experiences, whether they be lay, expert, scientific or medical. Even those reporting scientific results have largely testified as to their *opinions* regarding evidence. The current study aims to shed some light on whether the 'paradigmatic' nature of DNA evidence forms a different

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[115] A Semikhodskii, *Dealing with DNA Evidence: a Legal Guide* (Routledge Cavendish, 2007) 1.

category of expert evidence, and, if so, if there are differing challenges that the expert witness must face.

The argument that DNA evidence is different has not been without criticism. Strong arguments have been made that DNA profiling evidence is no different from any other evidence, on the basis that the value and quality of forensic evidence is always contextually variable.[116] In the case of DNA, challenges have been made to admissibility, technical and interpretation issues,[117] As examples, laboratory or other error is uncommon but possible;[118] although there might be a DNA match, this might be undisputed, with expert evidence consisting of opinion evidence regarding, for example, how the sample came to be at the crime scene; for complex samples, expert analyses may be disputed.

The question, even, of whether scientific evidence may be considered to be different from non-scientific evidence has been debated. The Law Commission, in its consultation paper on the admissibility of expert evidence in criminal proceedings, suggested that different guidelines might apply to scientific and 'experience-based' evidence,[119] however this distinction was not followed in their subsequent report.[120] Other commentators have also pointed out the theoretical and practical difficulties in the separation of scientific versus non-scientific evidence on the question of assessing expert evidence reliability.[121]

The position that DNA evidence is no different from other evidence (at least, in the court's view) has also been supported by recent cases in which,

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[116] Paul Roberts, 'Paradigms of Forensic Science and Legal Process: a Critical Diagnosis' (2015) 370 Philosophical Transactions of the Royal Society B 1, 3 (Roberts, Paradigms'.

[117] Semikhodskii (n 115) 140-153.

[118] For example, The Phantom of Heilbronn, Spiegel Online International, 26 March 2009; Peter Gill, *Misleading DNA Evidence: Reasons for Miscarriages of Justice* (Elsevier, 2014) 64; Forensic Science Regulator, 'Report into the Circumstances of a Complaint received from the Greater Manchester Police on 7th March 2012 regarding DNA Evidence provided by LGC Forensics' (2012) (FSR–R-618); Peter Gill, *Misleading DNA Evidence: Reasons for Miscarriages of Justice* (Elsevier, 2014) 21-30.

[119] Law Commission Consultation Paper (n 8) para 6.22.

[120] Law Commission Report (n 4).

[121] D Michael Risinger, 'The Irrelevance, and Central Relevance, of the Boundary between Science and Non-Science in the Evaluation of Expert Witness Reliability' (2007) 52 Villanova Law Review, 679.

controversially,[122] where statistical analyses have not been attainable (for example, because of poor quality or low quantity DNA sample), experts have testified as to their subjective opinion on a DNA match.[123] Furthermore, courts have judged that subjective expert opinion may take precedence over scientific argument. Certainly, these developments would appear to erode the concept of a new paradigm in forensics.

However, Sallavaci makes a strong (and, perhaps, paradoxical) argument in support of the proposition that DNA evidence is different on the basis that, by its very nature, DNA evidence *cannot* provide positive individual identification.[124] Forensic experts are therefore forced into providing truly scientific evidence (both by scientific rigour and law). Interestingly she suggests that this has been challenging for the experts themselves because they have 'nurtured' expectations 'proclaiming individualisation as their fundamental raison d'ętre'.[125] She also suggests that, because of their claim to individual identification, experts have been able to strongly influence determination of the ultimate issue. However, the scientific and legal rigour with which DNA evidence must be presented has meant that they are now prohibited from doing this.[126] In other words, they are forced to present the evidence according to legal principles (of the jury as ultimate arbiter of fact), because not to do so would be unscientific.

The current study seeks to determine forensic experts' perceptions of the 'new paradigm' of DNA profiling and how they are influenced by this.

2.8 Accusations of 'Trial Pathology' in the Adversarial Trial

It has been mentioned, above, that failings in scientific evidence have frequently been placed at the door of adversarialism. Roberts usefully summarised a 'top 20' frequently mentioned pathologies, including ignorance or manipulation by lawyers, communication failures, adversarial deficit (lower resource available to defence), testimonial silencing (process not allowing experts to give desired evidence), and number blindness, amongst others.[127]

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[122] Ian Evett, Sue Pope, 'Practice Points: Science of Mixed Results' (12 August 2013) Law Society Gazette.
[123] *R v Dlugosz* [2013] EWCA Crim 2.
[124] Sallavaci (n 1) 129.
[125] ibid 183.
[126] ibid 126-131.
[127] Roberts (n 116) 2-3.

It should be said, however, that these are not universally regarded as ‘pathologies’. Roberts makes a strong case that many of the ‘pathologies’ are based on misapprehensions about either the legal process, or the nature of forensic science.[128] As a simple example, the adversarial system is strong on party autonomy, each party free to use or not use evidence within certain constraints. However it may not be obvious to a non-legal person why relevant and probative evidence (in an act of ‘testimonial silencing’) might not have been used. Roberts suggests that many of these perceived ‘pathologies’ might better be described as necessary and desirable features of the adversarial system.[129] To circumvent any of these pathologies would destroy a strength of the adversarial system. This argument sees the strengths and weaknesses of the features of the adversarial and inquisitorial process as mirror images of each other.[130]

It is practically unthinkable that, in England, we would change wholesale to an inquisitorial criminal adjudication system. Adversarialism has been described as ‘an incomparably efficient way of narrowing down the issues and getting to the heart of factual disputes’, with the ‘self-serving partisanship which adversarial lawyers are expected to display… (being) the motor that drives adversarial truth-seeking… ‘.[131]

However, proposed reforms in the area of expert testimony seek to introduce many inquisitorial elements. These include reforms to rules on expert testimony, court-appointed experts, bifurcated trials, specialist juries, no juries in some cases, science courts, and a move to reduction of litigation.[132] Damaska has suggested that the such reforms have already weakened the adversarial process by diminishing the power of independent party action.[133]

So, too, it has been pointed out that the adversarialism can only be effective if it is rigorously, and conscientiously applied by all parties. Lawyers must recognise their foremost position as ‘ministers of justice’ and experts must respect their position as ‘unbiased and objective servants of the court’. Otherwise ‘pathologies’ may become manifest. Below is discussed

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[128] ibid 2.

[129] ibid.

[130] ibid 7.

[131] ibid 5.

[132] Sallavaci (n1) 5-6.

[133] Mirjan R Damaska, *Evidence Law Adrift* (Yale University Press, 1997) 141.

commentary on some aspects of adversarialism relevant to this study, including the effectiveness of examination and cross-examination, the competence of judicial players to understand complex (and, specifically, here, probabilistic evidence), the effect of various cognitive biases on judicial players and the relative equality of resource of prosecution and defence.

2.9 The Expert, Unbiased, Impartial, Objective or Independent?

It has been claimed that a danger to expert testimony is bias on the part of the expert witness.[134] Redmayne suggests that this is because each party may choose experts with an opinion most strongly in their favour, and may further bias the expert during preparation for trial.[135] On the other hand, however, he suggests that, despite the fact that it is inevitable that adversarial expertise will produce biased experts, this may not be as big a problem as it might first appear to be.[136]

It is worth considering the degree to which, in agreement with established thinking and law, just how important it is that the expert remained unbiased. On the one hand, Redmayne suggested that criticisms of adversarial expertise might be better seen as criticisms of adversarialism in general,[137] and that, whilst adversarial expertise 'is bound to' produce biased experts, there are reasons why this may not be a significant problem.[138] The reasoning he gives is that, firstly, no system short of compromising adversarialism (through, for example, single court-appointed experts) could eliminate the situation, but also that the very fact of 'adversarialism' motivates the expert researcher to redouble their efforts to uncover evidence and advance theories to support their employer's case (despite countervailing arguments concerning cognitive bias that may be engendered).[139]

Strong theoretical arguments have been, however, that not only expert evidence, but the position of the expert themselves is anomalous, and leads

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[134] Mike Redmayne, *Expert Evidence and Criminal Justice* (Oxford University Press 2001) 198; Sallavaci (n 1) 33.

[135] Redmayne (n 134) 198-203.

[136] ibid 203.

[137] ibid 201.

[138] ibid 203.

[139] ibid 203-204.

to serious difficulties.[140] Specifically, the criticism has been that if both experts testify as to opposing partisan opinion, then the jury has no way of knowing which is right. In fact, they now fail in the essential contribution supposed to be provided by the expert, which is assistance to the jury in matters beyond their everyday knowledge. In this way, the expert has become useless to the trial.[141]

The question of expert bias is a major strand of investigation within the current research, however it is important to be clear about the meaning of 'bias'. The terms 'unbiased' and 'impartial' are used in different ways by different authors, commentators, reports and legislation, sometimes synonymously, and sometimes implying a difference in meaning. Similarly, the terms 'objective' and 'independent' have specific meanings, but are used in different ways by different authors, and sometimes interchangeably.

As examples, the Criminal Procedure Rules 2015 state that an expert's opinion must be 'objective and unbiased' but do not use the word 'impartial'.[142] In their report on the admissibility of expert evidence, the Law Commission state the law to be that expert evidence must be 'impartial' and 'objective', but then go on to cite common law stating that the evidence must be 'objective' and 'unbiased'.[143] In the case of *R v Bowman*, it was stated that the expert must give '… independent assistance by way of objective unbiased opinion… '.[144] in *R v Henderson*, the court suggested that the expert should not 'assume the role of an advocate, influenced by the side whose cause he seeks to advance.', although it was not suggested that such evidence would necessarily be excluded.[145]

The Oxford English Dictionary, whilst suggesting that a synonym of 'impartial is 'unbiased', gives its primary definition as 'not partial; not favouring one party or side more than another'. Whilst suggesting that a synonym of

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[140] Learned Hand, 'Historical and Practical Considerations Regarding Expert Testimony' (1901) 15 No. 1 Harvard Law Review 40, 50.

[141] ibid.

[142] Criminal Procedure Rules 2015, pt 19.2.

[143] Law Commission Report (n 4) para 2.8.

[144] *R v Bowman* [2006] EWCA Crim 417; [2006] 2 Cr App R 3.

[145] *R v Henderson* [2010] EWCA Crim 1269, [2010] 2 Cr App R 24 [210] [219].

'unbiased' is 'impartial', gives its primary definition as 'not unduly or improperly influenced or inclined'.[146]

There are subtle differences in meanings between the terms, which may be significant. The specific meanings defined above will be used in evaluation of the current research's findings. Of course, of primary interest to the current study is the experts' understanding of these terms, and how they seek to comply with their associated responsibilities. It should also be understood that the words used by interviewees may not correspond exactly with their intended meaning: although an apparently trivial observation, it should be noted that whilst the opposite of 'unbiased' is 'biased', when referring to the opposite of 'impartial', an interviewee may not use the word 'partial', on the basis that this commonly has a different meaning. Similarly authors may use the term 'expert impartiality' as convenient shorthand for 'expert responsibility to remain unbiased', although it is not exactly synonymous.

The extent of the expert's responsibility to remain 'unbiased' should also be defined. Whilst the Criminal Procedure Rules state that the expert must help the court by giving opinion which is objective and unbiased, this does not mean that the expert does not have specific responsibilities to their instructing counsel. Defence case preparations (and prosecution preparations, so far as they concern strategy rather than evidence) are privileged and non-disclosable under common law and this extends to strategizing about the use and/or presentation of expert evidence. Common law overrides the Criminal Procedure Rules in this regard, adopting the position that legal professional privilege is absolute (*R v Derby Magistrates' Court ex parte B*[147]), precisely for the reason that anything less would prejudice a full and proper defence.

It seems evident that the expert is subject to a number of potentially conflicting pressures: in *R v Ward*,[148] it was stated that it was 'the clear duty of government forensic scientists is to assist in a neutral and impartial way' in the investigation itself, and not assuming that their 'task was to help the police', but rather to 'act in the cause of justice'.

Disclosure of scientific evidence takes place during a defence examination, during which the defence expert visits the prosecution expert to carry out an

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[146] Oxford English Dictionary, December 2015.

[147] *R v Derby Magistrates' Court, ex parte B* [1996] 1 AC 487, HL.

[148] *R v Ward* [1993] 1 WLR 619 [53] – [54].

examination of the evidence. CPS guidelines state that disclosure is not a responsibility of the expert, but rather the prosecution legal team, who make a decision on whether data should be disclosed.[149] Furthermore the CPS expectation placed on both prosecution and defence expert that the examination could not be a 'fishing trip'. [150] On the one hand, therefore open discussion about issues in the case is highly constrained. Meanwhile, the Forensic Regulator's Information on Legal Obligations for forensic experts, whilst confirming that disclosure is a responsibility of counsel, states that, under common law, the expert has a personal duty to disclose scientific evidence which might cast doubt on the prosecution case.[151]

Despite the fact that there might be inconsistent terminology within legal rules, official guidelines and common law, it might be argued, that there was less inconsistency of intention: each of these sources states that the intention regarding directions imposed upon the expert are to achieve the over-riding objective, that is, the cause of justice.[152]

Although a number of previous studies ascertained that experts claimed to be able to remain unbiased, no previous study drew any conclusions regarding potential *actual* bias. Indeed, as described above (2.4 DNA Expert Evidence), in the Sallavaci study there was some indication that an expert tried to help their counsel in court by not being seen to criticise their own barrister.

In summary, these findings support Redmayne's proposition that adversarial expertise is bound to produce biased experts, based on the finding that prosecution and defence experts found themselves very much to be the victims of adversarially and organisationally defined roles.

It may be argued that some bias may also enter the system by virtue of an individual expert's customary role. On the one hand, the defence expert has anecdotally been described as a 'hired gun' willing to say anything, but on the other, prosecution experts have been described as making unconvincing

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[149] Association of Chief Police Officers and Crown Prosecution Service, 'Guidance Booklet for Experts, Disclosure: Experts' Evidence, Case Management and Unused Material', (2010) para 4.3.1.

[150] Attorney General's Guidelines on Disclosure (2005) 1.

[151] Forensic Science Regulator (n 9) para 6.2.1.

[152] *R v Ward* [1993] 1 WLR 619 [53] – [54]; Criminal Procedure Rules 2015, pt 19.1. (1); Forensic Science Regulator (n 9) para 1.4.1.

expert witnesses for the defence, unwilling to shake off a prosecutor instinct.[153]

Of course, as stated above, the expert is retained by their respective counsel and must observe confidential privilege, however a question of interest is how experts see their duty in this respect, whether do feel biased in any way because of their customary role, whether they see conflicts within this, and how they aim to resolve any such conflicts.

2.10 Examination-In-Chief and the 'Crucible' of Cross-Examination

A common finding in the studies outlined above concerns lawyers' understanding and handling of evidence, and specifically scientific evidence. There are few empirical studies that look directly at this, however, a number of commentators have expressed doubts as to their competence.[154] Both the NAS Report and the Law Commission Report place responsibility for juror comprehension on the lawyers (along with appropriate judicial guidance).[155] From a practical point of view, their competence is manifested in their handling of examination-in-chief, and the presumed adversarial safeguard of cross-examination. Concerns regarding examination and cross-examination fundamentally inform the current study, as this is the 'crucible' in which the study participants are examined as to their testimony. Regarding preparation by lawyers, a study by Young gave further weight to the complaints voiced in the studies described above, stating that juries described the problems they had as being due to, or exacerbated by, poor presentation (for example, dry, ponderous, unduly complicated) and explanation of evidence.[156]

As part of its case for enhanced admissibility rules, the Law Commission suggested that cross-examination was an insufficient guard against unreliable scientific evidence.[157] The Report quoted the UK Register of

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[153] Science and Technology Committee, *Forensic Science on Trial* Seventh Report (HC 2004-2005) para 155 (HC Forensic Science Report).

[154] National Research Council of the National Academies, *Strengthening Forensic Science in the United States: A Path Forward* (National Academies Press 2009) 110 (NRC Report); Edmond, Is Reliability Sufficient? (n 7) 50.

[155] NRC Report (n 154) 236; Law Commission Report (n 4) [1.21].

[156] W Young, N Cameron, Y Tinsley, *Juries in Criminal Trials* (Law Commission of New Zealand Preliminary Paper 37, Vol 2, 1999) para 3.15, cited in Henderson (n 48) para 2.3.2.

[157] Law Commission Report (n 4) para 1.20.

Expert Witnesses, stating that internal consultation indicated that cross-examining advocates tended not to probe, test or challenge the underlying basis of an expert's opinion evidence but instead adopted the simpler approach of trying to undermine the expert's credibility.[158] It also cited evidence from US criminal cases illustrating that the advocate's objective in cross-examination is typically to 'impeach the character of the witness and to convey to judge and jury that the witness is not only scientifically incompetent, but also morally deficient'.[159] It has been suggested that this reflects the assumption that juries are incapable of assessing scientific methodology, however the House of Commons Report on Forensic Science (HC Forensic Science Report) suggested other tactical motives: 'when cross-examining expert witnesses, any questioning of that witness's reputation instantly damages their credibility, even when the accusations are without foundation'.[160]

This concern reflected similar concerns regarding cross-examination as a safeguard expressed by the NRC Report quoting Neufeld's comments after reviewing criminal cases in the US since *Daubert*:

> For years in the forensic science community, the dominant argument against regulating experts was that every time a forensic scientist steps into a courtroom, his work is vigorously peer reviewed and scrutinized by opposing counsel. A forensic scientist might occasionally make an error in the crime laboratory, but the crucible of courtroom cross-examination would expose it at trial. This 'crucible,' however, turned out to be utterly ineffective.161

It should be noted that arguments regarding the effectiveness of cross-examination are primarily aimed at the defence. Although, of, course, prosecution and defence may cross-examine opposing experts, the 'natural order' is that defence cross-examines to find gaps within the prosecution 'story'. Edmond suggested that limitations by the defence in their cross-examination was a product of limited resources and a strategical approach based on impressions of jury and judge capabilities and beliefs. This was the

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[158] ibid para 1.21.

[159] James M Shellow, 'The Limits of Cross-Examination' (2003-2004) 34 Seton Hall Law Review 317, 317.

[160] HC Forensic Science Report (n 153) para 165.

[161] NRC Report (n 154) 106-107, citing PJ Neufeld, 'The (Near) Irrelevance of Daubert to Criminal Justice: And Some Suggestions for Reform (2005) 95 (Supp. 1) American Journal of Public Health s 109, s 110.

reason why the greater part of the cross-examination of experts tended to be superficial, and aimed at undermining credibility or chain of custody rather than technical issues.[162]

2.11 Are Judge and Jury Competent?

The fact that ‘common sense’ reasoning tends to operate by means of stereotypical generalisations has been stated to be both ‘necessary’ but ‘dangerous’. They are necessary because some order has to be extracted from a mass of confusing data, but dangerous because they may contain false assumptions, reasoning fallacies, and illogical conclusions.[163] The inclusion of scientific evidence, particularly if it is probabilistic in nature, can only further compound the challenge faced in determining the facts in a case.

Coen and Heffernan, citing a substantial meta-analysis of jury studies by 18 leading jury scholars in the US, suggested that jurors genuinely attempt to engage with expert evidence, but their success in doing so is limited.[164] In any case, expert concerns regarding the jury’s competence to understand DNA evidence have strong empirical support from a wide range of studies. These have ranged from large studies using individuals summoned for jury service,[165] down to smaller studies using university students as ‘mock’ jurors.[166]

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[162] G Edmond, ‘Is Reliability Sufficient?’ (n 7) 51.

[163] Paul Roberts, Colin Aitken and Graham Jackson, ‘From Admissibility to Interpretation: New Guidance on Expert Evidence’ (2015) 179 Criminal Law and Justice Weekly 538, 540.

[164] Mark Coen, Liz Heffernan, ‘Juror Comprehension of Expert Evidence: a Reform Agenda’ (2010) Criminal Law Review 195, 197, citing N. Vidmar, and others, ‘Amicus Brief: Kumho Tire v Carmichael’ (2000) 24 Law and Human Behaviour 387, 388.

[165] For example, Dale A. Nance, Scott B. Morris, ‘Juror Understanding of DNA Evidence: An Empirical Assessment of Presentation Formats for Trace Evidence With a Relatively Small Random-Match Probability’ (June 2005) 34 Journal of Legal Studies 395.

[166] For example, Dartnall, Stephanie and Goodman-Delahunty, Jane, 'Enhancing Juror Understanding of Probabilistic DNA Evidence' (2006) 38:2 Australian Journal of Forensic Sciences 85.

It has been suggested that jurors without a scientific or technical training are ill-equipped to deal with complex statistical evidence.[167] It has been shown that probabilistic thinking does not closely coincide with intuitive thinking.[168] In some situations we undervalue statistical evidence, and in others we overvalue it.[169] Although people with existing statistical knowledge have been found to be better at logical reasoning, the level of statistical knowledge in the jury-eligible population is low.[170] The problem is, arguably, more acute in the case of DNA evidence, because it is explicitly stated in the form of a probability.

A number of inter-related modes of fallacious reasoning have concerned commentators regarding the jury's ability to evaluate DNA evidence. These are probabilistic errors of reasoning, for example, the 'prosecutor's fallacy', addressed in the next chapter, errors of reasoning through cognitive bias, and, lastly, errors in combining statistical DNA evidence with other evidence. These concerns have a firm basis in evidence: the 'prosecutor's fallacy' has been a cause of appeal in a number of cases,[171] and continues to be of concern;[172] reasoning errors have been demonstrated in many empirical studies, for example, in which subjects treat evidence differently according to how it is presented to them.[173] Other empirical studies have demonstrated a 'misaggregation' error, shown to occur when subjects combine traditional evidence with DNA evidence, varying as to whether DNA is over- or under-weighted. [174] This is highly significant: combining traditional with probabilistic DNA evidence is what happens in every trial involving DNA.

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[167] Myers R, Reinstei R, Griller G, 'Complex scientific evidence and the jury', (1999) 83 Judicature 150, 153.

[168] For example, J Schklar, 'Juror reactions to DNA evidence: Errors and expectancies' (1999) 23 no 2 Law and Human Behavior 159,159; Redmayne, Expert Evidence (n 134) 57-93.

[169] Redmayne (n 134) 58.

[170] Jonathan J Koehler, 'Decision Making and the Law: Truth Barriers' (2013) Law and Economics Series No. 13-04 Northwestern University School of Law reviewing literature at 5.

[171] For example, *R v Deen* (1994) The Times, 10 January; *R v Doheny* [1997] Cr App R 369.

[172] Charles EH Berger and others, 'Evidence Evaluation: A Response to the Court of Appeal Judgment in R v T' (June 2011) 51 Issue 2 Science & Justice para 4.3.

[173] Redmayne (n 134) 58-65.

[174] Schklar (n 168) 161.

The term ‘cognitive bias’, mentioned above, refers to the way in which human decisions are made, and the biases that may skew these. Psychologists describe human-decision making in terms of heuristics (‘rules-of-thumb’) that are commonly employed to simplify decision making. These heuristics provide a resource-effective, rapid, decision-making process, often with only incomplete information, and which prevent the paralysis of indecision which could be caused by over analysis of any given situation.[175] Furthermore it is an approach that generally works.[176] Heuristics can be continuously updated in the light of new experience and without excessive effort. In both physical and relationship terms, people use these tools continuously in their daily lives to interpret and predict behaviour.

Unsurprisingly, much consideration has been given to the way in which jurors process DNA evidence as part of their decision-making process, especially given the complex, probability-based, nature of this type of evidence.[177] The problem arises in that, although such heuristics are undoubtedly useful for making day-to-day decisions, the use of heuristic shortcuts may lead to irrational results. The literature documents many examples of types of cognitive bias which have been shown experimentally and observed in practice.[178]

An example of cognitive bias relevant to the trial is ‘anchoring’. The basic concept of the anchor is that, even for simple decision-making models, an initial opinion must be held, or formed, and then subsequently adjusted according to the evidence presented, along with other factors, to reach a final decision.[179] Where the fact-finders anchor their story incorrectly, they may only see evidence to support this rather than consider any other, equally plausible, versions. Studies have shown that, whilst stories cannot lose touch with reality, by virtue of the evidence, the most important anchor was in fact common sense and heuristical belief.[180] The danger is that a

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[175] Jenny McEwan, *The Verdict of the Court: Passing Judgment in Law and Psychology* (Hart Publishing, 2003) 16.

[176] HJ Einhorn, RM Hogarth, 'Behavioral Decision Theory: Processes of Judgment and Choice' (1981) 32 Annual Review of Psychology 53.

[177] For example, Schklar (n 168) 159-184.

[178] McEwan (n 175) 16.

[179] For example, R Hastie, 'Algebraic Models of Juror Decision Making' in R Hastie (ed), *Inside the Juror: The Psychology of Juror Decision Making* (Cambridge University Press 1993) 88.

[180] WA Wagenaar, PJ van Koppen, HM Crombag, *Anchored Narratives: the Psychology of Criminal Evidence* (Harvester Wheatsheaf, 1993).

story could become anchored by virtue of common sense and experience, despite the fact that an equally plausible, and possibly true, story be ignored. An example is that of a person found dead. The murder weapon, bearing DNA that matches John's DNA profile, is found beside the body. Without additional evidence this would not be enough to prove beyond doubt that John was the murderer, however this may become an anchor for a possibly erroneous story.

Empirical studies have shown that juries may base their decisions, particularly in complex cases, partly on external cues, such as the appearance and credibility of the expert witness.[181] The HOC Forensic Science on Trial Report of 2005 was disappointed to discover widespread acknowledgement that the demeanour of the expert witness had a significant bearing on juries' response to their evidence.[182] However, studies have shown that the situation is complex: in some situations, despite the complexity of the case, there is evidence that an expert's testimony has been dismissed on the basis of him appearing to be a 'hired gun',[183] especially in the case of defence experts.[184] Interviewees in some of the studies described above stated that 'looking like an expert' was a tool they used within court to assess the evidence. Certainly, expert witness bodies believe that these factors count: advice to experts underlines the importance of demeanour, appearance and emotional behaviour in court.[185]

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[181] JL Cooper, EA Barnett and HL Sukel, 'Complex Scientific Testimony: How do Jurors Make Decisions?' (1996) 70 Law and Human Behavior 379; Myers R, Reinstei R, Griller G, 'Complex scientific evidence and the jury' (1999) 83 Judicature 150, 153; Joseph Sanders, 'The Merits of the Paternalistic Justification for Restrictions on the Admissibility of Expert Evidence' (2003) 33 Seton Hall L Rev 881, 907-913 reviewing literature.

[182] HC Forensic Science Report (n 153) para 140-142.

[183] Joseph Sanders, 'The Merits of the Paternalistic Justification for Restrictions on the Admissibility of Expert Evidence' (2003) 33 Seton Hall L Rev 881, 907, 911.

[184] Jenny McEwan, *The Verdict of the Court: Passing Judgment in Law and Psychology* (Hart Publishing, 2003) 193, quoting WA Wagenaar, PJ van Koppen, HM Crombag, *Anchored Narratives: the Psychology of Criminal Evidence* (Harvester Wheatsheaf 1993).

[185] Paul Newman, 'Giving a Performance' (2006) Feb CN 109, 110; H Hillenbrand, 'The Effective Uses of Expert Witnesses' (1987) Autumn BRIEF 48.

Studies have suggested that jurors are not overwhelmed by experts just because they are experts,[186] however this does not, unfortunately, mean that they understand the expert. There is empirical evidence that juries cannot distinguish between flawed and good science.[187]

A related effect, known as the 'CSI Effect' has been claimed by some judicial officers and researchers. The 'CSI Effect' refers to a purported influence of dramatic portrayals in the media of forensic science (and particularly DNA evidence) in crime investigation.[188] The portrayal of DNA evidence as 'common, swift, reliable, and instrumental in solving cases' has led to the suggestion that the jurors' view of this type of evidence may be distorted.[189] Specifically it has been suggested that jurors may be unwilling to convict in the absence of DNA evidence, and a willingness to convict in the presence of such evidence, whether probative or not.[190]

There have been many studies, mostly based on mock jury studies, aimed at identifying whether such an effect exists, and its nature. Generally speaking, such studies have shown that there is a relationship between exposure to such media and juror expectations for forensic evidence,[191] but that there did not appear to be an association with the verdict delivered.[192] It should be noted that such an effect, even if not determined as experimentally influential on the verdict, may certainly have an effect in conjunction with the other factors, detailed above, that influence jury consideration of DNA evidence.

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[186] Sanders (n 183) reviewing literature at 907; Henderson Report (n 48) para 2.2.1. pp 15-16.

[187] Dawn McQuiston-Surrett, Michael J Saks, 'The Testimony of Forensic Identification Science: What Expert Witnesses Say and What Factfinders Hear' (2009) 33 Law and Human Behavior 436, 451.

[188] Evelyn M. Maeder and Richard Corbett, 'Beyond Frequency: Perceived Realism and the CSI Effect' (January 2015) 57 No. 1 Canadian Journal of Criminology and Criminal Justice 84.

[189] Ley, Barbara, Natalie Jankowski, and Paul Brewer, 'Investigating CSI: Portrayals of DNA Testing on a Forensic Crime Show and their Potential Effects' (2012) 21 (1) Public Understanding of Science 62.

[190] Lawson, Tamara F, 'Before the Verdict and Beyond the Verdict: The CSI Injection within Modern Criminal Jury Trials' (2009) 41 Loyola University of Chicago Law Journal 119.

[191] Brewer, Paul R. and Barbara L. Ley, 'Media Use and Public Perceptions of DNA Evidence' (2010) 32 (1) Science Communication 93.

[192] Maeder (n 188).

It has been assumed by many commentators that judges are better equipped to assess expert evidence than jurors.[193] Concerns have been raised at two levels, however. First, many consultees to the Law Commission Report expressed concerns as to the ability of judges to act as gatekeepers against unreliable evidence, stating that there might be a 'culture of acceptance' in relation to evidence of a scientific nature.[194] Second, concerns were voiced as to the acceptance of such evidence when admitted, that is to say, evidence was weakly challenged and then accepted too easily by judge and jury.[195] Indeed the Report not only argues for more scientific training for judges,[196] but also proposes that specialist assistance should be available to them in judging the reliability of such evidence.[197]

Empirical evidence regarding judges' comprehension of scientific evidence has shown no differences with that of jurors. Specifically, studies have looked at judges' ability to disregard inadmissible evidence, falling into the trap of cognitive bias, drawing false inferences from probabilistic data, focusing on central aspects rather than peripheral indicators, distinguishing features that make research sound.[198]

Edmond suggests that judicial summings-up are ineffective:

> There is little evidence that they help to make trials substantially fair or have any salutary or empirically discernible effect in mitigating misleading expert opinion evidence or unfairness to the accused. In many cases where directions or cautionary warnings about expert evidence are provided, including where they are 'tailored to the facts of the case', the warnings rarely provide sufficient information to enable a useful assessment of the expert opinion evidence.[199]

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[193] Henderson Report (n 48) reviewing literature at para 2.2.2.

[194] Law Commission Report (n 4) para 1.17.

[195] ibid para 1.25.

[196] ibid para 1.43.

[197] ibid para 1.35.

[198] Dawn McQuiston-Surrett, Michael J Saks, 'The Testimony of Forensic Identification Science: What Expert Witnesses Say and What Factfinders Hear' (2009) 33 Law and Human Behavior 436, 436-440 reviewing literature.

[199] Edmond, Is Reliability Sufficient? (n 7) 50, quoting J Lieberman and B Sales, 'The Effectiveness of Jury Instructions' in W Abbott and J Batt (eds), *A Handbook of Jury Research* (American Law Institute, 1999) and G Edmond, K Martire and M San Roque, 'Unsound Law: Issues with ("Expert") Voice Comparison Evidence' (2011) 35 Melb UL Rev 52.

Other empirical studies have focussed on adherence to judicial directions regarding specific aspects of evidence. Worryingly, studies indicate that jurors sometimes disregard judicial warnings regarding unreliability of evidence, they are prejudiced if they discover bad character or previous record of the defendant, they are biased where more than one count against the defendant is joined, they were unable to discount inadmissible (for example, illegally obtained) evidence, and they were negatively biased where the defendant maintained a right to silence.[200] In other studies, jurors have misunderstood significant aspects of judicial opening and closing remarks, and instructions as to the law. Remarkably, jurors have also been shown to ignore judicial directions, and directions that they found boring.[201]

Studies looking at the effectiveness of judicial direction on the jury's ability to combine scientific evidence with other evidence have shown variable results, however a study by Rowe indicated that judicial direction did improve a jury's ability to combine moderately probative DNA evidence with non-scientific evidence.[202]

2.12 Cognitive Bias and the Expert Witness

The previous paragraphs have focused on the competence of the judge and the jury, particularly regarding their reasoning ability concerning complex scientific evidence. Unfortunately, experts themselves have not been shown to be immune from either simple cognitive biases, nor errors in probabilistic reasoning.[203] Of particular concern has been so-called confirmation bias, that is, the tendency to look for confirmatory evidence and to ignore contradictory evidence.[204] Worse, our beliefs persevere even after they have been shown to be false.[205] It might be imagined that the very scientific nature of forensic evidence offered some safeguard against this bias, with its

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[200] McEwan (n 175) 127-133.

[201] Henderson Report (n 48) reviewing literature at para 2.3.1.

[202] Rowe, B I, 'A Possible Solution for the Problem of Juries Slighting Nonscientific Evidence: A Bayesian-like Judicial Instruction' (1997) 24 American Journal of Criminal Law 541.

[203] For example, *R v Deen* (1994) The Times, 10 January; *R v Doheny* [1997] Cr App R 369.

[204] T Gilovich, *How We Know What Isn't So: The Infallibility of Human Reason in Everyday Life* (The Free Press, 1991) 30-37.

[205] CA Anderson, MR Lepper, L Ross, 'Perseverance of Social Theories: The Role of Explanation in the Persistence of Discredited Information' (1980) 39 J. Personality & Soc. Psychology, 1037.

rigorous development of hypotheses, testing and controls, offering a safeguard against such bias, however there have been a plethora of cases in which this has been insufficient. The Australian case of Jama, reported in Chapter One, was one in which:

> The errors were compounded by scientists, police investigators, lawyers, and the judge to such an extent that there was manifest failure at all levels of the criminal justice system.[206]

(To be specific, the official report stated that DNA evidence appeared to have been viewed as possessing 'an almost mystical infallibility'.[207] Professor Gill suggested that this, coupled with a 'CSI effect' and confirmation bias affecting every level of the legal process, led to this failure.[208])

This was despite significant 'common-sense' evidence excluding the defendant. Edmond suggested that, because the analyst is not protected from irrelevant information regarding the context of the case, a 'biasing snowball effect' may take place where 'cross-contaminated' interpretations and opinions may bounce back and forth between lay and expert witnesses, converging as apparently independent lines of evidence corroborating each other.[209]

Worse, it has been suggested that such a lack of objectivity has, at least bordered on, deliberate intent. From the Court of Appeal in *R v Ward* in 1993:

> For the future is it important to consider why the scientists acted as they did. For lawyers, jurors and judges a forensic scientist conjures up the image of a man in a white coat working in a laboratory, approaching his task with cold neutrality, and dedicated only to the pursuit of scientific truth. It is a sombre thought that the reality is sometimes different. Forensic scientists may become partisan. The very fact that the police seek their assistance may create a relationship

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[206] Gill (n 95) 29.

[207] Frank HR Vincent, 'Report: Inquiry into the Circumstances that led to the Conviction of Mr Farah Abdulkadir Jama' (Victorian Government Printer, 2010).

[208] ibid.

[209] Gary Edmond and others, 'Contextual bias and cross-contamination in the forensic sciences: the corrosive implications for investigations, plea bargains, trials and appeals' (2015) 14 Law, Probability and Risk 1, 1.

> between the police and the forensic scientists. And the adversarial character of the proceedings tends to promote this process. Forensic scientists employed by the government may come to see their function as helping the police. They may lose their objectivity. That is what must have happened in this case. It is illustrated by the catalogue of non-disclosures which we have set out.[210]

The factors described above, concerning competence in reasoning, in the face of known fallacious modes of thinking, therefore informs this study in two ways. Firstly, forensic experts' views on the competence of the judge and jury might be assumed to influence the expert's behaviour in testifying. Second, the expert themselves, assuming an understanding of such factors, must behave in such a way as to minimise effects of bias on their own part. Interviewees' perceptions in both these areas are of importance.

2.13 Equality of Arms in the Crucible?

Informing this study is not only narrowly the relative ability of the defence to resource their case, but also the broader relative 'institutional resource' of prosecution and defence.

One of the broader principles of the fair trial is that there be an equality of arms between parties. As Edmond pointed out, however:

> …a symmetrical commitment: the idea of 'a level playing field'… The trial and its shadowlands are not, however, finely balanced. Not only is the state far better resourced, but the state has a near monopoly on many types of expertise and often is the only party able to test or analyse the evidence (and any crime scene) … The collection and testing of traces is often oriented to the suspicions of … investigators, and not necessarily (or only serendipitously) oriented to examining versions of events consistent with non-guilt. The state has access to vastly greater resources… (and) at earlier stages.[211]

Edmond goes on to point out that the defence enters proceedings in very different circumstances, without the ability to carry out tests for themselves, and dependent on the actions of prosecution experts.[212] It has been pointed

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[210] *R v Ward* [1993] 1 WLR 619.

[211] Edmond, Gary and San Roque, Mehera, 'The Cool Crucible: Forensic Science and the Frailty of the Criminal Trial' (July 2012) 24 No. 1 Current Issues in Criminal Justice 51, 56.

[212] ibid 57.

out, also, that the defence function is typically diffused among private practitioners, and who are not necessarily 'repeat players' within the relevant types of cases, and may be limited in availability and quality.[213] Commentators,[214] and official reports[215] have pointed out that this unbalance in resource has further implications for the development of the case, and the trial. Even though a case may not go to trial, in the absence of informed evaluation of the scientific evidence, defence lawyers are is unable to give appropriate advice.

At a simple level too, the narrow ability of the defence to 'afford' an effective defence is critical. The Law Commission Report acknowledged that there are deficiencies in the position regarding the limited resources of the defence party, however, at the same time, acknowledged that the resources required by each party need not necessarily be equal: the prosecution needs to show guilt beyond reasonable doubt, whereas the defence simply aims to rebut this.[216]

The prosecution arguably has another advantage: it is commonly accepted that jurors evaluate cases by the construction of competing 'narratives', that is literal development of a rationale to provide a logical explanation for the evidence observed.[217] Naturally, prosecution counsel seeks to promote a convincing story, and defence to rebut it. Edmond made the point, however, that the prosecution has an advantage, in that its 'tightly-woven narrative' presents a rather easy to accept story.[218] At the same time, supporting evidence of unknown probative value may be overvalued by the jury as it seeks to construct the most convincing narrative. Defence may often involve rather subtle and convoluted critiques of the prosecution story, which may

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[213] Roberts Study (n 2) 71-85; Peter Murphy, Evidence and Advocacy (5th edn, Blackstone Press Ltd, 1998).

[214] For example, DJ Gee, 'The Expert Witness in the Criminal Trial' (May 1987) Criminal Law Review 307, 309.

[215] For example, Roberts Study (n 2) 66-67, 85-87.

[216] Law Commission Report (n 4) paras 3.81 – 3.85.

[217] N Pennington, R Hastie, 'The Story Model for Juror Decision Making' in R Hastie (ed), *Inside the Juror: The Psychology of Juror Decision Making* (Cambridge University Press, 1993) 192.

[218] Edmond, Is Reliability Sufficient? (n 7) 50.

not only be hard to understand but have been shown to appear negatively to jurors.[219]

Empirical studies on the effectiveness of defence cross-examination give cause for concern. McQuiston and Saks describe two experiments, albeit not on identification evidence, in which the researchers adjusted the quality of cross-examination designed to demonstrate shortcomings in the evidence. The weight placed by the jury on the prosecution expert's testimony was not affected by sound and sophisticated cross-examination, even though the underlying evidence was weak.[220]

Furthermore, Edmond suggested that the defence is disadvantaged in that prosecution witnesses are 'portrayed' as 'state'-employed, 'disinterested' and therefore more likely to be unbiased individuals, in comparison to the evidently interested and forensically inexperienced defence witness, the former is likely to gain greater credibility.[221]

Although referring specifically to admissibility of scientific evidence using the US *Daubert* admissibility rule, the NRC report, quoting a review by Neufeld of criminal cases in the US stated that:

> The criminal defendant's challenge is usually perfunctory … Defense lawyers generally fail to build a challenge with appropriate witnesses and new data. Thus, even if inclined to mount a *Daubert* (admissibility) challenge, they lack the requisite knowledge and skills, as well as the funds, to succeed.[222]

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[219] Warren Young, Neil Cameron and Yvette Tinsley 'Juries in Criminal Trials: Part Two: A Summary of Research Findings' (1999) (NZLC PP37, v2) para 5.10.

[220] Dawn McQuiston-Surrett, Michael J Saks, 'The Testimony of Forensic Identification Science: What Expert Witnesses Say and What Factfinders Hear' (2009) 33 Law and Human Behavior 436, reviewing literature at 439.

[221] Edmond, Is Reliability Sufficient? (n 7) 50.

[222] NRC Report (n 154) 106, citing PJ Neufeld, 'The (Near) Irrelevance of Daubert to Criminal Justice: And Some Suggestions for Reform (2005) 95 (Supp. 1) American Journal of Public Health s 109, s 110.

2.14 Law and Science: Incompatible or Competing Cultures?

The cultures of science and law have been described as being in a 'marriage of opposites',[223] one that is 'troubled' and 'irreconcilable'.[224] Haack, although describing specifically the US legal system, summarised these purported opposites in the following terms:

> [T]here are deep tensions between the goals and values of the scientific enterprise and the culture of the law… : between the investigative character of science and the adversarial culture of our legal system; between the scientific search for general principles and the legal focus on particular cases; between the pervasive fallibilism of the sciences—its openness to revision in the light of new evidence—and the concern of the law for prompt and final resolutions; between the scientific push for innovation and the legal system's concern for precedent; between the informal, problem-oriented pragmatism of scientific investigation and the reliance of the legal system on formal rules and procedures; and between the essentially theoretical aspirations of science and the legal system's inevitable orientation to policy.[225]

Certainly, law and science represent two internally rational, but different, epistemologies. The question that arises is how law and science work together. The 'competing culture' model suggests that science and law collaborate in an unstable compromise,[226] playing a positive role by constructing and deconstructing each other's credibility.[227]

Certainly in terms of competition, the influential NAS report identified poor 'scientific' culture as one of the problems at the root of what it identified as 'serious deficiencies' in U.S. forensic science.[228] This has been echoed more generally by a number of commentators. For example, Edmonds, in a review comparing admissibility jurisprudence with best practice as recommended by what he termed 'peak scientific and technical organisations' reported

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[223] AKY Wonder, 'Science and Law: A Marriage of Opposites' (1989) 29 Journal of the Forensic Science Society, 75.

[224] S Haack, 'Irreconcilable Differences? The Troubled Marriage of Science and Law (2009) 72 Law & Contemporary Problems, 1.

[225] ibid 2.

[226] Nelken D, 'A Just Measure of Science' in Michael Freeman, Helen Reece (eds), *Science In Court* (Ashgate, 1998) 14-18.

[227] Sallavaci (n 1) 6.

[228] NRC Report (n 154) 19-20.

substantial differences in the indicia that each body used to evaluate the reliability of expert evidence.

He went on to state that, whilst he did not suggest that courts should simply defer to science, the courts should be engaged with scientists and scientific knowledge.[229]

> The (judicial)… version of reliability… is a peculiar legal construction that excuses the failure to have undertaken appropriate research and testing because of the confidence vested in adversarial forensic techniques.
>
> In a rational system of evidence and proof, it does not make sense to admit opinion evidence and allow the jury to attribute whatever value they deem appropriate depending on what may transpire in a particular trial. The jury should not be entitled to assign a probative value in excess of what formal evaluation demonstrates (or would demonstrate) is possible.[230]

There is little doubt, therefore, that at least some 'actors' within the fields of law and science regard their disciplines as competitive.

Roberts describes the notion of an 'elementary disciplinary divide' as plausible, but somewhat hackneyed, especially when it is applied to forensic science.[231] He points out that, because forensic science is an applied science, it is, in fact, engaged in the application of the law, and, whilst investigative forensics might share many of the characteristics of 'scientific enquiry', prosecutory forensics normatively shares its characteristics with the law.[232]

Concurring with this view, Cole has suggested that the finding of 'serious deficiencies' in U.S. forensic science is overly general and naïve, and that few of the empirical findings accumulated by sociologists of science about research science seem to apply to forensic science. Instead, forensic science seems to have developed a distinct culture for which a sociological

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[229] Edmond G, 'Legal Versus Non-Legal Approaches to Forensic Science Evidence' (2016) 20.1 International Journal of Evidence and Proof 3, 22.

[230] ibid 3-4, 24-25.

[231] Roberts P, 'Renegotiating Forensic Cultures: Between Law, Science and Criminal Justice' (2013) 44 Issue 1 Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences 47, 47 (Renegotiating).

[232] ibid 48.

analysis will require new explanatory tools, if any proposed reform is to be effective.[233]

The question of whether science and law are 'incompatible' harks back to the question addressed above (2.8 'Accusations of 'Trial Pathology'), that is, are 'trial pathologies' a symptom of the weakness of the adversarial system (as suggested by Haack's quote above), or, as suggested by Roberts, simply manifestations of the adversarial system. Under the latter argument, any perceived weaknesses are caused by inadequate operation of the adversarial system, rather than the system itself.[234]

This study aims to identify expert witnesses' views on the compatability or otherwise of science and law.

2.15 Law and Science: Engagement of Forensic Science

Sallavaci described the meetings of science, law and common sense in the adversarial trial as a 'hybrid form of languages'.[235] A key line of investigation within the current study is the degree to which forensic experts 'engaged with' the judicial process.

A number of studies and commentary have raised concerns regarding whether and how forensic experts engage with the judicial process. For example, in a survey by Walsh of over 6000 articles in international forensic journals between 1990 and 2003, only 0.9 percent of articles looked at legal issues, and only 0.4 percent considered legal aspects of DNA evidence.[236] This is in great contrast to the considerable debate around evidential aspects of DNA evidence seen in legal and criminological journals. Furthermore, a review of those 0.4 percent of articles suggest that these originate largely from a small pool of academically active commentators. Perhaps the failure to engage academically cannot be translated into a general conclusion that forensic scientists do not engage with the trial process, however the degree to which this may happen is an area of investigation within this study.

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[233] Simon Cole, 'Forensic Culture as Epistemic Culture: The Sociology of Forensic Science' (2013) 44 Issue 1 Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences 36, 36.

[234] Roberts, Paradigms (n 116) 9.

[235] Sallavaci (n 1) 111.

[236] Walsh (n 10).

Walsh suggested ideological reasons why the forensic expert might actively disassociate themselves from legal aspects of scientific evidence, suggesting that these are more the domain of legal and sociological experts. He goes on to quote a model developed by Corns,[237] in which science is described as 'appropriating' the criminal justice process, by its apparent neutrality and infallibility lending justification to repressive legal practices. On that basis he underlines the onus which should be apparent to forensic scientists in terms of the perceptions of such neutrality and infallibility.[238]

Interestingly, Edmond suggests that forensics should disengage from the judicial process not because of any ideological reason, but rather because of a legal failure on the part of judges and lawyers to deal with expert evidence and 'serious and endemic problems with many forensic sciences'.[239] In other words, judges and lawyers have failed, and forensic science has abased itself in an attempt to cater to what it believes the court needs. Rather than compromise sound science in this misguided aim, Edmond suggests that forensic science should 'develop socio-epistemic legitimacy through greater autonomy from (crime) investigators'.[240] He goes on to propose that 'forensic science… should not look to courts (or law) for guidance, leadership, credibility or legitimacy' adding that:

> …the historically cosy relationship with the courts, along with a certain shared comfort in lax admissibility standards for incriminating expert opinion, has diverted attention from research and interest in the reliability of evidence.[241]
>
> Until (forensic science) address(es) the identity issue… (it will) struggle to fulfil the very real needs of surprisingly frail adversarial legal processes.[242]

As a counterpart to this, he suggested that it is for the courts to engage with science and scientists, as, until now, they have 'privileged the wrong type of

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[237] C Corns, The science of justice and the justice in science, Law Context 10 (1992) 7–28.

[238] Walsh (n 10) 53.

[239] Gary Edmond, Mehera San Roque, 'Actual Innocents? Legal Limitations and their Implications for Forensic Science and Medicine' (2011) 43 Issue 2-3 Australian Journal of Forensic Sciences 177 (Edmond, Actual Innocents?).

[240] ibid 177.

[241] ibid 178.

[242] ibid 205.

heuristics in their attempts to engage with scientific and technical forms of knowledge'.[243]

As was pointed out in the NAS Report, '(t)he adversarial process relating to the admission and exclusion of scientific evidence is not suited to the task of finding '"scientific truth"'.[244]

As a counter balance, Roberts has challenged the 'stereotypical conceptions of law and science as cultural opposites', arguing that 'English criminal trial practice is fundamentally congruent with modern science's basic epistemological assumptions, values and methods of inquiry.' However he goes on to state that, whilst practical tensions exist, and may be explained, it is for the scientist to neutralise these tensions by 'paying close attention to criminal adjudication's normative ideals and their institutional expression in familiar aspects of common law trial procedure, including evidentiary rules of admissibility, trial by jury, adversarial fact-finding, cross-examination'.[245] In other words, on the law's terms. Whether forensic scientists are willing to do this is a subject of enquiry here. Indeed, Roberts pointed out (in a 'doubtless impertinent, but necessary, question… '), that, despite the fact that professional and ethical duties for expert witnesses had been widely advertised, including provisions within delegated statutory instruments, it was not clear how widely the message had been received and understood. Forensic science is in the law business, and is necessarily subservient to the legally defined concept of justice.[246]

It has been pointed out that the engagement of forensic science and the judicial process is first and foremost a social process, and yet forensic research has centred on scientific aspects rather than judicial.[247]

Robertson, the Director General of the Australian National Centre for Forensic Studies, suggests that forensics should move (back) to adopt the characteristics of a profession, rather than attempt to simply demonstrate

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[243] Edmond G, 'Legal Versus Non-Legal Approaches to Forensic Science Evidence' (2016) 20.1 International Journal of Evidence and Proof 3, 3-5.

[244] NRC Report (n 154) 12.

[245] Roberts, Renegotiating (n 231) 47.

[246] Roberts, Paradigms (n 116) 3-6.

[247] Ribaux, O and others, 'Intelligence-led crime scene processing. Part 1: Forensic Intelligence' (2010) 195 (1-3) Forensic Science International 10-16, quoted in Roberta Julian and Sally Kelty, 'Forensic Science and Justice: From Crime Scene to Court and Beyond' (July 2012) 24 No. 1 Current Issues In Criminal Justice 1, 2.

independence in a system compromised by the need to provide the judicial system with what it asks for,[248] a point echoed by Edmond:

> Forensic scientists should be appealing to techniques that have been studied and validated rather than whether a technically incompetent (legal) profession finds their opinions useful in the disposition of busy dockets.[249]

Before leaving the subject of forensic evidence in a 'frail' legal process, it is worth pointing out that Edmond's suggestion that some forensic science may compromise scientific standards is echoed by the NAS Report.[250] In the report, whilst not stating that forensic science was 'unscientific', they do say that much of it lacked 'adequate validation, certification, accreditation, oversight, and basic research, amongst other things'.[251] They also suggest that aspects of forensics do not exhibit scientific 'culture'.[252]

Lastly, some indirect, however, arguably powerful, evidence informs a hypothesis that forensic scientists do not engage with the judicial process. Two recent commissions invited submissions from forensic scientists, but with limited success. The recent Law Commission Consultation invited submissions from any interested parties.[253] There were only two submissions from individual forensic witnesses, both of whom were active commentators with a special interest. There were submissions from corporate suppliers of forensic services, however, arguably this does not demonstrate engagement at a scientific level, but rather at a management level. Similarly, a report on the effects of the closure of the Forensic Science Service, although it invited witnesses, rather than invited open contribution, only examined forensic scientists' view on the effect of the closure on the judicial process as a whole. On the one hand these witnesses were not asked specifically about their experiences in court, however on the other,

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[248] Roberta Julian and Sally Kelty, 'Forensic Science and Justice: From Crime Scene to Court and Beyond' (July 2012) 24 No. 1 Current Issues In Criminal Justice 1, 131.

[249] Edmond, Actual Innocents? (n 239) 196.

[250] NRC Report (n 154).

[251] Simon A Cole, 'Acculturating Forensic Science: what Is 'Scientific Culture', And How Can Forensic Science Adopt It?' (2010-2011) 38 Fordham Urb. L.J. 435, 446.

[252] NRC Report (n 154) 38-39.

[253] Law Commission Consultation (n 8).

witnesses from the legal profession lost no opportunity in expounding their views on the use of scientific evidence in court.[254]

2.16 Conclusions

This study is informed both by earlier studies on witness experience in court, and by the adversarial crucible in which the expert finds himself. Reported experience of witnesses across a broad spectrum, from lay witnesses through to medical experts, through to forensic experts, show a striking similarity: witnesses feel at the mercy of the adversarial system. Of concern is that, almost without exception, witnesses feel that they have not been able to give the evidence that they wanted to, or that they felt presented a true picture. They explain the reasons for this as being lack of opportunity to explain the evidence to counsel pre-trial, and a perceived lack of competence. Particularly, prosecution experts feel that they have not been given enough information to properly frame their case, and suspect that sometimes information is withheld from them. Perceived adversarial safeguards, particularly regarding challenge by the defence, have been criticised as weak, within the studies, and by eminent commentators.

Meanwhile, expert witnesses, whilst attempting to remain unbiased, find themselves affected by subtle pressures to take sides, not least because they fall into naturally differing roles of prosecution or defence.

Previous studies have not specifically looked at DNA testimony. As explained above, this provides a uniquely clear ‘lens’ through which the interaction between rigorous science and the judicial system may be examined. It was also noted above that, however close to a ‘gold standard’ DNA profiling is, it is not beyond challenge: recent cases have allowed expert opinion on DNA matches based on subjective judgment and not scientific knowledge. Rather than dilute the value of this study (after all, the study claims value in examining a ‘purely scientific’ forensic technique), this fact enhances the value: the study attempts to draw some conclusions regarding the argument that however rigorous the science, it can never, on its own, provide the legal truth. In this way, the view through the ‘lens’ is even clearer.

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[254] Science and Technology Committee, *Forensic Science*, Second Report Volume 1 (HC 2013–14).

Lastly, and, perhaps, most fundamentally, this study aims to examine how science and the law communicate. Although Sallavaci described the interface between science, law and common sense as a ‘hybrid’, others have described the interface as competing or incompatible. Certainly the studies outlined above seem consistent in their reports that accommodation has not been found. The implications for the findings of this study are great: a very pessimistic hypothesis would be that the greater the degree of scientific rigour on the part of forensics (and nothing can be more rigorous than DNA evidence), the greater the gulf between the worlds of law and science. The current study may say something about the engagement of the judicial system with the forensic scientist, however, for our purposes, the most important findings will be the degree of engagement of the forensic scientist with the judicial system. The current study aims to form some conclusions in this area.

Chapter 3
The Criminal Trial and DNA Evidence

3.1 Introduction

A central context of this study is the adversarial nature of the criminal trial in the English Crown court. Opposing prosecution and defence parties present and cross-examine evidence to support their respective cases, with the judge acting as neutral arbiter. Whilst lay witnesses may testify only as to evidence directly witnessed, experts may assist with evidence of specialist opinion. The decision as to the ultimate issue, that is, a decision of guilty or not guilty, is made by a lay jury, on the basis of the evidence presented.

It might be stated, more accurately, that the adversarial system not only provided a context, but *defined* this study. The forensic expert's actions throughout the investigative and prosecution process are dictated by the English adversarial system and concerns regarding expert evidence have centred on claimed detrimental effects of that adversarial process.[1] The objectives of the study, and the associated methodology, focussed specifically on those claimed detrimental effects. To that end, the reported findings and conclusions relate solely to expert evidence within the adversarial system. To support understanding of the study, including its objectives, methodology, and findings, this chapter explains pertinent areas of the adversarial trial, and the use of expert, and, particularly, scientific, evidence within it.

As discussed within Chapter One, the other key context of this study is the use of DNA evidence. Although, to a degree, DNA evidence may be said to 'define' this study, concerns relating to expert evidence extend to all types of expert evidence. To that degree, the general lines of investigation within this study do not exclude application of some of the findings to non-DNA forensic evidence. Having said that, the focus on DNA identification evidence within this study provided a special context, by virtue of its exceptional, if not unique, degree of scientific rigour. This chapter aims to support understanding of the study's objectives, methodology, and findings by explaining relevant aspects of, not only DNA evidence, but also supporting

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[1] Mike Redmayne, *Expert Evidence and Criminal Justice* (Oxford University Press 2001) 198-205; Oriola Sallavaci, *The Impact of Scientific Evidence on the Criminal Trial: The Case of DNA Evidence*, (Routledge, 2014) 33.

scientific principles. Important amongst these is a description of the probabilistic aspects of DNA evidence, which, perhaps unsurprisingly, have caused difficulties in relation to the certainty required of the trial process. The chapter also contains a description of the specific law relevant to the use of DNA evidence, and brief discussion regarding its latest developments.

3.2 The Adversarial Trial

Approximately 1.6 million defendants are proceeded against annually in criminal cases.[2] Trial before judge and jury in the adversarial arena of the English Crown court is frequently held up as representing the epitome of due process.[3] It might be regarded as strange, therefore, that trial before a jury happens in only between 0.5% and 1% of these cases.[4] This is because more than 97% of prosecutions are dealt with in the lower courts, and in those proceeding to the Crown Court, approximately 70% of defendants plead guilty.[5] Additionally, in a large number of cases of investigation of crime, there may not be sufficient evidence to proceed with a prosecution, an offence may be diverted through an alternative judicial process, or it may be judged not to be in the public interest to prosecute.[6]

It could be, perhaps naively, argued that, on that basis, the classic trial is of little relevance to the majority of investigated crime, and therefore to the criminal justice process. However, it may be convincingly argued that, not only does the trial have symbolic importance in underpinning societal confidence in the judicial process, but that the trial forms the ‘presentational surface’ of the entire underlying judicial process, and, in this way, both reflects and defines it.[7]

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[2] Ministry of Justice, ‘Judicial and Court Statistics 2011’ (2012).

[3] Gary Slapper and David Kelly, *The English Legal System* (14th edn, Routledge, 2013) 509.

[4] Ministry of Justice, ‘Judicial and Court Statistics 2011’ (2012); Ministry of Justice, ‘Criminal Court Statistics Quarterly, England and Wales, October to December 2014’ (March 2015).

[5] Ministry of Justice, ‘Judicial and Court Statistics 2011’ (2012) 9.

[6] Antony Duff and others, ‘Introduction: Towards a Normative Theory of the Criminal Trial' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 8-10.

[7] ibid 10.

Damaska defined the pure adversarial trial as proceedings structured as a dispute, between two sides in a position of theoretical equality, before a court which must decide the outcome of the contest; the parties themselves should establish that a contest exists, and its boundaries; evidence is exclusive to the party adducing it; an adjudicator's role is to ensure that the parties abide by the established rules, and would intervene only if one party objected to conduct by the other party; and only the parties themselves are interested in the outcome of the trial.[8] Although not a defining characteristic of the adversarial trial, a practical consequence of the adversarial trial is the principle of orality, that is, the principle that evidence presented by witnesses in person is superior to documentary evidence.[9] Damaska argued that this was because, where two parties are attacking each other's evidence, this can best be done orally. Associated with this is the belief that the truth of a witness's evidence may be assisted by an assessment of their demeanour,[10] and that cross-examination by the opposing party's counsel is sufficient to uncover weaknesses in that evidence.[11] Given the centrality of evidence to the trial, and for reasons of policy that the dispute be on a level of equality, the admissibility of the evidence is closely regulated and controlled. Whilst, again, not a defining factor of adversarial trials, the philosophy, at least, of trial by one's peers in the form of a jury, also sits at the heart of the adversarial trial.[12]

In contrast to the adversarial system, most of continental Europe has historically adopted an 'inquisitorial' approach to trial.[13] The inquisitorial system involves the appointment of (for example, in France, often presented as a classical inquisitorial system) a *juge d'instruction*, whose responsibility is to carry out an investigation of the case, to include both prosecution and defence cases, and culminating in a trial, which is also seen as part of the investigation. They are therefore expected to arrive at the truth by their own

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[8] MR Damaska. 'Evidentiary barriers to conviction and two models of criminal procedure: A comparative study' (1973) 121.3 University of Pennsylvania Law Review 506.

[9] J McEwan, *Evidence and the Adversarial Process: The Modern Law* (2nd edn Hart Publishing, 1998) 3.

[10] M Stone, *The Proof of Facts in Criminal Trials* (Green, 1984) 150.

[11] R Egglestone, *Evidence, Proof and Probability* (Weidenfield & Nicolson, 1978) 35.

[12] McEwan (n 9) 3.

[13] R Auld, *Review of the Criminal Courts of England and Wales: Report* (Stationery Office, 2001) ch 11 para 1 (Auld Report).

efforts.[14] This is in contrast to the adversarial system, in which it is argued that the truth is more effectively discovered by having two self-interested researchers starting from opposite points of view, and so less likely to miss anything than the impartial researcher starting from some point between.[15] Indeed, regarding expert witnesses, Damaska suggested an advantage for adversarialism in that '(r)egularly subjected to duelling experts, adjudicators need not surrender to the authority of science as blindly as those confronted with a single opinion of their chosen expert'.[16] In its purest sense the inquisitorial trial itself is a final examination of documentary evidence, or *dossier*, (seen as being more reliable than oral evidence), and not a confrontation between the accused and the prosecution.

It should be noted, however, that, although adversarial and inquisitorial systems remain distinct, as Professor John Spencer has said, 'the borrowings between the two have been so extensive that it is no longer possible to classify any of the criminal justice systems in Western Europe as wholly adversarial or wholly inquisitorial'.[17] Additionally, although the English legal system is often held to be the paradigm of adversarial tradition,[18] the modern reality, in practice, deviates in a number of respects from these paradigmatic characteristics. This, if for no other reason than that, as opposed to the concept of a neutral state in a pure adversarial process, the state does indeed have a central interest in the prosecution of crime.[19]

Regarding the first of the arguments mentioned above, that the trial has symbolic importance. Even if trial by judge and jury does not constitute the major form of trial in England, this should not be seen as undermining the fundamental importance of the tradition of trial before jury to the English legal system. As Auld LJ pointed out in the *Review of the Criminal Courts of England and Wales of 2001*, until the middle of the 18th century almost all trials were before a jury;[20] not only are its principles at the heart of the entire judicial process, but the structure and many features of the modern system

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[14] Kate Malleson and Richard Moules, *The Legal System* (4th edn, Oxford University Press, 2010) paras 1.29 – 1.30.

[15] P Devlin, *The Judge* (Oxford University Press, 1979) 61.

[16] Mirjan R Damaska, *Evidence Law Adrift* (Yale University Press, 1997) 152.

[17] Auld Report (n 13) ch 11 para 3.

[18] McEwan (n 9) 2.

[19] ibid

[20] Auld Report (n 13) ch 11 para 2.

are based on the same principles. It has been said by the historian, EP Thompson, that 'The English common law rests upon a bargain between the law and the people. … A jury is the place where the bargain is struck'.[21] The rationale underlying this contention is that it allows not only the active participation of the layman, but assigns them the role of decision maker. As such it acts as a counter to the power of the judiciary, and, as Michael Mansfield QC has argued, 'is the most democratic element of our judicial system' and the one which poses 'the biggest threat to the authorities'.[22] As such the jury is central to public confidence in the criminal justice system, at least.

To explore the concept of trial as symbolic statement of judicial authority further: it has been pointed out that society places serious import on the attachment of blame to an individual (that is, a guilty verdict), but at the same time it is difficult to convincingly justify the substance of a decision, especially given the need for finality, and the fact that charges may be denied. It has been argued that, this being the case, a fundamental objective of the trial is to establish public confidence by justifying, at least, the manner in which judicial decisions have been made, thereby stamping a seal of legitimacy over the court's decision.[23] Interestingly, it has been suggested that many of the 'vestigial' symbolic aspects of the modern trial, have as an underlying objective, the reinforcement of authority and 'a solemn search for truth'.[24]

The second argument supporting the importance of the trial, briefly, that the trial forms a 'microcosm' of the judicial process, may be viewed in two ways. First, and, at first sight, simplistically, the argument is that, because an investigation may eventually become a trial, then every step of the process, from scene of crime, to detection, to prosecution, to trial, must reflect the requirements of the trial, if it is not to fail at that stage. That is to say, investigative and pre-trial processes depend on the trial rather than vice-versa. Ashworth suggested that the trial, of over-emphasised importance, be

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[21] Quoted in James Driscoll, 'The Decline of the English Jury' *(*Spring 1979) Vol. 17 Issue 1 American Business Law Journal 99, 113.

[22] Quoted in Gary Slapper and David Kelly, *The English Legal System* (14th edn, Routledge, 2013) 510.

[23] John D Jackson, 'Managing Uncertainty and Finality: The Function of the Criminal Trial in Legal Inquiry' in Antony Duff and others (eds*), The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 128.

[24] ibid 134-135.

viewed as the tip of a judicial iceberg, protruding above an under-emphasised pre-trial process:

> 'A full-dress trial may be less of a centrepiece than a monument to the failure of the many pre-trial machinations to produce a guilty plea'[25]

'… or dismissal', should, perhaps, be added.

Second, and persuasively, it has been pointed out that, if close scrutiny is made of the essential defining elements of a trial, then, in many ways, the investigation and pre-trial process may actually conform with and contain the minimum elements of a trial, and therefore itself be seen as a form of trial.[26] Examples of this would include the accused being informed about the evidence against them; the exclusion of inadmissible evidence; having the right to challenge the evidence and advance their own case; the ability to plead guilty without trial or, indeed, the ability of prosecutors to drop the prosecution; the existence of the 'caution', which, arguably, could not exist in the absence of a potential future trial.

3.3 The Objectives of the Trial

The foregoing says little about the objectives of the trial. It has been written that 'the greatest of all fallacies entertained by lay people about the law is… that it is the business of the court of justice to discover the truth'.[27] *Prima facie* this may be a rather cynical view of the function of the court, however it serves to draw attention to the fact that, although a simple analysis must draw a conclusion that the primary objective of the trial is to discover the 'substantive truth', this may indeed differ from the 'legal truth' on which the verdict is based.

As Auld LJ stated in his 'Review of the Criminal Courts',

> Once the courts are considered in the context of the criminal justice system as a whole, including the community at large and the various agencies and

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[25] Ashworth A, 'Criminal Justice and the Criminal Process' (1988) Vol 28 No 2 Brit. J. Criminology 112-113.

[26] John D Jackson, 'Managing Uncertainty and Finality: The Function of the Criminal Trial in Legal Inquiry' in Antony Duff and others (eds*), The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004).

[27] F Pollock, 'Essays in the Law' (University Press, 1922) 275.

> others involved in the process, it is obvious that their purpose and function are not confined to the forensic practicalities of convicting and sentencing the guilty and acquitting others.[28]

It might be assumed that, in the ideal world, substantive and legal truth coincide, however this is arguably a naïve view. Whether a substantive truth actually exists in any case is indeed a question of debate: it is widely accepted that 'truth' concerning narrative accounts cannot be found, but only re-constructed by subjective judgment and interpretation of evidence.[29] Where substantive truth and legal truth diverge in practice, it is the legal truth that is sought by the trial.

There are sound policy and practical reasons for this to be the case: it has been pointed out that 'notions of legality and due process are central to the very definition of a trial',[30] and that its purpose is not only to reach an 'accurate' judgment, but, as mentioned in the previous section, to communicate the justice of this to the defendant and to society.[31] The Government's explicit objectives for the criminal justice system (presumably including the trial itself), is that criminal cases be dealt with justly.[32] This includes acquitting the innocent and convicting the guilty, dealing with prosecution and defence parties fairly, recognising the defendant's rights , particularly those under Article 6 of the European Convention on Human Rights, respecting the interests of witnesses, victims and jurors and keeping them informed, dealing with cases efficiently and expeditiously, and ensuring that the correct information, including other relevant factors, is taken into account when considering the disposition of case.[33] They do not explicitly require the determination of substantive truth.

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[28] Auld Report (n 13) ch 1 para 4.

[29] Heike Jung, 'Nothing But The Truth? Some Facts, Impressions and Confessions about Truth in Criminal Procedure' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 148.

[30] Jenny McEwan, 'Ritual, Fairness and Truth: The Adversarial and Inquisitorial Models of Criminal Trial' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 55.

[31] R A Duff, *Trials and Punishments* (Cambridge University Press, 1986) 115.

[32] Criminal Procedure Rules 2015, s 1.1 (1).

[33] Criminal Procedure Rules 2015, s 1.1 (2).

Other constraints upon the adversarial trial lie in the principles of finality of decision, as required by common law,[34] and the interest of public confidence.

This requirement of finality in an environment of uncertainty means that the courts must operate an 'error preference' policy. In practical terms this means that wrongful acquittals are preferable to wrongful convictions.[35] For this reason, English law has been described as having a 'principled asymmetry' in favour of innocence.[36] For example, the burden of proof is placed on the prosecution to prove their case, at a standard of 'beyond reasonable doubt', against a defendant who is assumed to be innocent until proven guilty. The verdict may be 'guilty', or 'not guilty', that is, not shown to be guilty, rather than 'innocent'. (It should be noted that judicial guidance states that the judge should simply direct the jury that they should be 'sure' of the defendant's guilt, even though the term is considered to be legally synonymous.[37])

Whereas substantial truth may be reached more readily under a 'principle of free proof', whereby any logically relevant evidence may be admitted, it is, arguably, self-evident that this would not be compatible with the objectives and constraints described above. This being the case, specific rules involving various and complex (largely exclusionary) rules of evidence act to countermand certain types of evidence on a policy basis,[38] and evidence a rational response to the judicial system's objective of legal fact finding given the constraints placed upon it.[39]

As an example, and relevant to this study, was the question of admissibility of certain types of DNA evidence. In *Hoey* it was claimed that Low Copy

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[34] Law Commission*, Double Jeopardy and Prosecution Appeals* (Law Com No 267, 2001) para 4.3.

[35] Paul Roberts and Adrian Zuckerman, *Criminal Evidence* (2nd edn, Oxford University Press, 2010) 19; John D Jackson, 'Managing Uncertainty and Finality: The Function of the Criminal Trial in Legal Inquiry' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 127.

[36] Roberts and Zuckerman (n 35) 19.

[37] Judicial Studies Board, *Crown Court Bench Book: Directing the Jury* (2010) 16.

[38] R Emson, *Evidence* (4th edn, Palgrave Macmillan 2008) 2.

[39] John D Jackson, 'Managing Uncertainty and Finality: The Function of the Criminal Trial in Legal Inquiry' in Antony Duff and others (eds*), The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 140.

Number DNA evidence should have been excluded on the basis that it was unproven, therefore inadmissible, and therefore excessively prejudicial to the defendant's case.[40]

Almost every aspect of the principles, procedures and rules discussed above, governing the judicial process and trial, have suffered significant challenges regarding their impact on the ability to reach a 'just' verdict with regard to considerations of public policy.[41] An interesting observation has been made that, despite these challenges, and despite ongoing statutory reform, the elements of the trial outlined above still exist; this being the case, perhaps these elements could be said to form the essential defining factors of the trial in the English criminal legal system.[42]

Before leaving the discussion of the objectives of the adversarial trial, it is worth considering the degree to which its procedures and rules aim to provide a level playing field for the prosecution and the defence. In his Review of the Criminal Courts of England and Wales, Auld LJ gave an interesting account of the history of judicial thinking regarding the balance of society's rights and those of the defendant. Whilst evidently a balance has always been a consideration, this has apparently not always been envisaged as an equal balance.[43] Arguably, this may not have been intended as a policy decision, but rather as a statement of fact, given the different resources and competing interests. Nevertheless, whilst the concept of 'equality of arms' is not mentioned specifically in Article 6 of the European Convention on Human Rights, it has nevertheless become accepted as a central tenet of the right to a fair trial,[44] and is therefore implicit in English law. Specifically the rights described in Article 6 include that of the defendant to know the evidence against them, to challenge it, and to advance their own case. It has been suggested, however, that any expectation of such equality in the English courts is 'hardly any more than a transparent and potentially

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[40] *R v Hoey* [2007] NICC 49 (20 December 2007).

[41] For example, Antony Duff and others (eds*), The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004)

[42] Antony Duff and others, 'Introduction: Towards a Normative Theory of the Criminal Trial' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 3-4.

[43] Auld Report (n 13) ch 1 paras 12-18.

[44] For example, *Salov v Ukraine* (app.no.65518/01), ECtHR Judgment 6 September 2005, [87].

pernicious, fiction'.[45] The issue of the 'equality of arms' necessary for a fair trial is relevant to this thesis, given the assumption that significant technical resource is required to advance and defend DNA evidence.

In summary, it may be argued that the objectives of the criminal justice system, and the trial, as part of this, assuredly aim to pronounce on the substantive truth of each case but within a dominant framework of due process. Arguably, a 'just' outcome may be said to be most closely aligned with the achievement of the latter. Before leaving this subject, it is worth mentioning that, given the highly technical nature of DNA evidence, and the inevitable interaction of, on the one hand, 'scientific reality' with, on the other hand, 'legal reality', as described above, there is significant scope for conflict.

3.4 Trial Procedure in the Crown Court

The decision to prosecute is made by the Crown Prosecution Service (CPS), after receiving a case file from the police, and based on official criteria (such as being in the public interest and having a realistic prospect of conviction).[46] In practice, however, the police have significant (and arguably over-riding) discretion as to whether to ignore, caution, or pursue a prosecution, and if the decision is prosecution, then the specific charges to be laid.[47] It may be remarked that the CPS cannot prosecute a case of which they are not aware. The Criminal Law Act 1977 determines where the case will be heard, depending on offence type.

The procedure followed in the Crown Court for a single defendant is briefly summarised below.[48]

The charge is read and the defendant asked for their plea. In the event of a not guilty plea, a jury of 12 is sworn in. The opening of the Crown case is made by counsel for the prosecution, stating the basic elements of the law that must be proved, and the evidence on which they will rely. Witnesses for the Crown will be called and asked by prosecution counsel to give their evidence. This is known as 'evidence-in-chief'. They will be cross-examined

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[45] Roberts and Zuckerman (n 35) 14.

[46] Crown Prosecution Service, 'The Code for Crown Prosecutors' (2010).

[47] Gary Slapper and David Kelly, *The English Legal System* (14th edn, Routledge, 2013) 356-357.

[48] JG Hall, G Smith, *The Expert Witness* (2nd edn, Barry Rose Law Publishers Ltd, 1997) 52-56.

by defence counsel and then re-examined by prosecution counsel on any matters arising during defence's cross-examination. If evidence is not contested, then it may be read in court rather than presented in person. It should be noted that expert witnesses, for prosecution and defence, are permitted to be present in court while they are not presenting evidence, unless counsel makes successful application that they may be excluded. This concludes the first part of the prosecution case.

If the defence is calling witnesses other than the defendant themselves, then they make an opening speech, outlining the defence case. This is usually reserved until after the defendant has been examined, if there are no other witnesses. The defendant is the first to give evidence. They will then be cross-examined by the prosecution, and then re-examined by the defence. At the end of the defendant's evidence, counsel for the prosecution makes their closing speech, followed by that of the defence.

After both prosecution and defence cases have been so concluded, the judge delivers a summing up to the jury, summarising points of law and the evidence presented, after which the jury retires to consider its verdict. This must initially be unanimous. After two hours however, the judge may direct that a majority verdict of at least 10 to 2 will be accepted. The jury returns and delivers its verdict, upon which the defendant is released or sentenced.

3.5 The Creation of Competing Cases

The case against a suspect is not a self-evident construct, but may better be described as a narrative, or 'story', constructed by investigators and developed by the prosecution, that both bears critical examination in the light of all the evidence, and, is most likely to lead to a successful prosecution.[49] Within an incident may lie the basis for more than one type of case.[50] Whether the jury choose to believe the prosecution or defence story defines the verdict, however it might be noted that the story in a juror's mind is not necessarily exactly the same as that proposed by counsel, but one constructed from their own perception of the presented case, and evidence, with any gaps filled by inferences.

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[49] A Sanders, 'Constructing the Case for the Prosecution' (1987) 14 Journal of Law and Society 229.

[50] ibid 228.

The mode of thinking known as the ‘story model’, was first described by Pennington and Hastie, and proposed the literal development of a rational story by the fact-finder to provide a logical explanation for the evidence observed.[51] Pennington and Hastie’s model described the process engaged in by the fact-finder as consisting of three steps: first, to construct a ‘value-free’ (that is, objective) account of what happened, second, to apply the categories of law that apply, as given within judicial instructions, and, third, to determine a verdict.[52] The model is held to determine the verdict, rather than justifying a decision after the fact.

Of course the construction of the ‘objective account of what happened’ is not a mechanical process: it has been suggested that the stories expounded in court create tensions reflecting those encountered in everyday life, including common experiences, common sense, social norms and ordering. The more ‘engrossing’ the story that is constructed, the better the judgment that may be made.[53] Additionally, Pennington and Hastie made the point that the third stage of the story development process, making a final decision by comparing the ‘coverage, coherence, uniqueness and goodness-of-fit’ between the preferred story and the hierarchy of legal decisions, is assisted by the fact that the development of the law has reflected socially acceptable behaviour. It is therefore no coincidence that the hierarchy of legal definitions closely parallel observed human motives, intentions and actions.[54] An interesting example of this is that it has been shown that whilst juries may not understand the complexities of hearsay rules, they do follow the rules; it has been suggested because they intuitively distrust ‘second-hand’ evidence.[55]

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[51] N Pennington, R Hastie, ‘The Story Model for Juror Decision Making’ in R Hastie (ed), *Inside the Juror: The Psychology of Juror Decision Making* (Cambridge University Press 1993) 192.

[52] Robert P Burns 'The Distinctiveness of Trial Narrative' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 161-162; Pennington (n 51) 192.

[53] ibid 159-160.

[54] Pennington (n 51) 201.

[55] P Miene, E Borgida, R Park, 'The Evaluation of Hearsay Evidence: a Social Psychological Approach’ in NJ Castellan (ed), *Individual and Group Decision Making: Current Issues* (Erlbaum, 1993).

Many questions have been raised regarding the jurors' ability to construct a rational account. [56] As Auld LJ said in his review of the Criminal Courts report:

> And, at the end of the trial, the judge orally gives them complex directions on the law and a summarised regurgitation of the evidence, much of which must become a blur for many of them by the time they are considering their verdict.[57]

3.6 Case Construction

The start point for the narrative presented in court occurs at an early stage, with the police investigation, and a subsequent prosecution decision to pursue a particular version of the facts. The story so created depends heavily on the lines of enquiry pursued by the police, the evidence, both physical and in the form of witness statements (including suspect statements), and the strength of the resulting case that the police and prosecution are able to construct.

The very interaction between investigator and suspect and other witnesses involves classifications by which the suspect and witnesses may understand their actions or what they have observed. So terms such as recklessness, consent, trespass, may not only be suggested, but also adopted by the suspect and witness in their responses to questioning.[58] Case narratives thus become progressively 'fixed' as the behaviours and observations of suspect and witnesses (and physical evidence) become, arguably, progressively constrained within such definitions. Professor Redmayne has suggested that a certain 'reification' surrounds the process – as the story is built, the assumptions, interpretations and decisions made by the investigator, become progressively hidden and difficult to access or challenge. This, too, then has the effect of constraining and entrenching a particular line of reasoning and construction of a particular case.[59]

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[56] Jenny McEwan, *The Verdict of the Court* (Hart Publishing, 2003), 18.
[57] Auld Report (n 13) ch 5 para 77.
[58] Redmayne (n 1) 8.
[59] ibid

The subject of case ‘construction’ has received considerable attention,[60] particularly in the wake of a number of high-profile miscarriages of justice. Professor Redmayne has pointed out that case construction has become a ‘widely used metaphor’, but that relatively little attention has been paid to the precise ways in which cases can be said to be constructed.[61] The somewhat ‘sinister’ tone adopted by some ‘constructionist’ literature implies that the early adoption of a ‘story’ is fraught with perils and biases, as positive evidence and lines of enquiry are selectively used to build the case and alternative lines side-lined.[62] Professor Redmayne’s view is that, as a whole, the constructionist literature does not support such a general finding, and that we should simply regard the construction of cases as being synonymous with building of cases. Further we should not abandon seemingly naïve assumptions that there are facts, and careful examination of the evidence can say what the facts are.[63]

Redmayne presents some caveats, however, in the form of cognitive biases and what he terms ‘interaction’ and ‘reification’ during the police investigation, initiation of a case story and building of evidence to support that story. Of particular importance to this thesis is the fact that forensic experts (who may later provide testimony as ‘unbiased’ experts) may play an important role in the investigation, and contribute significantly to lines of enquiry that may eventually become a prosecution case.

Neither is the expert neutral in the investigation process: experts may be called to the crime scene by police officers, who they work alongside. They may each, therefore form the context within which the other acts.[64] Indeed, in many cases it is the expert who will determine whether a crime has been committed.[65] For example, from the earliest stage the expert does not only collect scientific evidence from the crime scene, but may also have a pivotal role in deciding which evidence to collect (for example advising investigators

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[60] For example: Sanders (n 49); M McConville, A Sanders, R Leng, *The Case for the Prosecution: Police Suspects and the Construction of Criminality* (Routledge, 1991).

[61] Redmayne (n 1) 16.

[62] CAG Jones, *Expert Witnesses: Science, Medicine and the Practice of the Law* (Clarendon Press, 1994) 273, 218, 220.

[63] Redmayne (n 1) 16-17.

[64] WL Bennett, M Feldman, *Reconstructing Reality in the Courtroom* (Tavistock, 1981) 41.

[65] Carol AG Jones, *Expert Witnesses: Science, Medicine and the Practice of the Law* (Clarendon Press, 1994) 198.

as to whether it is worth profiling DNA from a cigarette butt found outside the direct crime scene), assisting investigators with creating hypotheses (for example whether a particular DNA profile was a mix from two perpetrators or from a single perpetrator) and otherwise having a direct effect on lines of enquiry.

The central importance of the narrative construct has been recognised by counsel. In order to present a convincing narrative, they must provide evidence which may not be strictly relevant, but provides the context against which a juror may create a narrative. To underline this, the trial has been described as a type of drama, progressing in time, and presented largely by voice, each having a rhetorical significance.[66]

The opening statements by prosecution and defence have been described as a 'battle for the imagination' of the jury, with counsel commencing to 'perform' their 'factual theory' of the case.[67] It has been suggested further that, jurors are unable to compare both prosecution and defence counsel's accounts on a point-by-point basis, but rather construct their own accounts based on both.[68]

3.7 Role of Evidence

The 'Facts in Issue' or 'Ultimate Issues' in a case are those that the prosecution must finally prove beyond a reasonable doubt, or the defence raise a doubt in order to succeed in court.[69] For example the prosecution may adduce admissible evidence in an attempt to prove the ultimate issue of whether the accused (D) was guilty of stealing property. Unless D pleads guilty then the prosecution must show that (i) D appropriated property; (ii) that the property belonged to someone else; (iii) D intended to deprive the owner permanently of the property; and(iv) that D acted dishonestly.[70]

The party bearing the burden of proof (the prosecution in criminal cases[71]), must set evidence before the court, as 'trier of fact', that disputed facts have been proved to a level of probability set by law. Within criminal cases this

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[66] R Burns, *A Theory of the Trial* (Princeton University Press, 1999) 124-154.
[67] ibid.
[68] Burns (n 66) 172.
[69] Emson (n 38) 6-8.
[70] Theft Act 1968 s 1(1).
[71] *Woolmington v The Director of Public Prosecutions* [1935] AC 462 HL.

must be proved 'beyond reasonable doubt'.[72] Only the court may make the determination of whether facts at issue have been proved to this level.

Evidence may be direct, such as a statement from witness 1 (W1) that he saw D take the property in question, or may be indirect (also known as 'circumstantial'), such as the fact that the stolen property was found in the possession of D. Facts can be proved only inferentially through circumstantial evidence.

3.8 Expert Evidence in the English Court

The presentation of expert testimony, itself, presents a challenge. It has long been acknowledged that experts with a relevant degree of expertise may testify as to factual matters within their specialisation, in order to assist the jury with its resolution of disputed facts.[73] This may appear to be a self-evident necessity, however it should be recalled that an expert witness is not an ordinary witness: they did not witness the alleged crime, but rather examined objects presented to them, their testimony consisting of their specialist judgment or opinion on this. A fundamental principle of evidence in the adversarial court is that witnesses may testify only as to fact, and not opinion, so it is only under rules of exception that the expert may testify.[74] Indeed, the use of an expert in court has been described as '… logically … an anomaly (from which) serious practical difficulties arise'.[75]

In modern times, the exception regarding expert evidence has, perhaps, been best summarised by Lawton LJ in the leading case of *R v Turner*:

> An expert's opinion is admissible to furnish the court with scientific information which is likely to be outside the experience and knowledge of a judge or jury.[76]

It is commonly stated that the exception whereby experts may testify allows experts, unlike ordinary witnesses, to testify as to 'opinion'. Of course, much

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[72] *R v Summers* [1952] 1 All ER 1059.

[73] Law Commission Consultation Paper, *The Admissibility of Expert Evidence In Criminal Proceedings In England And Wales: A New Approach to the Determination of Evidentiary Reliability* (Law Com CP No.190, 2009) para 2.1 (Law Commission Consultation).

[74] Roberts and Zuckerman (n 35) 139-142.

[75] Learned Hand, 'Historical and Practical Considerations Regarding Expert Testimony' (1901) 15 No. 1 Harvard Law Review 40, 50.

[76] *R v Turner* [1975] 1 QB 834, CA.

expert *medical* evidence (such as cases of baby shaking) does, indeed, consist largely of opinion, however, it may not be obvious how a DNA expert, reporting on the output of a scientific instrument, and explaining the principles of DNA match probability is reporting an opinion. Simple reports such as this may indeed be factual, and indeed it has been described as 'trite law' that witnesses with relevant expertise may assist the court within their area of expertise.[77] However, further to this, testimony of expert opinion would be needed, for example, as to how a DNA sample was deposited at a crime scene, or, for more complex DNA evidence (for example, a complex mixture) for which no standard analysis was possible, the nature and meaning of that DNA evidence.

Whilst the common law governing the admissibility of expert evidence has developed significantly over the years, there has been significant debate regarding its application. There have been proposals to make it the subject of statutory control, most notably in the Law Commission Report on Expert Evidence in 2011.[78] The position remains that it is governed by common law, although, as described below, there have been claims that recent amendments to the Criminal Procedure Rules have somewhat 'codified' some of the Law Commission's recommendations.[79] Common law provisions regarding the admission of expert evidence have often been described with reference to the Australian case of *Bonython*,[80] which, it has been claimed, has been cited in English courts, and correctly summarised the position regarding admissibility of expert evidence.[81] *Bonython*[82] stated that, to be admissible, expert evidence must pass the tests of 'assistance', that is, whether a juror would be able to reach a conclusion without the aid of the expert; 'reliability', that is, whether the subject matter of the evidence forms part of a body of knowledge accepted as reliable; and 'relevant expertise', that is, that the expert must have sufficient expertise in the area of special knowledge.[83] The evidence given must also be unbiased, that is, the expert's

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[77] Law Commission Consultation (n 73) 2.2.

[78] Law Commission Consultation (n 73).

[79] Ian Dennis, 'Tightening the law on expert evidence' (2015) Criminal Law Review 1,1-2.

[80] *R v Bonython* (1984) 38 SASR 45, 46-47.

[81] Law Commission Consultation (n 73) paras 1-2.

[82] *R v Bonython* (1984) 38 SASR 45, 46-47.

[83] Law Commission Consultation (n 73) para 1.2.

duty must be primarily to the court, and not to the calling party.[84] It should be noted that reference to Bonython[85] as a definition of admissibility has not been uncontroversial,[86] and it has been suggested that the true single test of admissibility in English courts was that given in *Turner*,[87] quoted above, that is to say, a simple test of helpfulness.[88]

None of the foregoing, however, should be taken to mean that the judge does not have a responsibility of ensuring that scientific evidence is reliable, according to the basic rules for the admission of evidence.[89] The question arises, however, as to whether an enhanced reliability test exists for scientific evidence, as has been suggested, either in common law, or as a result of amendments to the Criminal Procedure Rules.[90]

Reliability of expert evidence may, arguably, be of greater concern from a policy perspective, than general evidence. It is widely acknowledged that jurors may place great emphasis and reliance on expert witness testimony: the Criminal Bar Association, quoted in the Law Commission Report on Expert Evidence, stated that: '…rightly or wrongly, [expert evidence] is often 'trusted' like no other category of evidence'.[91] The Law Commission report noted that this statement is echoed by both the London Criminal Court Solicitors' Association and the Association of Forensic Science Providers.[92] Given that expert evidence forms an exception to the fundamental adversarial tradition of directly witnessed factual evidence, it is unsurprising that such evidentiary hurdles exist, and continue to cause debate. It should be noted that the Law Commission Consultation on Expert Evidence took, as one of its starting positions, the fact that there had been a number of high profile miscarriages of justice caused by admission of erroneous expert evidence.[93] Concerningly, they also pointed out that these cases may be the

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[84] Law Commission Consultation (n 73) para 1.3.

[85] *R v Bonython* (1984) 38 SASR 45, 46-47.

[86] Roberts and Zuckerman (n 35) 496-497.

[87] *R v Turner* [1975] 1 QB 834, CA.

[88] Roberts and Zuckerman (n 35) 486-490.

[89] Redmayne (n 1) 94-95.

[90] Dennis (n 79) 1-2.

[91] Law Commission, Expert Evidence in Criminal Proceedings in England and Wales (Law Com No 325, 2011) para 1.16 (Law Commission Report).

[92] ibid para 1.16 n 20).

[93] Law Commission Consultation (n 73) paras 2.12-2.28.

'tip of a larger iceberg', given that little is known about forensic error rates.[94] Arguably, this is particularly concerning for DNA forensics, given known error rates that have a significant effect on the strength of the DNA evidence but have not always been taken into account.[95]

The term 'reliable' itself has been the subject of debate, however as a working definition here, it is proposed that the definition given by Professor Redmayne is adopted, when he stated that despite the fact that attempts to define the term are often found to 'collapse into other evidentiary terms' such as 'probative value' or 'relevance', the 'reliability' does have a 'coherent, if unarticulated, meaning, which treats 'reliable' as a synonym of 'dependable' or 'trustworthy'.[96]

Discussion of 'enhanced reliability' tests often make reference to the *Frye* standard, a US case in which it was stated that '…for an expert to be competent to give an opinion based on a scientific theory, that theory "must be sufficiently established to have gained general acceptance in the particular field in which it belongs"'.[97] Although this has been superseded now by Federal Rules of Evidence Rule 702,[98] Rule 702 stated enhanced criteria of its own, which included relevance and reliability, this to be determined by reference to whether the technique can and has been tested, whether it has been the subject of peer review, the technique's error rate, and whether the technique is generally accepted. Furthermore the court pointed out that these were guidelines only and were not exhaustive.[99] On the one hand the application of Rule 702 was seen as being a relaxation of admissibility rules, but, on the other, was seen as imposing a requirement on the judge to screen evidence before admission.

Although admission of expert evidence is (and, arguably, remains) governed by common law, there have been ongoing proposals for reform. For example, proposals by the Royal Commission on Criminal Justice focused upon enabling the resolution of disputes before the trial, by requiring defence

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[94] ibid paras 2.12-2.26.

[95] Peter Gill, *Misleading DNA Evidence: Reasons for Miscarriages of Justice* (Elsevier, 2014) 118-120.

[96] Redmayne (n 1) 118.

[97] *Frye v. US* 293 F. 1013 (1923).

[98] *Daubert v Merrell Dow Pharmaceuticals,* 113 S. Ct 2786 (1993).

[99] ibid.

disclosure of its case, and a pre-trial meeting of experts.[100] More recently, the Law Commission Report on Expert Evidence[101] proposed statutory reform, to include an enhanced admissibility test for expert evidence.

The Criminal Procedure Rules came into being in 2005,[102] by provision of the Courts Act 2003, reproducing the substance of the rules they replaced. From November 2006, until the end of the empirical part of this study, the provisions regarding expert evidence remained, (with some exceptions) largely unchanged. Briefly, regarding expert evidence, they stated the expert's overriding duty to the court,[103] the contents of the expert's report (including the scientific basis for the opinion reached),[104] the requirement for disclosure, upon request, to the opposing party of scientific data upon which opinion was based,[105] the provision for a court-ordered pre-trial meeting of experts to identify areas of agreement and dispute,[106] and provisions for the court to appoint a single joint expert.[107]

Although the Government did not proceed with the primary legislation recommended by the Law Commission, including its recommendation of the introduction of an enhanced admissibility test, it has been suggested that judicial tendency has been progressively converging with the Law Commission's preferred approach.[108] This was first explicitly stated in the Criminal Practice Directions associated with Criminal Procedure Rules 2014.[109] These directions draw the court's attention to the Law Commission's proposals for an enhanced expert evidence admissibility test, however, they point out that there are common law provisions that already apply to these.[110] The Directions cite *R v Dlugosz*, which stated that:

> … the court must be satisfied that there is a sufficiently reliable scientific basis for the evidence to be admitted. If

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[100] Runciman Royal Commission Report, Cm2263.

[101] Law Commission Report (n 91)

[102] Criminal Procedure Rules 2005.

[103] Criminal Procedure Rules 2015, pt 19.2.

[104] ibid pt 19.3.

[105] ibid pt 19.4.

[106] ibid pt 19.6.

[107] ibid pts 19.7 - 19.8.

[108] T Ward, 'Expert Evidence and the Law Commission: Implementation Without Legislation' (2013) Criminal Law Review 561.

[109] Criminal Practice Directions 2014.

[110] Criminal Practice Directions 2015, pt 19A.3.

> there is then the court leaves the opposing views to be tested before the jury.[111]

The Directions go on to state that common law does not preclude the court from taking into account, when determining reliability, factors such as those proposed by the Law Commission, before listing a wide range of criteria.[112] It should be noted that the common law does not simply seek to admit or exclude expert evidence. The judge also has a role in ensuring that evidence admitted is not unduly strongly expressed. This was recognised in *R v Reed*, in which it was stated that:

> … care must be taken to guard against the dangers of that evaluation being tainted with the verisimilitude of scientific certainty.[113]

It should be noted that the empirical (interview) stage of this study was completed before publication of the Criminal Procedure Rules 2015. The amendments discussed above remain highly relevant however, because they illustrate the judicial tendency towards the greater control of scientific evidence evident over the last few years.

On the one hand, therefore, there has been powerful direction towards an enhanced admissibility standard for expert, and, specifically, scientific evidence, however the courts are reminded that the guidelines remain those within common law. Having said all this, and as quoted in Chapter One, it has been suggested that trial judges may not be willing to become 'gatekeepers' for expert evidence, and:

> …confronted say with complex scientific evidence contested by experts on both sides, will prefer to take the traditional path of leaving the jury to decide between them.[114]

This sentiment reflects earlier judicial comment in *R v Clarke*[115] regarding, particularly new or advanced, scientific evidence, in which it was stated that:

> …it would be wrong to deny to the law of evidence the advances to be gained from new techniques and advances in science.[116]

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[111] *R v Dlugosz* [2013] EWCA Crim 2.

[112] Criminal Practice Directions 2015, pts 19A.4 - 19A.6.

[113] *R v Reed* [2009] EWCA Crim 2698, [2010] 1 Cr App R 23 [121 – 122].

[114] Dennis (n 79) 1-2.

[115] *R v Clarke* [1995] 2 Cr App R 425, 430, CA.

[116] Roberts and Zuckerman (n 35) 498.

It has been suggested that the path is open to the rigorous application of common law regarding the admission of expert evidence, but it is yet to be seen whether this path is taken.[117]

3.9 DNA Profiling

3.9.1 A Paradigm Shift

The advent of DNA profiling has been described as a 'paradigm shift' in forensic identification.[118] Following intense scientific debate as to the use of correct analytical methods, the correct population databases, the statistical models used, the quantification of error rates and how to quantify increasingly low match probabilities, DNA profiling is regarded as the only forensic identification technique based on largely undisputed scientific rigour.[119] The term 'paradigm shift' refers to the increasing pressure on older identification techniques, such as fingerprint analysis, to prove their reliability according to the same rigorous scientific principles.[120]

3.9.2 The Structure and Location of DNA

All higher living things consist of cells, each of which contains a number of smaller bodies known as organelles. These include a nucleus and mitochondria. Both the nucleus and mitochondria contain DNA, however nuclear DNA, contained within the chromosomes, is most commonly thought of when referring to an individual's genome, and, specifically, DNA profiling. With the exception of the sex cells, each nucleus contains 23 pairs of chromosomes, one of each pair having been inherited from one of the parents. Sex chromosomes may be of X or Y type. Individuals with two X chromosomes are female and those with one X and one Y are male.[121]

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[117] Ward (n 108) 576.

[118] MJ Saks and JJ Koehler, 'The Coming Paradigm Shift in Forensic Identification' Science (2005) 309 Science 892.

[119] E Beecher-Monas, *Evaluating Scientific Evidence: An Interdisciplinary Framework for Intellectual Due Process* (Cambridge University Press, 2007) 104; National Research Council of the National Academies, *Strengthening Forensic Science in the United States: A Path Forward* (National Academies Press, 2009) (NRC Report) 7.

[120] DA Stoney, 'Fingerprint Identification: Scientific Status' in DL Faigman and others (eds), *Modern Scientific Evidence: The Law and Science of Expert Testimony*, vol. 2 (St Paul: West, 1997) 55-78.

[121] A Semikhodskii, *Dealing with DNA Evidence: a Legal Guide* (Routledge Cavendish, 2007) 4-5.

The DNA molecule takes the form of a double-helix with two complementary strands running in opposite directions. Each strand consists of a chain of chemical units known as nucleotides, each of which carries an extending organic base.[122] There are four types of base: Adenosine ('A'), Guanine ('G'), Cytosine ('C') and Thymine ('T'). A always links to T and C always links to G, so that the sequence of one strand can be derived from the other. It is the sequence of bases that form genes, collectively forming the individual's genome, or, more popularly, the 'genetic code'.[123] Only 1-2% of the human genome contains coding regions. The other regions comprise control regions and regions of unknown function. The human genome contains approximately 3.2 billion base pairs and contains about 30,000 coding sequences ('genes'). It is these genes that control the specific characteristics of the individual, and are passed on through reproduction.[124]

3.9.3 DNA Markers

Mutations are alterations in the DNA sequence, caused by errors in reproduction or environmental effects. They may comprise inversions, duplications, deletions or substitutions of DNA sequences. Mutations typically have little effect on the individual because more than 98% of human DNA is non-coding. Where mutations have occurred, there will be a number of variations of the gene, known as 'alleles', present in the population. It is this genetic variation that gives each individual their particular characteristics. Mutations occurring in non-coding regions are much less likely to be deleterious to the individual and so, in practice, variations in these areas are far more common.[125]

It should be remembered that each individual inherits one of each homologous (paired) chromosome from each of their parents. This being the case then it is possible that the individual has different alleles on the different homologous chromosomes. Homozygous describes the situation where the same allele is inherited from both parents, and heterozygous where they are different. Certain alleles have natural precedence over others, however, and the 'dominant' allele takes precedence over the 'recessive'. The importance from a DNA profiling point of view is that where the individual is

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[122] ARW & JM Jackson, *Forensic Science* (2nd edn, Pearson Education, 2008) 141-144.

[123] ibid.

[124] Semikhodskii (n 121) 3-5; Jackson (n 122) 141-144.

[125] Semikhodskii (n 121) 8-12; Jackson (n 122) 146-149.

heterozygous, two alleles will appear on their DNA profile (representing one from each parent). The combination of an individual's alleles comprises his or her genotype.[126] The terms 'marker' or 'locus' are commonly used for profiling purposes, to refer to a site occupied by a particular gene on a particular chromosome.[127]

It might be noted that there is a proportion of genetic material common between relatives. From a criminal justice perspective, this is important because it allows the possibility of familial searching, that is, even if the DNA profile found at the crime scene does not match a specific individual on the database, then it may be possible to identify possible family members, useful as an intelligence lead.

3.9.4 DNA Profiling

The question that DNA profiling aims to answer is how likely it is that a profile (obtained, for example, from the crime scene) could belong to an individual other than the suspect. The key factor therefore in the DNA profiling technique is discriminatory power. It is impossible from a practical point of view to routinely sequence an individual's entire genome, and in any case more than 97% of human DNA is identical between individuals. The approach taken, therefore, is to analyse a limited number of markers where variations in sequence are known to occur and to create a profile of the allele variants found at these loci. The loci analysed in the modern test are mostly in non-coding areas which has the advantage that they have selective neutrality and are, therefore relatively frequent in the population. This may be seen as somewhat counter-intuitive, however, if rare alleles were chosen then most criminals would not have them and they would not be present at the crime scene.[128]

An additional feature of the chosen markers is that with the exception of Amelogenin on the sex chromosomes they represent sequences called tandem repeats. These are mutations in which a sequence of DNA repeats a number of times. A simple example may be seen at Figure 1. This is important for the technique, because different alleles have different molecular masses and can therefore be easily separated and identified.[129]

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[126] ibid.

[127] ibid.

[128] Semikhodskii (n 121) 12.

[129] ibid.

The first DNA profiling system was known as VNTR (Variable Number Tandem Repeat (mutation)). VNTRs contain units (the result of mutations) containing between 6 and 100 bases, repeated up to 100 times. Enzymatic 'probes' were used to cut the DNA sequence at known points, after which they were radioactively labelled, and separated by gel electrophoresis. The gel plate was then photographically developed to visualize it, and a characteristic banding pattern was produced. Interpretation of a VNTR profile was by visual comparison of the pattern produced by the suspect sample with that of the crime scene sample. From a legal standpoint VNTR remains significant because it was the method of analysis used in a number of important cases, and both the method of analysis and the interpretation of the evidence was at issue in each case.[130]

The modern technique is based on STRs (Simple Tandem Repeats). These are similar to VNTRs except that the sequences are much shorter. The use of shorter sequences reduces so-called 'stutter' (faulty 'ghost' peaks), as they can be amplified with fewer errors. The technique relies on the technique of PCR (Polymerase Chain Reaction)[131] to amplify the sample level. PCR involves a DNA polymerase enzyme that binds itself to the DNA strand and then synthesizes a duplicate copy using free nucleotides (A, T, C & G) that have been added to the mixture. The process is then repeated through a total of 28 cycles, thereby multiplying the amount of DNA present exponentially and so producing large sample quantities for analysis.

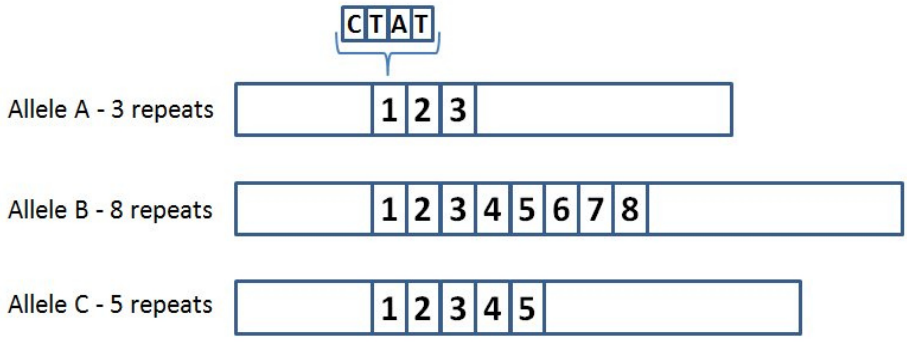

Figure 1: Example of three alleles formed by variable number of repeated STRs.

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[130] For example, *R v Adams* [1996] 2 Cr App R 467; *R v Deen* (1994) The Times, 10 January.

[131] RK Saiki and others, 'Primer-directed Enzymatic Amplification of DNA with a Thermostable DNA Polymerase' (1988) Vol 239, Issue 4839 Science, 487-491.

The modern test is highly automated, with separation achieved by capillary electrophoresis and a laser detector used to identify the retention time for each DNA fragment. This is used to automatically identify each allele by its size (smaller fragments have lower retention times), and so produce a profile of allele identities for the sample.[132]

During the empirical stage of this study, the standard test used in the UK was AmpF*l* STR®SGM Plus™ (Applied Biosystems), hereafter referred to as 'SGM+'. SGM+ analysed 11 different markers including one on the sex chromosome (to identify gender). These are all on different chromosomes and assumed to be independent. The estimated probability of a match between two unrelated individuals with a full profile (all 10 loci plus gender marker) using SGM+ was 1 in 10 billion, however to be conservative this was quoted as less than 1 in 1 billion.

After a DNA sample has been profiled, a numeric code is produced indicating the genotype at each locus. A simple example of a report identifying alleles at all loci may be seen at Figure 2. This is presented along with an analysis of the expected frequency of this particular profile within the relevant population.

Locus	D3S1358	vWA	D16S539	D2S1338	D8S1179	D21S11	D18S51	D19S433	THO1	FGA	Amelogenin
Genotype	15,17	18,18	11,12	19,19	14,14	28,29	15,16	14, 16	5,9.3	19,21	X,Y

Figure 2: Example numeric individual profile.

From summer 2015, a new 16 loci test started to be introduced. The new test adds an additional 5 loci to the existing SGM+ test. In practice the advantage of the new test is not an increase in the statistical match probability number (which remains at 1 in a billion), but increased reliability when testing degraded samples. It achieves this by a reduction in amplicon (DNA fragment) size, so increasing resolution.[133] This means that when

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[132] Semikhodskii (n 121) 14-16; Jackson (n 122) 159 -163.

[133] Valerie C Tucker, Amanda J Kirkham, Andrew J Hopwood, 'Forensic validation of the PowerPlex® ESI 16 STR Multiplex and Comparison of

applied to mixtures of DNA it will be possible to detect more components (that is, it will be able to separate DNA fragments inseparable by the older tests because of similar retention times).

3.9.5 Complex DNA Samples

The majority of forensic DNA samples contain DNA from two individuals. In this case more than two alleles may be identified at each locus. Where one of the contributors is known, then the profile of the other may be deduced, however where both are unknown special analytical approaches are required.[134] A mixture from two contributors is known as a 'simple mixture'.

Where the sample containing DNA is very small, or where it is degraded, it may not be possible to produce a full profile. This is often the situation in the case of a minor contributor to a mixed sample. It may be possible to obtain a more full profile by using LTDNA analysis, or otherwise the discriminatory power of the test may be compromised.[135] Note that 'partial' does not mean that only some markers match – in the case of any markers not matching, then an exclusion is established.

LTDNA Analysis refers to a range of techniques (originally involving an increased number of PCR replication cycles, but now also including other techniques) allowing analysis of DNA from extremely small samples. This might be from a surface with no visible biological stain, to which a very small number of human cells may have been transferred by touch.[136] The technique is so sensitive that it has raised issues about the greater risk of contamination by DNA coincidentally present from other sources.[137]

Forensic samples may comprise complex mixtures of DNA, including low template and partial components. Such samples cannot be analysed entirely automatically but require operator interpretation.

3.9.6 DNA Profiles and the National DNA Database

DNA profiling relies on the existence of the National DNA database ('NDNAD'). The NDNAD of England and Wales was established on 10th April 1995 and was the first of its kind in the world. Scotland and Northern Ireland

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Performance with AmpFlSTR® SGM Plus®' (May 2012) Volume 126 Issue 3 International Journal of Legal Medicine, 345-356.

[134] Semikhodskii (n 121) 34-37.

[135] ibid.

[136] Semikhodskii (n 121) 37-38.

[137] Jackson (n 122) 181-182.

have their own databases with their entries being submitted to the NDNAD on a daily basis. Police powers to obtain samples from arrestees, and retain information derived from them, as well as cross-check against profiles from unsolved crime scenes were established in the Police and Criminal Evidence ('PACE') Act 1984, as amended by the Criminal Justice and Public Order Act 1994 and the Criminal Justice and Police Act 2001.[138]

It is worth noting that, after challenges in the European Court of Human Rights,[139] and with only limited exceptions, DNA profiles from innocent people and children are now not retained on the database.[140] Additionally, only digital profiles are now held, and not the original biological samples.[141] Despite this, with approximately 9.3% of the UK population on the database, this is the largest in the world by proportion of population.[142]

Many different types of biological evidence collected at the crime scene are suitable for DNA analysis, the most common of which are blood, semen and saliva. These may be direct, for example in the form of semen or drops of blood, or may be indirect, for example from a cigarette butt or chewing gum.[143] Within the laboratory, the DNA is quantified and analysed.[144] Profiles obtained (for simple profiles, a series of digits indicating the alleles found) are then compared with other samples to identify matches. It will be recalled that a match does not mean that the samples come from the same source, only that this possibility may not be excluded. However, the overall frequency of the DNA profile is calculated. This is based on known allelic frequencies within the population and application of correction factors based on population genetics (this includes correction factors for such things as known racial sub-populations).[145] Reports of interpretation results are then submitted to investigators.

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[138] Semikhodskii (n 121) 79.

[139] *S and Marper v The United Kingdom* - 30562/04 [2008] ECHR 1581 (4 December 2008).

[140] Home Office, 'National DNA Database Strategy Board: Annual Report 2012-13', 3.

[141] ibid para 2.2.

[142] ibid para 2.2.

[143] Association of Chief Police Officers, 'DNA Good Practice Manual' (2005) 2nd edn, para 3.4.

[144] Jackson (n 122) 151.

[145] Semikhodskii (n 121) 63-66.

The NDNAD contains DNA profiles from three sources: Scene of Crime ('SOC') samples from unknown persons and derived from biological samples taken from the crime scene or victims, Criminal Justice ('CJ') samples taken from known people arrested on suspicion of involvement in a criminal case, and elimination or volunteer samples taken for example as part of an intelligence-led mass screening of a particular population.

Every day, all the profiles in the NDNAD are checked against each other in a process called speculative searching. The objective is to obtain full or partial matches between CJ and/or SOC records. A number of possible matches may be obtained which are then reported back to the designated officer within the relevant Police Force.[146] Four types of matches are possible: a loaded CJ profile matches another CJ profile: this would indicate a duplicate, or that the individual had an alias, or, although of low probability, there is a coincidental match. A loaded CJ profile matches a SOC profile possibly from an unsolved or 'cold' case: in this case the individual matched would become a suspect. A loaded SOC profile matches another SOC profile: this indicates that the same individual may have been present at both crime scenes, providing an intelligence lead; the individual cannot be identified however. A loaded SOC profile matches a CJ profile: again the individual would become a suspect for the crime.

3.10 DNA Profiling in Evidence

The use of DNA identification evidence in court presents a greater challenge than may be assumed from the foregoing. Whilst fingerprint evidence is simply presented as a 'match', and DNA evidence in the form of a probability statement, the situation is more complex. Specifically, DNA evidence presents two areas of complication. First, the particular challenge for DNA evidence is that it must be probative, that is, it must assist in determining facts at issue. As an example, evidence of a DNA match in a rape case investigation or trial has no probative value if the defendant's defence is one of consent. Below, the 'framework of propositions' used by forensic experts is outlined.

Second, the presentation of DNA evidence is constrained by common law. Notably, and somewhat paradoxically, experts are constrained from using some well-accepted scientific principles that are acceptable for less rigorous

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[146] M Lynch and others, *Truth Machine: The Contentious History of DNA Fingerprinting* (The University of Chicago Press 2008) 144.

scientific evidence. Unsurprisingly, this has been the subject of intense scrutiny and debate. Linked to this is the complicating factor of fallacious modes of thinking regarding probabilistic evidence. This is linked because probabilistically erroneous presentation of evidence has been challenged in case law.

There is a vast literature on these aspects. The following review seeks to outline only to a sufficient degree those aspects necessary to follow the subsequent empirical study.

3.11 Ensuring DNA Evidence Addresses the Right Question

Evidence may be addressed to four different levels of issue: Source, Sub-source, Activity and Offence. These have been referred to as the hierarchy of propositions.[147] Forensic scientists may be asked to address questions at each of these levels. Examples of these questions are as follows:

Source Level: Is the defendant the source of the semen found at the scene?

Sub-source: Does the DNA come from the semen found at the scene (or from other cellular material)? The distinction between this level and source level is important if, for example, the accused claims that his DNA is present because of simply touching the victim. Interestingly although match probabilities for DNA may be in the range of 1 in a billion, tests to determine cell type (for example, semen or blood), are nowhere near as sensitive, a point that may not be clear to a jury.

Activity: Did the defendant have intercourse with the victim?

Offence: Did the defendant rape the victim?

It is for the forensic expert to determine the sub-source question, however may also be able to assist with opinion regarding the significance of the evidence (subject to *Doheny* restrictions in the trial itself[148]). This might include source or even activity level, but the ability of the scientist to offer

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[147] R Cook and others, 'A Hierarchy of Propositions: Deciding which Level to Address in Casework' (1998) 38 Science & Justice 231; Colin Aitken, Paul Roberts and Graham Jackson. 'Fundamentals of Probability and Statistical Evidence in Criminal Proceedings: Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses' (Royal Statistical Society, 2010) paras 3.4 – 3.8 (RSS Fundamentals).

[148] *R v Doheny* [1997] Cr App R 369.

opinion on these has, as described below, been controversial. Offence level questions are strictly for the jury.[149]

Confusion between questions addressed has been identified as a potential and actual cause of miscarriage of justice. In the case of Scott, the reporting scientist reported that the crime scene DNA sample matched Scott's profile with a match probability of one in a billion (sub-source question). The expert stated, in the next sentence, that it was his opinion that the DNA 'most likely' originated from sperm (source question).[150]

The association of the one in a billion statistic with the opinion that the sample came from sperm has been termed the 'association error'. In Scott there was poor scientific basis for the latter claim, and yet the investigators associated the small match probability figure with that claim. In fact, the source of the DNA was Scott's saliva, and he was innocent of the charges.[151]

As described below, it will not be found surprising that there has been controversy as to the level to which experts may testify, especially when they have given their opinion as to activity level questions (for example, whether the defendant was holding the weapon).

3.12 Probabilistic Expression of DNA Evidence

A distinctive feature of DNA profiling is that it is explicitly probabilistic. A match between the DNA of the defendant, and that found at the crime scene, is expressed in the form of a 'match probability'. For example, in *R v Deen* this was stated as 1 in 3 million.[152] This did not mean that it was 3 million to one that Deen was guilty (an example of the 'prosecutor's fallacy' discussed below), but rather, the fact that 1 in 3 million of the population would be expected to have the same profile. The question, then, arises as to what, exactly, the match probability means. In fact, it may be regarded as the probability of finding that evidence *assuming that the defendant was innocent*. In *Deen*, that probability was 1 in 3 million. However, hypothetically, if there was no other evidence against Deen, then 10 males (assuming a 30 million male population) could equally likely be the

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[149] Gill (n 95) 41.
[150] ibid 41-42.
[151] ibid.
[152] *R v Deen* (1994) The Times, 10 January.

perpetrator, theoretically making him only 10% likely to have carried out the crime. One common way to regard this is as a statement of 'strength of evidence', with the higher the number, the greater the strength of the evidence. The modern test states a match probability conservatively as 1 in a billion.

In summary, the expert thus may only state the probability of the evidence given the proposition, and not the probability of the proposition given the evidence. The latter would be an example of the prosecutor's fallacy.

In fact, the strength of evidence is a relative construction, and is generally only meaningful when constructed according to competing sets of propositions. For example, what is the probability of seeing the evidence given the prosecution hypothesis, compared to the probability of seeing the evidence given the defence hypothesis.[153] This is known as the 'likelihood ratio'. In the above example, if the defence hypothesis was that the DNA did not belong to the defendant, then the likelihood ratio would be 3 million to one (i.e. the probability of a match if the prosecution hypothesis was correct (1) divided by the probability of a match if the defence hypothesis was correct (1 in 3 million)). However, if the defence hypothesis was that there had been consent, then the ratio would be 1 to 1, i.e. there would be a DNA match in any case. In this case the evidence would have no probative value.[154]

At an investigative stage, forensic experts may calculate likelihood ratios for use by investigators, in order to allow assessment of various hypotheses, and determine an investigative strategy. In addition, they may attach adjectival indicators of evidence strength, usually according to a standard scale (for example, a likelihood ratio of 1 to 1000 would be labelled as 'moderately strong support' for the proposition that it related to.[155]

As will be described below, common law prevents the scientist from using likelihood ratios for DNA evidence in court, nor adjectival indicators of evidential strength. For simple cases, that is, where the defendant is simply

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[153] Roberto Puch-Solis and others, 'Assessing the Probative Value of DNA Evidence: Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses' (Royal Statistical Society, 2012) paras 4.1 - 4.15 ('RSS DNA Evidence').

[154] ibid para 7.1.

[155] J Buckleton, 'A Framework for Interpreting Evidence' in J Buckleton, CM Triggs, SJ Walsh (eds), *Forensic DNA Evidence Interpretation* (CRC Press, 2005) 27–63.

disputing that the DNA is theirs, the likelihood ratio is effectively the same as the match probability, however, where the match probability is lower (for example in the case of a partial profile), the jury may not understand that, say, a 1 in a million match, may not offer a high evidentiary strength. For more complex DNA cases, for example low template or mixed DNA profiles, the evidence can only be expressed in the form of likelihood ratios, and is accepted as such in court.

Many forensic commentators have argued a case for the adoption of 'Bayesian' analysis of evidence.[156] Bayes' Theorem provides a mathematical formula that allows the updating of the probabilities of issues in light of new evidence. Specifically, the prior probability of an issue is multiplied by the likelihood ratio of the new evidence. This results in a posterior probability of the issue conditioned on both the prior probability of the issue and the likelihood ratio of the new evidence. This posterior probability may then be used as a prior probability in subsequent new calculations, each taking additional evidence into account. The end result is a final posterior probability conditioned on all the evidence in the case.[157]

It should be noted that both objectively quantitative evidence (for example, DNA profiling) and subjective evidence (for example a fact-finder's estimation of the probability of an alibi being false) may be combined using the method. As will be seen below, however, attempts to use this in court have failed.

3.13 Development of DNA Evidence in the English Court

Despite the fact that DNA evidence was first placed before in a jury in 1987,[158] its first substantial challenge in the English courts was in the case of

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[156] For example, Evett IW and others, 'Interpreting Small Quantities of DNA: the Hierarchy of Propositions and the use of Bayesian Networks' (2002) 47(3) Journal of Forensic Sciences 520–530; William C Thompson, Franco Taroni, Colin GG. Aitken, 'How the Probability of a False Positive Affects the Value of DNA Evidence' (2003) 48(1) Journal of Forensic Sciences 1. See also David L Faigman, and AJ Baglioni Jr 'Bayes' Theorem in the Trial Process: Instructing Jurors on the Value of Statistical Evidence' 12.1 Law and Human Behavior (1988) 1.

[157] RSS Fundamentals (n 147), para 2.25.

[158] 'Rapist in Genetic Fingerprint Case Jailed for 8 Years' *The Times* (London, 14 November 1987).

R v Deen in 1994.[159] This was in stark contrast to the so-called 'DNA wars' in the US, which saw considerable effort expended in challenging and defending the technique's reliability.[160]

Deen had been convicted in 1990 of rape, the main evidence against him being a DNA match. Importantly, Deen's grounds for appeal pre-figured a number of the challenges which not only concerned commentators over the following period but also a number of subsequent test cases (and continue to so so). The first grounds of appeal were whether there was a match at all. It should be noted that in these early days of DNA profiling, matches were assessed by visual examination of bands in a gel. In *Deen*, discrepant bands had been explained away, whilst normally the presence of any such bands would exclude the defendant. Arguably this was not only an example of 'confirmation bias', but also one of a presumption of guilt. Second was how the match probability was calculated – in this case the DNA statistic was combined with a blood stain statistic, Deen claimed erroneously. Also, the population against which the statistics were calculated was challenged. Thirdly, *Deen* provided the classically quoted example of the 'prosecutor's fallacy', with the expert stating that the sample, in his judgment, came from Deen, and the judge stating that this proved guilt 'pretty well to certainty'. Although not highlighted within the appeal it is worth pointing out that both expert and judge were possibly guilty of jury usurpation: it is for the jury to decide on the ultimate issue.

During the appeal, the Lord Chief Justice, Lord Taylor, made the much-quoted comment: '(i)t makes it very difficult, even if the scientist gets it right, and the judge gets it right – if this is what is right – what on earth does the ordinary jury make of it?'[161]

3.14 Doheny and Adams

In a set of three inter-related cases, the Court of Appeal set out important principles which have impacted all subsequent cases involving DNA. The

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[159] *Deen* (n 152).

[160] Jay D Aronson, *Genetic Witness: Science, Law, and Controversy in the Making of DNA Profiling* (Rutgers University Press, 2007) 4; R Williams, P Johnson, *Genetic Policing: The Use of DNA in Criminal Investigations* (Willan Publishing, 2008) 49.

[161] Transcript of proceedings in the Court of Appeal, 7 December 1993 (transcript by John Larking), 46, quoted in Redmayne (n 1) 58.

cases involved that of *R v Denis Adams*,[162] and his subsequent appeal.[163] Between these two cases, the conjoined appeals of Doheny and Gary Adams were heard (note that these are different Adamses).[164] The cases were interdependent in that they considered similar points of law, significantly including those related to DNA evidence, and each case considered precedent determined in the earlier cases in the set. These cases determined the current common law direction for presenting DNA evidence in court (sometimes referred to as the 'Doheny Direction'), and rejected the use of probabilistic approaches to non-statistical evidence.

The Doheny and Adams appeals were joined in *R v Doheny & Adams*[165] mainly because of common ground that the court (both expert witness, and the judge, in their summing-up) had fallen foul of the 'prosecutor's fallacy', more accurately described as the 'transposed conditional'.[166] The court described the fallacy as follows:

> It is easy, if one eschews rigorous analysis, to draw the following conclusion:
>
> 1. Only one person in a million will have a DNA profile which matches that of the crime stain.
>
> 2. The defendant has a DNA profile which matches the crime stain.
>
> 3. Ergo there is a million to one probability that the defendant left the crime stain and is guilty of the crime.
>
> Such reasoning has been commended to juries in a number of cases by prosecuting counsel, by judges and sometimes by expert witnesses. It is fallacious and it has earned the title of 'The Prosecutor's Fallacy'.[167]

A simple example exposes the fallacious nature of this reasoning: if a cow has four legs, then it does not follow that anything with four legs is a cow. In the quoted example above, if a population of 25 million men was assumed in England, then, assuming no other evidence against the defendant, there

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[162] *R v Adams* [1996] 2 Cr App R 467.

[163] *R v Adams (No. 2)* [1998] Cr App R 377, CA.

[164] *Doheny* (n 148).

[165] ibid.

[166] Puch-Solis 'RSS DNA Evidence' (n 153).

[167] *Doheny* (n 148) 373-374.

would be 25 other potential offenders. On that simple basis, the defendant would only have a 1 in 25 chance of being that offender.

It should be noted that, as in *Doheny*,[168] and in *Deen*,[169] the perpetration of the 'prosecutor's fallacy' in court did not automatically make the conviction unsound, however, it did, and does continue to be, a basis for appeal, due to the potentially prejudicial fallacious evidence presented to the court. In *R v C*[170] the judge at the initial trial employed the 'prosecutor's fallacy' in his summing up, but this was not sufficient to overturn the conviction. Note that in *Deen*, both the expert witness and judge were guilty of fallacious thinking. It is worth bearing in mind that, despite the fact that judge, expert and counsel now have a greater understanding of the fallacy and are able to avoid or to give direction concerning it, it has been suggested that this might not stop the jury (nor anyone else) falling into the trap of their own accord.[171]

However, the court discussed at length the presentation of DNA evidence and issued specific guidance as to how this type of evidence should be presented. Specifically, they stated that experts should confine their testimony to the 'random occurrence ratio' (more accurately known as the 'random match probability'). They also laid down a textual template for judicial direction that they stated 'may be appropriate, tailored to the particular facts of the case':

> Members of the jury, if you accept the scientific evidence called by the Crown, that indicates that there are probably only four or five white males in the United Kingdom from whom that semen stain could have come. The defendant was one of them. If that was the position, the decision you have to reach, on all the evidence, was whether you are sure that it was the defendant who left that stain or whether it was one of that small group of men who share the same DNA characteristics.[172]

The court stated, also, that the expert 'should not be asked his opinion on the likelihood that it was the defendant who left the crime stain, nor when

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[168] *Doheny* (n 148).

[169] *Deen* (n 152).

[170] *R v C* [2011] EWCA Crim 1607.

[171] Redmayne (n 1) 58.

[172] *Doheny* (n 148) 375.

giving evidence should he use terminology which may lead the jury to believe that he is expressing such an opinion.'[173]

This is highly significant, as it means that the forensic expert is truly confined to the statement of random match probability: they may not, for example, express their opinion as to how likely it was that the defendant was at the crime scene, nor attach any adjectival description of how strong the numerical evidence might be. It might be noted that within investigative work, DNA match reports might be accompanied by standard adjectival descriptions, such as 'very strong' (evidence).[174] Such descriptions must be removed from expert reports if they are to be presented in court.[175]

Somewhat paradoxically, DNA evidence, the most rigorous of forensic identification methods, is the only form of such evidence in which the expert is barred from presenting his opinion in this way. The question might arise as to why this bar exists. It might be explained on the basis that, arguably, given that DNA evidence is probabilistic, the expert, having simply determined the match probability for the DNA, is in no better position to state whether the accused is the source of that DNA than the jury. On that basis, such a decision is within the domain of the jury. It has been suggested, also, that such a policy also assists in preventing the jury falling into making faulty inferences, such as the 'prosecutor's fallacy'.[176] On the other hand, it has been pointed out that this leaves the jury with little assistance in understanding the interaction of DNA with other evidence.[177]

Turning to the case of *Adams*[178] and his appeals:[179] *Adams* was the first case in which the prosecution relied solely on DNA identification.[180] In fact, all the other evidence (including an alibi, not matching a description, and not being picked out in an identity parade) pointed against guilt. Indeed, the Adams cases have been portrayed as a battle between science and

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[173] *Doheny* (n 148) 374.

[174] Association of Forensic Science Providers, 'Standards for the Formulation of Evaluative Forensic Science Expert Opinion' (2009) 49 Science and Justice 161 - 164.

[175] Semikhodskii (n 121) 114.

[176] Roberts and Zuckerman (n 35) 60.

[177] IW Evett, 'DNA Profiling: a Discussion of Issues Relating to the Reporting of Very Small Match Probabilities' (2000) Criminal Law Review 341 - 355.

[178] *Adams* (n 162).

[179] *Adams (No. 2)* (n 163).

[180] Redmayne (n 1) 58.

common sense.[181] A novel defence was attempted, which involved an eminent team of expert statisticians, and used Bayesian statistics to combine DNA evidence with 'ordinary evidence'. Briefly, and explained somewhat simply, the Bayesian approach involves assessing a prior probability, and some pertinent item of evidence (expressed as a likelihood ratio). A posterior probability for the issue, conditioned on the combined value of the prior probability and the likelihood ratio, is calculated, which then becomes the prior probability for additional pieces of evidence.[182] Significantly, these elements of evidence may be subjective (for example, the likelihood of a witness lying), or objective (for example a DNA match). The jury were issued with a questionnaire and instructions, that invited them to estimate probabilities of non-statistical evidence to be true, for example, how likely would Adams have been to be able to call an alibi. It is not known whether the jury used the questionnaire or not, but in any case the court took a hard line on the use of such mathematical techniques, stating that the expert should not expound a statistical approach to evaluate whether the defendant left the crime scene stain, and that the Bayesian procedure 'plunges the jury into inappropriate and unnecessary realms of theory and complexity deflecting them from their proper task'.[183]

Further that: '[W]e have very grave doubt as to whether that evidence was properly admissible, because it trespasses on an area peculiarly and exclusively within the province of the jury, namely the way in which they evaluate the relationship between one piece of evidence and another.'[184] Also that the application of mathematical formulae to separate pieces of evidence was simply inappropriate to the jury's task, which should be 'by the joint application of their individual common sense and knowledge of the world to the evidence before them.'.[185]

Significantly, these rulings have been taken to mean not only that use of the Bayes formula was not permitted, but neither could likelihood ratios be used to present DNA evidence in court.

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[181] For example, M Lynch and others, *Truth Machine: The Contentious History of DNA Fingerprinting* (The University of Chicago Press, 2008).
[182] RSS Fundamentals (n 147) para 2.25.
[183] *Adams* (n 162) 482.
[184] *Adams* (n 162) 481.
[185] *ibid.*

These common law rulings have been described by some scientists as flawed and out of date,[186] with scientifically and logically better ways of presenting the evidence,[187] Indeed, as described above, likelihood ratios are the scientifically accepted method of expressing such forensic data, and are used generally during investigation of crime.[188]

These rulings are important to this study, as, in principle, they still apply to the way that DNA evidence is presented at the time of this study. On the one hand, Professor Redmayne described the *Doheny* direction as being a 'rough and ready solution to a difficult problem, rather than… a perfect one' (if for no other reason than fact-finders may find it hard to understand likelihood ratios).[189] On the other, it has been suggested that the more general use of likelihood ratios has crept in by the back door.[190]

Beyond its value as a 'rough and ready solution', Redmayne pointed a' perhaps more useful, view of the *Doheny* direction, and how it might be applied additionally to non-DNA evidence. What the direction states is that the defendant is merely one of a number of suspects (the others unidentified) who may have carried out the crime. Now, the jury must take into account any other evidence that might make the suspect more likely to be the offender.[191] Interestingly this is Bayesian analysis(!).

It is, arguably, possible to convict solely on the basis of DNA evidence.[192] The Court of Appeal has recently ruled that DNA evidence alone may provide evidence of possession of a firearm.[193] Additionally, they have ruled that the absence of evidence other than a full DNA match is not sufficient to declare that there is no case to answer.[194]

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[186] For example, Evett, Small Match Probabilities (n 177); Redmayne (n 1) 71-74; Semikhodskii, (n 121) 135.

[187] RSS DNA Evidence (n 153) paras 7.1 - 7.3.

[188] RSS Fundamentals (n 147) para 4.9.

[189] Redmayne (n 1) 93.

[190] RSS DNA Evidence (n 153) para 7.4.

[191] Redmayne M, 'Appeals to Reason' (Jan 2002) Vol 65 No. 1 The Modern Law Review 19, 19-27.

[192] *R v Adams* [1996] 2 Cr App R 467; *R v Lashley* [2000] EWCA Crim 88; *R v Ogden* [2013] EWCA Crim 1294; *R v Sampson (Albert)* [2014] EWCA Crim 1968.

[193] *R v Sampson (Albert)* [2014] EWCA Crim 1968.

[194] *R v FNC* [2015] EWCA Crim 1732.

Reliance simply on DNA evidence has, however, led to a number of miscarriages of justice.[195] On that basis the Crown Prosecution Service: Guidance on Expert Evidence recommends that prosecutors regard this evidence cautiously, and aim to identify supporting evidence.[196] Even if the accused accepts that the DNA is his, this, too, on its own may not be sufficient. For example, in *R v Grant* the defendant did not dispute that the sample on the balaclava was his DNA, or that it had been found at the crime scene, but stated that the balaclava was deposited at the scene innocently.[197]

3.15 Complex DNA Evidence

It should be noted that the *Doheny* direction applies only to simple DNA matches. In cases where the profile is partial, low quantity, or mixed, DNA evidence can only be presented in the form of a likelihood ratio. A number of recent cases have considered the position where the DNA sample is insufficient in quantity or quality for the forensic expert to calculate a full profile, where the crime DNA sample is mixed, or both. Special analytical techniques must be used for these analyses (for example a LTDNA technique where the sample is low in quantity), as well as sophisticated statistical methods. For complex samples, the analysis cannot be fully automated, and requires expert judgment.

In *R v Bates*,[198] the defence claimed that, because of the 'impossibility of ascribing any statistical value to the potential exculpatory effect of the voids in a partial profile', then the evidence did not, under *Doheny,*[199] satisfy the requirement that only a probabilistic statement may be made in the case of DNA evidence. Further, that, the bands missing from the profile could have exculpated the defendant. Per Moore-Bick LJ, the court dismissed the

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[195] For example, Forensic Science Regulator, 'Report into the Circumstances of a Complaint received from the Greater Manchester Police on 7th March 2012 regarding DNA Evidence provided by LGC Forensics' (2012) (FSR–R-618); Forensic Science Regulator, 'The Performance of Cellmark Forensic Services 6th December' (2013) (FSR-R-625); Forensic Science Regulator, 'Report on the Performance of Bedfordshire Police and Key Forensic Services' (2013) (FSR-R-628).

[196] Crown Prosecution Service, 'Guidance on Expert Evidence' (2014) 44 – 46.

[197] *R v Grant* [2008] EWCA Crim 1890.

[198] *R v Bates* [2006] EWCA Crim 1395.

[199] *Doheny* (n 148).

appeal, stating that it would be impractical in every case to take account of exculpatory evidence 'that may exist', and, further, that as long as the expert explained the basis and limitations of the evidence, it was probative, in that it assisted in determining the facts of the case, albeit in a less perfect way than for a full profile.

The very reliability, and therefore admissibility, of the LTDNA technique was challenged in *R v Hoey*,[200] leading to a temporary suspension of its use, and a subsequent review by Professor Caddy which confirmed its reliability.[201] In *R v Reed*,[202] however, the level below which it was possible to analyse DNA and calculate a reliable match probability was challenged. The court determined (arguably, somewhat arbitrarily), that, at the current state of science, there was an absolute level (100-200 pg of DNA sample) above which a reliable statistic could be calculated, and that where samples were above this level, the reliability of the LTDNA technique should not be challenged. The court referred to this level as the 'stochastic level' (a reference to a statistical term meaning that below this level, random effects might outweigh the 'signal').

In *R v Broughton*,[203] the defence challenged the admissibility of LTDNA where the sample size was below this 'stochastic threshold'. The court, supported in *R v C* [2010],[204] ruled that nothing in *Bates*[205] precluded the admission of such evidence, so long as its limitations were clearly laid out by the forensic expert.

The courts have considered, too, the question of transfer of DNA. For example, in *R v Weller*,[206] the defendant, accused of sexual assault, was found to have the victim's DNA under his fingernails. The prosecution's case was that this was through vaginal penetration, however the defence case was that the DNA had been innocently transferred. The defence's specific case was that the DNA transfer evidence was inadmissible because there was insufficient scientific basis to evaluate the mode of DNA transfer.

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[200] *R v Hoey* [2007] NICC 49 (20 December 2007).

[201] B Caddy, BGR Taylor, and AMT Linacre, 'A Review of the Science of Low Template DNA Analysis' (Home Office Report, 2008).

[202] *R v Reed* [2009] EWCA Crim 2698, [2010] 1 Cr App R 23.

[203] *R v Broughton* [2010] EWCA Crim 549.

[204] R v C [2010] EWCA Crim 2578, [2011] 3 All ER 509.

[205] *R v Bates* [2006] EWCA Crim 1395.

[206] *R v Weller* [2010] EWCA Crim 1085.

However, the appeal was dismissed, the court ruling that the expert witness was permitted to express conclusions about source, transfer, and persistence of genetic material based partly upon experience and upon unpublished research.[207] Similarly, in *Reed*,[208] the court stated that the expert may (indeed, it was '…essential to do so…',[209]) evaluate the possibilities for DNA transfer, so long as there was a sufficiently reliable basis to do that.[210] However, this opinion must not be speculative, and, in any case, should be careful to 'guard against the dangers of that evaluation being tainted with the verisimilitude of scientific certainty…'.[211]

The court in *Weller*[212] was critical of the appellant's witness, stating that 'if one tries to question science purely by reference to published papers and without the practical day-to-day experience upon which others have reached a judgment, that attack is likely to fail, as it did in this case.'[213] This was significant to the current study in that a central line of investigation was the relationship between science and law. In *Weller*,[214] the prosecution expert was an FSS employee, whereas the defence expert was an academic expert with no field forensic experience. The defence expert in *Reed*[215] came in for similar criticism.[216] The significance of 'experience' taking precedence over 'science' in court is examined and discussed in Chapter Seven.

In *Reed*,[217] the Court of Appeal had advised that the forensic expert may give opinion on how a DNA crime scene sample may have been transferred, despite the fact that no data other than expert subjective opinion. That is, no database existed, as for judging DNA matches. In *Dlugosz*,[218] the question arose as to whether the expert could give a subjective opinion on the DNA match itself. There was no dispute that the DNA crime scene sample was of too low quantity and quality in order to reliably state a match probability, and

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[207] ibid 41-51.
[208] *Reed* (n 202).
[209] ibid 120.
[210] ibid 120-127.
[211] ibid 121.
[212] *Weller* (n 206).
[213] ibid 49.
[214] *Weller* (n 206).
[215] *Reed* (n 202).
[216] ibid [104-110].
[217] *Reed* (n 202).
[218] *Dlugosz* (n 111).

the defence's case was that this made the DNA evidence too unreliable to admit. However, the Court of Appeal ruled that, as long as the true nature of the evidence was made clear to the jury, and the court was satisfied that (again) the witness had sufficient forensic experience, then the evidence passed the test of 'assistance'.

> … it does seem to us that provided it is made clear to the jury the very limited basis upon which an evaluation can be made without a statistical database, a jury can be assisted in its consideration of the evidence by an expression of an evaluative opinion by the experts. … provided the expert has sufficient experience… it must then be made very clear to the jury that the evaluation has no statistical basis. It must be emphasised that the opinion expressed is quite different to the usual DNA evidence based on statistical match probability. It must be spelt out that the evaluative opinion is no more than an opinion based upon [the expert's] experience which should then be explained. It must be stressed that, in contrast to the usual type of DNA evidence, it is only of more limited assistance.[219]

This is highly significant to the use of DNA evidence in court. It will be recalled that the 'new paradigm' of forensics that is DNA analysis, referred to the ability to objectively state match probability in the form of a scientifically robust probability statement. But cases such as *Bates*,[220] *Broughton*,[221] *Reed*,[222] and *Dlugosz*[223] involve once again (subjective) opinion evidence. In the case of *Dlugosz*,[224] this was subjective evidence as to the DNA match itself (as opposed to, for example, mode of transfer), the heart of the 'new paradigm'.

This approach has been criticised by both the legal community, describing the ruling as 'potentially a retrograde step… lower(ing the bar) in the most difficult of cases, which are exactly the cases that should demand the highest level of statistical analysis',[225] and the scientific community:

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[219] *Dlugosz* (n 111) [24].

[220] *Bates* (n 205).

[221] *Broughton* (n 203).

[222] *Reed* (n 202).

[223] *Dlugosz* (n 111).

[224] *Dlugosz* (n 111).

[225] Amoah-Nyamekye Evans, Steven Bird, 'Westlaw Case Comment, DNA (Criminal Evidence)' (Westlaw, 27 November 2013).

> The ruling assumes that a scientist who has quantitatively evaluated a large number of mixtures cases will have the knowledge to assign a reliable qualitative opinion of weight of evidence in a case that is too complex for a quantitative assessment. However, there is no scientific basis for this belief — no scientific literature provides a reliable methodology, scientists are not trained to make such assessments and there is no body of standards to support them. Casework experience is not a substitute. The true composition of the DNA result in any given case cannot be known so it does not provide a reliable control for learning purposes.[226]

Professor Gill described this decision, to admit subjective opinion, as 'retrograde', counter to established scientific method, and, indeed, based on a test that has been shown experimentally to be non-generalisable, stating that, for DNA, there is no real alternative to probabilistic calculations.[227]

The apparent 'reversion' to a simple admission test of basic reliability and assistance has arguably been underlined in the most recent Criminal Procedure Rules,[228] in which *Dlugosz*[229] is explicitly cited as precedent for this proposition:

> It is essential to recall the principle which is applicable, namely in determining the issue of admissibility, the court must be satisfied that there is a sufficiently reliable scientific basis for the evidence to be admitted. If there is then the court leaves the opposing views to be tested before the jury.[230]

However, as noted above, there is strong scientific reservation regarding the precedent set in *Dlugosz*:

> … *R v Dlugosz* is a prime example showing how the legal system can unwittingly be complicit in propagating a method that has no scientific basis. It is particularly dangerous, since the … method invites confirmation bias. As this is now established practice, the same errors will be repeated across different cases… [231]

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[226] Ian Evett, Sue Pope, 'Practice Points: Science of Mixed Results' (12 August 2013) Law Society Gazette.

[227] Gill (n 95) 122-129.

[228] Criminal Procedure Rules 2015; Criminal Practice Directions 2015.

[229] *Dlugosz* (n 111).

[230] Criminal Procedure Rules 2015; Criminal Practice Directions 2015.

[231] Gill (n 95) 129.

3.16 Conclusions

This chapter has reviewed the key defining factors of this study, that is, the nature of the adversarial trial, the role of evidence, specifically the role of expert evidence, and the legal framework surrounding these.

The chapter has also reviewed the distinctive nature of DNA profiling evidence, explaining how it is the most rigorous of forensic identification methods. However, the developments in, primarily, case, law, reviewed above, have underlined a number of the questions at the heart of this thesis. The *Doheny* direction, despite originating eighteen years ago, has apparently not been challenged or over-ruled, despite significant criticism from commentators from the start. As part of its investigation into the relationship between law and science, this study will look at whether 'science' has somehow 'crept in', or whether this somewhat historical precedent has been simply accepted.

Many of the test cases described above involved, not the DNA match itself, but how the DNA came to be at the crime scene. This offers a potential answer to the question of why the *Doheny* direction has not been challenged, that is, simple DNA matches are simply accepted. Regarding issues such as transfer, this study investigates the degree to which the expert feels themselves qualified to give their opinion on this type of evidence, and the degree to which they feel themselves constrained in the courts.

Very significantly, it may be argued that the use of DNA evidence has come full circle. Originally referred to as a paradigm change in forensic identification, and a gold-standard against which older forensic tests must measure themselves, the case of *Dlugosz*[232] appears to indicate that, (somewhat paradoxically) for more complex and challenging DNA samples, the paradigm no longer strictly applies, and the expert may consider themselves qualified to offer their opinion based solely on their 'experience', as for any other type of expert evidence.

This goes to the heart of the line of investigation within this study, the relationship between science and law in court. On the one hand, common law rules regarding admission of expert evidence appear (despite all the intellectual energy described above in terms of proposals for reform), to remain at the simple level of basic sufficient reliability and assistance to be

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[232] *Dlugosz* (n 111).

put before the court. On the other hand, however, prominent members of the scientific community have criticised the method endorsed in cases such as *Dlugosz*[233] as being scientifically unreliable.[234] The question of how forensic experts resolve this conflict in court is a crucial one to this study.

[233] *Dlugosz* (n 111).

[234] Evett and Pope (n 226); Gill (n 95).

Chapter 4
Methodology

4.1 Introduction

Whilst the broad aims of this study were to examine, as a whole, expert witnesses' experience of testifying as to DNA evidence in the adversarial court, two central research questions underpinned this. The first involved the question of whether, and how, conflicts arose from the fact that the expert has a duty to the court to give unbiased assistance and yet is called by opposing parties to support their case in an adversarial criminal trial. Specific questions included the nature of any such conflicts, how these conflicts were addressed, and whether these attempts at resolution were successful. The second central question was whether, and how, conflicts arose between the rigorous scientific, and probabilistic nature of expert evidence, and the exigencies and need for certainty of the English legal process.

Over seventy years ago, it was observed that if one wanted to find out something about people's activities, then the best way was to ask them.[1] Whilst the philosophical underpinnings, and the scientific principles and caveats regarding data generation by interview have been significantly developed since then, interviews remain a trusted method within sociological studies. This study involved semi-structured interviews with twenty-five experts with significant experience in testifying as to DNA evidence in criminal trials. Subsequent analysis was then aimed at both describing, and offering potential explanations for, observations concerning the research questions described above.

It has been suggested that researchers have sometimes assumed that interviews will be part of their qualitative research method, without further consideration.[2] In order to assure, therefore, as far as possible, the internal validity of this study, and to, at least, make observations regarding potential external validity, it was critical, as a preliminary step, to confirm that this was indeed the optimum methodology and to root this methodology within the

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[1] Michael Brenner, Jennifer Brown, David Canter, 'Introduction' in Michael Brenner, Jennifer Brown, David Canter (eds) *The Research Interview: Uses and Approaches* (Academic Press, 1985) 2-3.

[2] Jennifer Mason, *Qualitative Researching* (2nd edn, Sage Publications, 2002), 63.

study's theoretical perspective, that is, to consider its epistemological stance. It was also important to assess known and potential limitations of interviews as a data generation tool. These considerations allowed creation of a frame of reference from which a valid and effective research methodology could be developed, as well as development and application of a detailed study design that could yield relevant data reflecting manifestations of the questions under study.

This chapter commences, therefore, with a discussion of the rationale and limitations inherent in qualitative studies, and describes the theoretical underpinnings of the methodology chosen, that is, semi-structured interviews. It goes on to describe the detailed research design, and considerations regarding the sample design and implementation. Whilst the processes of recruitment, interviewing, transcription of recorded interviews and subsequent analysis were performed partially simultaneously, each is described and discussed in turn. Challenges experienced at each stage are also detailed. The chapter concludes with a discussion of ethical issues arising within the study and how they were addressed.

4.2 Qualitative Methods

'Qualitative research' in the social sciences describes a range of research techniques aimed at observing and explaining human behaviour.[3] Whilst quantitative methods concern themselves with the question of 'how many', qualitative methods concern themselves with the 'what', 'why' and 'how'.[4] The volume and richness of qualitative data has been highlighted as a factor differentiating it from quantitative research, in that it is concerned with concepts, meanings, metaphors, symbols, and qualitative descriptions,[5] and unlike (arguably) the case for quantitative research, within qualitative methods, consideration of the data is inseparable from considerations of the subjective viewpoint of researchers, aiming to explain the world that they observe.[6]

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[3] Denzin NK and Lincoln YS, 'Introduction: The Discipline and Practice of Qualitative Research' in *Handbook of Qualitative Research* (Sage Publications, 2005) ch 1.

[4] Mason (n 2) 4.

[5] Bruce L Berg, *Qualitative Research Methods for the Social Sciences* (6th edn, Pearson, 2007) 3.

[6] Denzin (n 3) 3.

It has been argued that most quantitative research, with its well-established concepts of null hypotheses and statistical method, pays scant regard to the theoretical underpinnings of the method itself, however, for the qualitative researcher 'swim(ming) against the tide of cultural heritage of how science is done', an understanding of the philosophy underpinning such research is of central importance.[7] Within qualitative research it is critically important to ensure that the methodology chosen is rooted in the theoretical stance taken within the study and particularly its view of its epistemology.[8]

Theoretical examination of the philosophical framework underlying the proposed methodology provides a frame of reference from which a valid and effective research design may be developed. Put specifically, unless this study's ontological position was that interviewees' knowledge, understandings, perceptions and interpretations provided meaningful evidence of the social reality under study, and its epistemological position was that qualitative semi-structured interviews were a valid method of generating such data, then the outputs of the study would have little or no validity or further usefulness.[9] At a more practical level, without a robust theoretical understanding, whilst surface shortcomings arising from the difference between quantitative and qualitative methods may have been easily identified and resolved, more fundamental shortcomings in design may have gone undetected. Particularly, design errors may have been built in, or accepted, because of false assumptions engendered by familiarity with more established quantitative techniques.[10] It is, therefore, important to be clear about the theoretical standpoint taken within this study, particularly regarding its ontological and epistemological positions.

In general terms, discussion of ontology in sociological studies has been framed as a choice between the two opposing perspectives of positivism, and interpretivism.[11] Briefly, positivism argues that reality consists of what may be sensed, through sight and touch, for example, with both natural and social worlds operating within a strict set of laws. Reality may therefore be

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[7] Pamela Maykut and Richard Morehouse, *Beginning Qualitative Research: A Philosophic and Practical Guide* (The Falmer Press, 1994) 2.

[8] Michael Crotty, *The Foundation of Social Research: Meaning and Perspective in the Research Process* (2nd edn, Sage Publications, 1998) 47.

[9] Mason (n 2) 63-64.

[10] Maykut (n 7) 1-2.

[11] David E Gray, *Doing Research in the Real World* (2nd edn, Sage Publications, 2009) 17-18.

studied by the same methods as applied to scientific enquiry.[12] By contrast, interpretivism looks for 'culturally derived and historically situated interpretations of the social life-world',[13] that is to say, the scientific reality is different from the social reality, and indeed even that no external reality exists independent of people's beliefs. As will be detailed below, this study took the well-established stance of 'critical reality', which rejects outright positivism or constructivism in favour of an arguably more practical approach to using qualitative tools to study the social world, briefly, that data generated may be used to provide evidence that may be critically used to draw conclusions about the phenomena studied.[14]

Considerations of epistemology have been broadly framed under two opposing standpoints, those of inductive logic and deductive logic. Briefly inductive logic involves building knowledge bottom-up from evidence, in order to derive explanatory theories. By contract, deductive logic (associated with the 'scientific method') involves development of a theory, framing a testable hypothesis, and then assessing the evidence in order to test that hypothesis.[15] Positivism implies a deductive approach, in which the truth of a hypothesis may be deduced (or, to be exact, falsity of a null hypothesis), however, interpretivism implies an inductive approach, in that a number of alternative conclusions may be inducted, all with validity.[16]

A purely positivist approach might envisage an interview in which the data generated represented a perfect representation of (social) reality, however the pure constructivist might state that any interview simply represented a narrative view of the world constructed by the interviewer and interviewee within the context of that interview, and representative of no external meaning.[17] In the former such reality might be deduced, and in the latter, possible realities inducted. Such polarisation appears challenging from a social research point of view: it might realistically be assumed that positivist

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[12] ibid 18.

[13] Crotty (n 8) 67.

[14] Sotirios Sarantakos, *Social Research*, (4th edn, Palgrave Macmillan, 2013) 33.

[15] Mason (n 2) 180.

[16] Gray (n 11) 33.

[17] Jody Millar and Barry Glassner, 'The 'Inside' and the 'Outside': Finding Realities in Interviews' in David Silverman (ed) *Qualitative Research: Theory, Method and Practice* (2nd edn, Sage Publications, London 2004), 125.

'pure data' might be unattainable through interview within the sociological study, given the complexity of the social world, however, to accept the constructivist view that no useful data may be generated would deny the validity of the substantial research, apparently empirically sound, based on data generation using qualitative methods, for example, interview.[18] Indeed the constructivist approach has been critiqued on the basis that 'there is a considerable difference between being sceptical about the bases of truth claims, … and denying that truth…'.[19]

It has been argued that there can be no truly pure inductive or deductive approach: the former cannot proceed without being informed by questions arising from previous work in the field, and the latter can only proceed on the basis of hypotheses based on inductions from earlier evidence.[20] This study's epistemological approach lies strongly within the deductivist tradition, in that it was based on a number of specific research questions, but at the same time it was accepted that there was a strong need for inductive methods in terms of interpreting the personal experiences of the interviewees. After all, it was judged likely that different perceptions and opinions, sometimes conflicting, would be generated from the study subjects. Taking the above considerations into account it was proposed here that, by taking into account the critiques and objectives of both positivist and constructivist schools, valuable data concerning the social world under study could be generated by the application of rigorous interview methodological construction, application and analysis.

As briefly mentioned above, the ontological approach taken within this study belonged to the school of 'critical realism', the best known statement of this being that of Bhaskar.[21] Bhaskar argued, in 'The Possibility of Naturalism', that, in many ways, the social sciences, and specifically human behaviour, could be studied in the same way as natural systems, that is, in a scientific fashion.[22] Critics proposed that, whilst natural systems could be reduced to universal laws, human behaviour could only be 'roughly patterned' rather than conforming with defined laws. In response to this, Bhaskar argued that

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[18] ibid 126.

[19] Sanders CR, 'Stranger than Fiction: Insights and Pitfalls in Post-Modern Ethnography' (1993) 17 Studies in Symbolic Interaction 97.

[20] Norman Blaikie, *Designing Social Research: The Logic of Anticipation* (Polity Press, 2000), 100-102.

[21] Bhaskar R A, *A Realist Theory of Science* (Verso, 1975).

[22] Bhaskar R A, *The Possibility of Naturalism*, (Routledge, 1979).

even within systems considered to be natural, proof of cause and effect was not possible, only the ability to show associations of certain conditions with certain effects. It was the scientist's job to continually refine definitions of such associations. Bhaskar argued that this was no different from social systems, albeit generally somewhat less complex.[23] The practical methodological approach associated with this philosophy, and the approach taken in this study, is commonly referred to as 'critical realism'.[24] This approach is based on the position that there is a reality independent of human thinking, which may, at least, be discerned up to a point.[25] This reality is not directly accessible, but may be indirectly accessed intellectually and through human experience and perception.[26] This has been described as a 'post-positive' approach in that it rejects outright objectivist and constructivist ontologies. It suggests that 'the social world is produced and transformed in daily life'.[27]

It would be mistaken, however, to describe the approach of critical realism as simply existing in between the constructivist and positivist schools of thought. In fact, it rejects both these approaches, constructivism on the basis that there is indeed a reality, and positivism, on the basis that, although there is a reality, it can only be accessed indirectly. All that can be done is to attempt to express, in thought, the structures and ways of acting of things that exist independently of thought'.[28]

As an example of how these approaches were combined within this study, one key research question topic was how, and how well, DNA evidence was presented and examined. Theoretically, in the world of the 'realist', this is a known fact, which could be determined empirically. On that basis, hypotheses could be determined, and then tested, using deductive reasoning. In this study, however, the question of how well DNA evidence was presented and tested was determined through personal reflection and

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[23] B Carter and C New, 'Introduction: Realist social theory and empirical research' in Bob Carter and Caroline New (eds) *Making Realism Work: Realist Social Theory and Empirical Research* (Routledge, 2004) 1.

[24] Colin Robson, *Real World Research: A Resource for Users of Social Research Methods in Applied Settings*, (3rd edn, Wiley, 2011) 30-31.

[25] T Wiesman, *The Faces of German Realism* (Selbstverlag, 2005) 61.

[26] Sarantakos (n 14) 33.

[27] Bhaskar RA, *Reclaiming Reality: A Critical Introduction to Contemporary Philosophy* (Verso, 1989) 4.

[28] Bhaskar Realist Theory of Science (n 21) 250.

opinion, an interpretative process using inductive reasoning, and likely to generate multiple possible conclusions. Usefully, researchers have been reminded that qualitative interviewing creates but a reconstruction of reality, through the interviewee's (and interviewer's) eyes, rather than a faithful reproduction of 'reality'.[29]

4.3 Research Design

It has been proposed, in the interests of defining, positioning and generally creating a framework for, qualitative studies, that, prior to consideration of specific methodology and detailed method, consideration should be given to the nature of the social reality to be investigated, what may represent knowledge or evidence of that social reality, consideration of the data source, and the method of generating that data.[30] It should be noted that, because of the necessarily subjective nature of qualitative research, it has been argued that it is more accurate to regard such research as data 'generation' rather than 'collection', as might be the case in quantitative research.[31] These considerations will now be looked at in turn.

In sociological terms, the social reality may be said to be the fact that the English criminal trial process manifests the high level principle of an adversarial mode of trial, legally mandated procedures in terms of the trial process, scientific principles in the form of the evidence (and, here, specifically DNA evidence), legal principles regarding admissibility and presentation of that evidence, and judgment on the part of all the human players involved, both objective and subjective. It is the interaction of these factors, particularly as regards human judgment under constraints of legal and scientific origin, which is under consideration in this thesis.

Of course, many approaches have the potential to yield data representing knowledge or evidence of that social reality. A recent paper usefully summarised the main methods by which 'knowledge or evidence' of the adversarial process may be determined. These included interviewing prosecutors or defenders involved in forensic cases, free-ranging discussions with judicial officers who specialised in forensic trials, observing jury trials in which DNA evidence was contested, interviewing juries at the conclusion of these and other 'DNA trials', analysing the transcript narrative

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[29] Mason (n 2) 63.

[30] ibid 13-21.

[31] ibid 51-52.

of the relevant trials, and facilitating focus groups with the main stakeholders in the obtaining, analysis and presentation of forensic evidence.'[32] Examples of such stakeholders included police, judges and magistrates, advocates of all types, community workers, corrections officers and legislators.

Whilst the ability of expert witness interviews to provide valuable data supporting the investigation of the social reality of interest will be discussed below, it should be noted that, although not intended by Findlay, above, to be an exhaustive list, the omission of expert witness interviews supports the proposition that not only does this study offer a novel viewpoint, but that it also provides a so far missing perspective on the reality under study.

Regarding data source: the subject population comprised experts with experience in DNA evidence. They offered a rich source of data because they had expert knowledge of DNA evidence vastly superior to judge, prosecution, defence or jury, albeit on a scientific rather than legal basis, and they had a specific interest in this area. In addition their view was assumed to be unbiased. Although judge and jury are assumedly unbiased in judicial terms, they are unable to view the trial process in an unbiased way, because they are key players within it. The expert witness stood outside of this process and was not required to direct court proceedings and rule on law (as for the judge), or find fact (as for the jury). The expert was therefore, to this extent, an unbiased observer. The expert was required also to be judicially unbiased under law. In addition, as professional scientists and trained expert witnesses, it was judged that subjects were able to offer rational, professionally-informed and well-argued opinions. Additionally, the subjects selected had experience of a large number of relevant trials. This may not have been the case for judges or counsel, and was certainly not the case for jurors.

It should be noted that, although interviewing of expert witnesses was apparently a novel approach, that is not to say that the expert witness (or more specifically the forensic science) community has not been highly active in terms of scientific and statistical comment regarding the presentation and examination of DNA evidence. Significantly, however, much of that commentary has been largely centred on technical comment, rather than on experience of DNA evidence in court. One additional observation flowing

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[32] M Findlay, 'Juror Comprehension and the Hard Case - Making Forensic Evidence Simpler' (2008) 36 International Journal of Law, Crime and Justice 15, 15-53.

from this was that such commentary had largely come from a sub-set of academically active commentators, rather than from a wider pool of all experts active in testifying as to DNA evidence in court. The approach taken in this study therefore targeted a largely untapped source of knowledge and opinion.

Regarding interviews as a data generation method: interviewing offered a highly effective method of generating data for a number of reasons: the researcher was likely to 'hear' much more than the researcher was 'told'; subjects were likely to use the opportunity to clearly state their views; generally large amounts of data were likely to be generated for analysis; because, in this case, the subject interviewees were, by nature and training, highly literate, they were able to clearly vocalise and communicate their viewpoint.[33] Additionally, interviews offered a highly flexible method of data generation, because, in contrast to, for example, questionnaires, the interviewer could ask complex questions, adapt to the interviewee, correct misunderstandings and generally control generation of data.[34] These advantages would not all be realised with any other method of generating data from such subjects (for example using questionnaires).

4.4 Validity and Reliability

One objective of qualitative (indeed, any) research should be that it may be possible to draw generalisations from the data that may be applied to other settings in which similar conditions exist.[35] The degree to which this may be done depends on a number of factors, including the validity of the study. Validity has been described as having three components, measurement validity, internal validity and external validity.[36]

Measurement validity relates to the degree that the method measures and captures the data under consideration. In the current study, and as described below (4.7 Interview Schedule Design), this was assured by

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[33] D Wilkinson, P Birmingham, *Using Research Instruments: A Guide for Researchers* (Routledge Falmer, 2003) 63.

[34] Sarantakos (n 14) 295-296.

[35] Jane Lewis and others, 'Generalising from Qualitative Research' in Jane Ritchie and others (eds) *Qualitative Research Practice: A Guide for Social Sciences Students and Researchers* (2nd edn, Sage Publications, 2014) 359.

[36] ibid 356.

rigorous alignment of the interview schedule with the questions under consideration. This was further controlled by assessment of the schedule at pilot interview.

Internal validation relates to the degree to which causal statements are supported by the data. It also relates to the reliability of the data generated, that is, whether it consistently measures (or 'generates' data).

As will be described below in the respective sections, internal validity may be assured by systematic design of the interview schedule, and rigorous use of best practice in the interview process itself.[37]

External validation relates to the degree to which the study's findings can be generalized to situations outside of the study. There are limits to what may be generalised in any study, and careful consideration must be given during the design. and analysis and interpretation of the data as to the degree to which findings may be generalised. Generalisation is possible in terms of the whole population of which the sample is a part, in other settings with similar conditions, and in terms of theoretical constructs.[38] A number of questions have been suggested that may be used to assess the credibility of a qualitative study's wider inferences.[39] These include whether the study was carried out systematically, whether interpretations are well supported by the data, whether the interpretation has developed appropriate theoretical models, and whether the findings are corroborated by other sources.[40]

These factors were taken into account in the current study during both analysis and interpretation of the data generated.

Regarding corroboration, it has been suggested that data may be 'triangulated', that is, looked at from diverse points of view. This might include comparison with other studies, or other methods of generating the data from the same source, the use of different observers using the same data generation method or looking at the data from different theoretical perspectives.[41] In the Roberts study, for example, findings were triangulated

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[37] Gray (n 11) 17-18.
[38] Lewis (n 35) 359.
[39] ibid 359-364.
[40] ibid.
[41] ibid 358-359.

by interviewing both expert witnesses and barristers, regarding specific cases.[42]

Due to the limited size of the current study, it was judged that any practical attempt at triangulation (for example, by interviewing counsel), would have been counter-productive in that it would have limited the overall breadth of data (that is to say, in this study twenty-five experts were interviewed, however a 'triangulated' method would have involved approximately ten interviews with experts and twelve with counsel. This was felt to be too low a sample size of either). Instead, the quality of the study was assured by, as described above, rigorous experimental design and implementation, as well as rigorous and reflective analysis and interpretation.

4.5 Interview Structure and Design

Interviews may be structured, semi-structured, non-directive, focussed, or informal conversational in nature, progressing from the formal to the informal.[43] It could be argued that no interview schedule could be fully structured (or it would simply be a questionnaire), or could be completely unstructured (or how would the researcher even begin to ask questions). On that basis most qualitative research using interviews could be described as being somewhere on the formal – informal continuum (indeed, it may be noted that the terms 'qualitative interviewing' and 'semi-structured interviewing' are frequently used synonymously[44]). Because of the relative specificity of the research questions within this study, the decision was made to utilise a relatively structured approach, designed so that the interview would remain within boundaries of the topic areas. Additionally, by using this structured approach, it would have the advantages of consistency and reproducibility and could be more easily demonstrated to be free of bias.

Having said this, certain strengths of the less structured interview were drawn upon, both in the design and the implementation. From a design point of view, optional probe questions were built in, and from an implementation point of view, an open style of interview was applied. These points will be discussed further below. It was judged that this structure would allow the

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[42] Paul Roberts and Chris Willmore, *The Role of Forensic Science Evidence in Criminal Proceedings* (Runciman Report CM2263, Research Study No. 11, Royal Commission on Criminal Justice 1993).

[43] ibid 218-221.

[44] Mason (n 2) 62; Sarantakos (n 14) 280.

interviewer to ‘shape the flow of information’, but, at the same time, allow interviewees the scope to express themselves and to illustrate and expand on initial responses. Additionally it was judged that this method had the potential to generate ‘richer’ data.

Exponents of a more flexible style recommend the use of simple bullet pointed guides within a high-level question structure.[45] However, the main advantage given for this method, that it allows the generation of data to be framed by participants rather than dictated by the terms of the study, were judged to be a disadvantage to this study, in which specific questions were to be addressed. Further, whilst flexible interviews might have satisfied purist ideals of qualitative research, the principle that ‘all methods must be open, consistently applied and replicable by others’[46] was deemed to take precedence in this study.

Interviews were to be recorded unless the participant objected. They were then to be subsequently transcribed. The primary advantage of recording was that a vastly greater amount of data could be generated. Additionally, this data was ‘rich’ in that it was later possible to analyse ‘meta-data’ such as nuances, frequency of statements, relationships between items and emphases, where judged useful.

4.6 Sample Design and Implementation

The sampling strategy and design is of central importance in qualitative studies, as it affects the usefulness of the data generated, the type of analysis that may be applied, and the value of broader inferences made from those analyses.[47] This will now be discussed in detail. For clarity, within this discussion, the term ‘research population’ is taken to mean the entire population of expert witnesses in the UK with experience of DNA testimony in court and the term ‘study population’ is taken to mean the subset of the research population who participated as interview subjects within this study.

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[45] Sue Arthur and others, ‘Designing Fieldwork’ in Jane Ritchie and others (eds) *Qualitative Research Practice: A Guide for Social Sciences Students and Researchers* (2nd edn, Sage Publications, 2014) 149.

[46] A Oakley, 'Paradigm Wars: Some Thoughts on a Personal and Public Trajectory' (1999) 2(3) International Journal of Social Research Methodology, 252.

[47] Jane Ritchie and others, ‘Designing and Selecting Samples’ in Jane Ritchie and others (eds), *Qualitative Research Practice: A Guide for Social Sciences Students and Researchers* (2nd edn, Sage Publications, 2014) 112.

In this study the research population of interest had already been broadly defined by the nature of the research objectives (that is, expert witnesses with experience in DNA testimony within adversarial courts). A detailed sampling strategy was defined. This strategy included development of sample selection criteria to confirm and bound the study population; consideration of appropriate sample size and of required quotas of specific sample sub-types; development of an appropriate sampling strategy; identification of an appropriate sample frame (that is, information source) from which the study sample could be selected. A detailed discussion follows of these components, and how they were built into the sample design.

In contrast to quantitative studies, non-probability sampling methods are used in qualitative studies, and the sample is not designed to be representative of the subject population as a whole. The sampling approach taken in this study was ‘purposive’ in that it sought to select a sample of the subject population that displayed features of interest.[48] Whilst this meant that the sample could not be taken to be representative of the population as a whole, this approach did allow a broader investigation of features of interest across the population than would have been possible if a quantitative method were to have been used.[49] Such a purposive sampling approach aimed to ensure that the greatest number of types of characteristics relevant to the research questions were represented, and with sufficient, if not necessarily exhaustive, diversity. Details of the criteria applied are discussed below, however at the outset it should be stated that the sampling approach may be defined as having been homogeneous in that it aimed to include only subjects conforming to a certain characteristic (briefly, here, DNA expert witnesses),[50] but within this sample, a heterogeneous sampling approach[51] was taken in which the aim was to represent every sub-type (for example, here, experts with background and experience in prosecution, defence, police, public, and private providers). By aiming to include as diverse a sample range as possible within the boundaries of the defined subject population, the aim was that the contributions of each element could be

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[48] Berg (n 5) 44.

[49] ibid.

[50] Robson (n 24) 276.

[51] ibid.

considered in light of each other, not just in terms of the interplay between them, but also in terms of relative importance.

A number of entry criteria were applied, in order to eliminate any members of the research (parent) population who were not deemed to be relevant for inclusion within the study population. It was judged that it was not possible to define a formal minimal academic qualification for inclusion because of the fact that many different disciplines have actively contributed to the debate regarding DNA evidence in court, and have given testimony in criminal cases. These disciplines have included sociologists, psychologists, criminologists, information scientists, molecular biologists, geneticists, medical researchers, mathematicians, statisticians, forensic scientists, lawyers, epidemiologists and public health specialists.[52]

Three specific criteria were applied. Firstly the subject had to be experienced as an expert witness in the presentation of DNA evidence in criminal courts. Secondly they had to be based within the United Kingdom. Although the scope of this research was within the jurisdiction of England and Wales, there was great commonality of most aspects of the handling of DNA evidence, both legally and scientifically, with Scotland, and a decision to exclude the opinion of Scottish experts would limit the availability of valuable data. Additionally it was known that a number of experts based in Scotland were active also in the courts of England. It should be noted that, although some experts with experience in the English courts are based outside of the UK, these were excluded because of ethical issues concerning research outside of the UK. It was judged that this did not exclude a significant sample base. Lastly, the subjects had to possess significant volume and quality of experience. Because it was perceived that experts may have had very different qualities of experience (for example, in terms of specific expertise, interests and job role), it was judged unnecessarily restrictive to pre-empt minimum experience level, for example in terms of numbers of cases they had been involved in. Sufficient experience was therefore to be judged during interview. In the event, potential subjects without such experience were eliminated, or eliminated themselves during initial recruitment, so that no interviewees were judged at interview to possess insufficient experience to be included within the sample.

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[52] M Lynch and others, *Truth Machine: The Contentious History of DNA Fingerprinting* (The University of Chicago Press, 2008) 33-55.

We turn now to consideration of sample size. Sample size in qualitative studies is generally small.[53] There are a number of reasons for this:[54] firstly, with proper analysis, larger sample sizes may not yield additional data; secondly qualitative studies are not concerned with quantity, so there is not a minimum sample required for statistical significance; thirdly, because qualitative data is rich in detail, sufficient data can be generated from a relatively small number of samples; fourthly, because each sample (that is, interview) requires significant resource, logistical practicality may limit numbers sampled.

It was judged important, however, that in this study the sample size was not too small, and it was clearly borne in mind that, although sample size may remain relatively low, a rigorous purposive approach had to be maintained for it to retain validity. In this study it was judged that a sample size in the range twenty to thirty would allow generation of sufficient data across the target sub-set quotas, taking into account the above considerations. This was based on the heterogeneity of the population (the population was relatively homogenous, although with some sub-sets), the nature and number of selection criteria (as discussed below, clear, not numerous, and no requirement for complex sampling, such as control groups, comparisons between groups or nested criteria), and lastly the practicality of recruitment and interviewing. The chosen sample size was also assessed by comparison with established standards. As an example, a recent survey of interview-based sociological research papers within Great Britain and Ireland indicated a sample range between one and ninety-five with a median of twenty-eight.[55] Additionally in a recent review of expert opinion on sample sizes in sociological studies, thirteen renowned experts gave their observations and opinion.[56] In this review, experts were agreed that the absolute number depended on a range of factors, and was critically dependent on the detailed methodological design of the study. However, examples of specific sample number ranges recommended by the authors

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[53] Ritchie (n 47) 117.

[54] ibid.

[55] Mark Mason, 'Sample Size and Saturation in PhD Studies Using Qualitative Interviews' (2010) Vol 11 No 3 Forum: Qualitative Social Research.

[56] S E Baker and R Edwards, 'Introduction' in S E Baker and R Edwards (eds) *How Many Qualitative Interviews is Enough? Expert Voices and Early Career Reflections on Sampling and Cases in Qualitative Research* (National Centre for Research Methods Review Paper, 2012).

included between twenty and fifty,[57] and twelve and sixty.[58] Indeed, the authors of the latter suggested that, where criticism of sample sizes of greater than thirty arose, such critics misunderstood the principles of inductive research.[59] It should be noted that the authors were generally agreed, also, that sample numbers within studies may have been limited as much by the logistical limitations necessarily impinging on them, however did not believe that this, by itself, necessarily acted to the detriment of the studies. With regard to these benchmarks, and to a critical evaluation of the sample base within the overall methodological design, it was judged that the chosen sample size assured the internal validity of the study. In the event a sample size of twenty-five was achieved.

The purposive approach adopted sought to sample as wide a range of relevant experience as possible within the court. In conjunction, therefore, with the determination of appropriately sized sample frame, consideration was made of minimum quotas required for specific sub-sets of sample types.[60]

During the design phase, some basic assumptions were made regarding the research population. From the point of view of the prosecution expert, prior to the break-up of the Forensic Science Service ('FSS') it would have been desirable to ensure that both subjects working for the FSS and working for private companies were represented. Such a distinction did not exist for defence experts. Post-FSS break up, no such distinction applied, although there was still a distinction between large and small prosecution providers. The decision therefore was simply to ensure that significant (although not necessarily equal) numbers of experts with primary prosecution or defence expertise were interviewed. In order to ensure that the final sample satisfied these rather basic criteria, a matrix was constructed and ongoing assessment of sample types was carried out throughout the interview process. Data logged included interviewee name, study code, amount of prosecution and/ or defence experience, qualifications, employer, job title, years of experience in DNA evidence.

Although it might be noted that the definition of sample quotas for the sub-populations of prosecution, defence, large and small providers was relatively

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[57] ibid 5.

[58] ibid.

[59] ibid.

[60] Sarantakos (n 14) 178.

simplistic, justification for this was provided by the fact that many interviewees did not exactly fit into any one sub-set, but had a wide range of experience throughout their career (for example a significant number of experts working for defence consultancies had spent most of their career within prosecution within the FSS; some experts working with big private providers had similarly spent part of their career with the FSS).

The 'sample frame' refers to the pool of potential subject samples from whom a cohort of participants can be selected and recruited.[61] In this study the sample frame was created initially by identification of existing sources of information. In this phase of this process, potential participants were identified from existing contacts, attendance lists from professional seminars and conferences, and web searches. As described above, a purposive approach was taken, in that a range of potential interviewees (samples) were sought ,in order that the sample contained the widest range of relevant attributes.[62] Ethical considerations regarding use of such lists were taken fully into account and are discussed in detail at the end of this chapter. After this initial phase, the sample frame was expanded by a process of generation, by asking for recommendations from the initial participants. This is sometimes referred to as 'snowball' sampling.[63]

A number of considerations were identified that were taken into account in both phases of this process. Firstly it was necessary that the sample frame provided enough information to inform the necessary selection.[64] It was assessed that initial identification of participants, followed by generation of further participants did not in itself provide sufficient information to filter and select on the chosen sample criteria, however it was judged that unsuitable participants could be eliminated from the sample during the recruitment phase.

Secondly it was necessary that the sample frame provided comprehensive coverage of the overall population of interest, and did not omit any significant groups.[65] It was judged less important to ensure that any sub-sets were not over-represented: as discussed above, qualitative factors were of interest

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[61] Earl Babbie, *The Practice of Social Research* (10th edn, Thomson Wadsworth, 2004) 199.

[62] ibid 183.

[63] Berg (n 5) 185-186.

[64] Ritchie (n 47) 121.

[65] Sarantakos (n14) 167.

rather than quantitative factors. This second consideration was important in this study: until the final closure of the FSS in March 2012, the research population was structured in a relatively stable way. This was no longer the case at the start of this study, with many relevant personnel either redeploying, variously to private providers, Police laboratories, private consultancies, academia, or leaving the profession. The fact that there was no methodical redeployment of capacity by the Government meant that there was no systematic route to ensuring that all new sub-sets of research population had been identified. The approach taken within this study was to define initial quotas of study population sub-sets, and to maintain this under review during the entirety of the fieldwork.

A third consideration was whether the sampling frame could yield a sufficiently large sample size, not simply in terms of available subjects, but also in terms of their willingness to participate.[66] Sample size was discussed above, however it was judged that, not only would there be sufficient willing participants, but that it would not be difficult to expand the sample frame were numbers to be short.

The last consideration regarded the logistical practicality (including time, resource and cost) of applying the sample frame.[67] With reference to the designed sample size, it was judged practical to interview the required sample within a reasonable timescale.

It will have been noted that, because the second phase of sample generation involved asking initial participants to suggest further interview subjects, then the creation of the sample frame, and conduct of initial fieldwork (that is, interviews) were carried out simultaneously, to a degree. This was not considered a disadvantage as it allowed active monitoring of sample quotas.

An additional challenge may have arisen during the generation of samples, in that by asking existing participants to suggest new interview subjects, then it might be likely that they would suggest participants very similar to themselves, thus introducing bias.[68] This was not considered to be a major disadvantage as the overall approach was a purposive one, and did not seek to demonstrate representativeness. Additionally, the fact that sub-set quotas

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[66] ibid 182.

[67] ibid 167.

[68] Babbie (n 61) 184.

were identified and managed, meant that bias through snowball sampling was minimised. This is discussed below.

Generating new potential participants, whilst interviewing initially identified participants, had the significant advantage of allowing monitoring and adjustment of sub-set quotas within the sample frame. A potential challenge existed in that, by not strictly separating creation of the sample frame with fieldwork, there would be a temptation to adjust other aspects of the fieldwork in the light of an emerging sample frame. An example of this would have been adjusting interview questions outside the scope of the interview schedule. Although this might have yielded additional data of interest, it might potentially have degraded the value of the overall data set because of lack of consistency across the whole study population. Because of this, rigour was applied during the interview process in order to remain within the scope of the original interview schedule.

In the first phase (that is initial identification and recruitment of participants), approximately thirty potential participants were approached by e-mail with a brief explanation of the study objectives and a request for an expression of interest. Of these thirty people, eighteen responded positively and subsequently took part in the study. Each confirmed subject was sent further information and an Information Sheet and Consent Form (See Appendix A). Of the remaining potential subjects approached, two responded that they preferred not to take part, and no response was received from the other invitees. Seven more participants took part in the study after recommendation from initial interviewees, so that the total number of interviewees was twenty-five, in line with the original target regarding final sample size (between twenty and thirty).

Regarding monitoring of quotas, it will be recalled that it was planned to simply ensure that there was an adequate representation of prosecution and defence experience, but also to regularly assess the sample database in order to identify whether sub-sets with relevant experience had been omitted. A significant number of earlier interviewees mentioned ‘police laboratories’ as providers of DNA expert witness services. It was ascertained that, although police laboratories had always had some DNA capability (although was assumed to be generally reducing because of centralisation to the FSS and other providers), in fact, with the demise of the FSS, it was now apparent that police laboratories were increasing their capacity. This being the case, the decision was made to identify, and involve in the study a number of police employed experts. In the event two additional subjects

were enrolled (included in the twenty-five total). Reflecting on the achieved sample of twenty-five participants, fourteen female and eleven male subjects participated, with a median experience of eighteen years of working with DNA forensic evidence (in a range six to twenty-six years). The ratio of subjects with mainly prosecution experience to those with substantial defence experience was approximately two to one. Regarding employer, six worked with large forensic suppliers, and fourteen with small consultancies. Of the latter, seven had, until recently, worked within the FSS for most of their careers. Two further interviewees worked within police laboratories and three within academia, although still with substantial experience in court. In terms of qualifications, all were qualified to Bachelor's Degree, with five of these qualified further to Masters, and ten to Doctorate level.

Whilst not considering the achieved sample representative, it was judged that significant breadth of attributes of interest within the study population had been addressed.

A number of additional challenges presented themselves during recruitment. Firstly, because of the recent demise of the FSS, many potential interviewees were no longer contactable through existing contact details. New addresses were sometimes difficult to track down as experts had variously moved to other employers or out of the professional area completely. Whether this significantly altered the 'mix' of eventual study population is unknown, however, arguably, this may have provided a more heterogeneous sample (rather than possibly a homogenous group with similar experience), as a wider sample frame had to be applied.

Regarding the willingness of participants to take part: as mentioned above, only two potential participants preferred not to take part (and gave no reason), however others did not respond to an introductory or follow up e-mail. These tended to be experts working within private companies for whom individual e-mail addresses could not be identified. Whether these invitations reached individuals, or were filtered by administration departments or management, is unknown. This did potentially reduce the desirable scope of potential participants: these were mainly from 'medium'-sized companies who may have had different experiences to the experts employed within largely big or small private providers (and who comprised most of the achieved sample).

4.7 Interview Schedule Design

The ‘Interview Schedule’ provides the framework for semi-structured interviews.[69] At a simple descriptive level, the schedule comprises formalised questions designed to contribute answers to research questions, and appropriate subsidiary questions.[70] At a more detailed level, the interview schedule had to satisfy a complex requirement: specifically it represented and mediated the physical manifestation of the overall study design, in that it linked and controlled the study design with the implementation of the interviews themselves.

Interview schedules structure the layout, the breadth, the depth and the consistency of the data to be generated, as well as informing, if not driving, the later analytical aspects of the research.[71] The design of the schedule was therefore critical in this regard.

The decision to use a semi-structured approach dictated the design of the interview schedule: an overall structural ‘map’ and key questions formed the backbone of the schedule, designed to assure consistency and coverage. Within each structured question, optional prompt questions were designed to allow the researcher to probe further within certain boundaries. It should be noted that, not only had the schedule to reflect the substantial content of the research, but it also had to reflect the philosophy regarding the proposed interview structure (that is, the planned degree of flexibility, decisions on open or closed questions and areas to probe), and accommodate considerations regarding desired interview style (for example ensuring that bias was not introduced, either by interview style or by the nature of questions asked).

It is worth underlining that design of the interview schedule was a very challenging part of the study. A number of iterations were drafted before it was judged that the schedule achieved the objectives outlined above. Although it had already been decided to carry out a pilot interview to assure a number of aspects of the study (for example flow of questions and timing), it was judged that the pilot would be of particular value in terms of assessing the ‘fitness for purpose’ of the interview schedule itself.

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[69] Hilary Arksey and Peter Knight, *Interviewing for Social Scientists: An Introductory Resource with Examples* (Sage Publications, 1999) 96-97.

[70] ibid 97.

[71] Arthur (n 45)149.

A number of critical areas had to be considered during the detailed construction. Firstly, that the interview questions provided a reliable basis for generating data relevant to the research questions.[72] Secondly, that its structure and style allowed the desired control of the flow of the interview and generation of the data, so that all relevant areas were properly investigated.[73] Thirdly, to ensure that good style was adopted within the questions, for example, by ensuring that questions did not introduce bias, by, for example, by leading an answer.[74] Each of these considerations will be considered in turn.

The substantial content was directly informed by the central research questions of the thesis, namely, on the one hand, the potential conflicts between the expert's duty to remain unbiased and the adversarial English legal system, and on the other, between the demands of scientific rigour and both the adversarial system and the procedural requirements of the judicial process.

In the late 1990s, a spotlight fell on the use of expert evidence in court, generated to a large degree by a number of high profile miscarriages of justice. The 2007 House of Commons Science and Technology Committee Report, 'Forensic Science on Trial' (HC Forensic Science Report),[75] highlighted the special position of the expert witness in that, unlike other witnesses, they may testify as to their opinion. They went on to describe a major concern, that experts were frequently regarded as 'hired guns', citing evidence that both prosecution and defence sometimes 'shopped around' for the expert with most influence in the court-room.[76] On the one hand, it is not difficult to accept that, in an adversarial arena, each party sought to maximise the strength of their own case, however, the report underlined that the decisions in high profile miscarriages of justice such as those of Sally

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[72] Michael Brenner, 'Intensive Interviewing' in Michael Brenner, Jennifer Brown, David Canter (eds) *The Research Interview: Uses and Approaches* (Academic Press, 1985) 151.

[73] ibid 152.

[74] ibid 151.

[75] Science and Technology Committee, *Forensic Science on Trial* Seventh Report (HC 2004-2005) para 171 (HC Forensic Science Report).

[76] ibid paras 147 - 148.

Clark,[77] Angela Cannings[78] and Damilola Taylor,[79] could be directly traced to the issues highlighted above.[80]

Recognising the somewhat anomalous position of unbiased expert evidence in an adversarial arena, the HC Forensic Science Report made a number of recommendations to 'regularise' the use of experts and expert evidence. These included recommendations for pre-trial meetings of 'opposing experts' to identify areas of agreement and contention: this to reduce the burden on jurors by focusing their attention solely on areas of contention, and also to prevent collapse of trials where one party might be ambushed by new evidence during trial.[81] It also discussed the possibility of single joint experts,[82] and current proposals regarding disclosure.[83]

Many of the Report's concerns were echoed in the Law Commission's 2011 report on Expert Evidence in Criminal Proceedings,[84] with similar recommendations, as well as a draft bill, which, if it had been adopted, would have enshrined such recommendations within statute.

Although few of either parties' recommendations have become enshrined in primary legislation, most of the general recommendations were included in the Criminal Procedure Rules, particularly part 33 (now part 19).[85] In addition, although the draft Expert Evidence bill was not adopted, part 33, and particularly the Criminal Practice Directions 2014,[86] sought to enshrine the principles espoused by the draft bill into practice.[87] Significantly, the rules and practice guidelines mandated few requirements, but rather restated various, mostly recent, developments in common law, and recommended that courts took these factors into account.

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[77] *R v Clark* [2003] EWCA Crim 1020.

[78] *R v Cannings* [2004] 1 WLR 2607.

[79] *R v Preddie* [2007] EWCA Crim 2044.

[80] HC Forensic Science Report (n 75) paras 130, 148.

[81] ibid paras 151 - 152.

[82] ibid paras 149 – 150.

[83] ibid paras 153 – 154.

[84] Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325, 2011).

[85] Criminal Procedure Rules 2014, pt 33.

[86] Criminal Practice Directions 2014, pt 33, (now Criminal Practice Directions 2015 pt 19).

[87] Ian Dennis, 'Tightening the law on expert evidence' (2015) Criminal Law Review 1,1-2.

Without restating the common law position described in the previous chapter, it will be recalled that developments in recent cases have been far from clear in terms of their scope, and have courted much controversy as to their exact meaning and applicability.

Returning to the first of the key research questions: there are some statutory rules and many non-mandatory guidelines. It is worth reiterating that the prime objective of these rules was to promote and maintain unbiased expert evidence, concentrating solely on areas of contention. Many of these rules and guidelines would arguably be more at home in an inquisitorial arena, yet the fact remains that the arena in this case remains not just adversarial in nature, but driven by adversarial parties and controlled by a judge used to presiding over adversarial proceedings.

The first major strand of questioning, therefore, had at its heart the question of the degree to which the above listed rules and guidelines achieved their objectives in practice. Associated with this was the question of if, and how, elements of the system attempted to compensate, and how successful they have been in this.

The HC Forensic Science Report also underlined concerns regarding the science presented in court. These concerns included the admissibility of certain evidence, but also the way it was presented in court. The report pointed out particularly the difficulties in presenting DNA evidence, because of its probabilistic nature.[88] It is worth noting that, since the HC Forensic Science Report, there has been no change to the common law position regarding how simple DNA evidence is presented. With the vast advances in DNA technology, as well as subtleties regarding which questions are being asked by the court, and how the evidence provides answers, there has been a huge amount of commentary. Concerningly, HC Forensic Science Report pointed out that there was evidence that the weight that the jury placed on expert evidence was unjustifiably weighted by the way that it was presented by the expert (particularly, the expert's 'demeanour').[89] Meanwhile the expert community has, on occasion, been outraged by (to their mind) nonsensical proclamations on expert evidence by the courts. Indeed an entire issue of the Criminal Law Journal was dedicated to critique on an example of this in *R v T*[90]. Also, whilst not considered nonsensical, recent cases such as *R v*

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[88] HC Forensic Science Report (n 75) paras 159 -162.

[89] ibid para 140.

[90] *R v T* [2010] EWCA Crim 2439, [2011] 1 Cr App R 9.

Dlugosz[91] have thrown into question how complex DNA evidence (not subject to simple DNA match rules and the *Doheny* direction) should be presented.

The second major strand of questioning, therefore, was how the complexities of DNA evidence, with its scientific rigour, stood up to the very different objectives of the adversarial trial, with its desire for legal certainty. In a similar fashion to the earlier research question, the question also arises as to how elements of the system reacted in an attempt to compensate where there were conflicts.

From a data generation point of view, therefore, two distinct areas of interest arose. One complicating factor that was evident, was that many aspects of these two research questions overlapped. For example, and, hypothetically, the expert may judge that their instructing counsel has inculcated within the court fallacious thinking, for example, the 'prosecutor's fallacy'. From the point of view of responsibility to remain unbiased, the expert may be challenged as to whether they should, or indeed can, bring this to the attention of the court, as it might damage 'their' party's case. On the other hand, from the point of view of science, the expert may judge that however careful counsel has been not to fall into the trap of the 'prosecutor's fallacy', the court has indeed fallen into this trap. The expert should therefore bring this to the attention of the court.

The two central research questions may thus be seen as 'cross-cutting' the experience of the expert. Added to this, an additional factor that had to be taken into account was that, although it was the trial itself that was of central interest, many formative aspects of this were informed by events pre-trial. This issue, too, could be seen to cross-cut the factors discussed above.

Although it might have been possible to structure interviews around these central research questions, that is, synchronically, it was judged that this would have a number of disadvantages. These were that, not only might the direction and structure of the interview seem somewhat 'artificial' from the participants' viewpoint, but also that the process might have become inefficient in that ground might have been duplicated – if not in the questions, then certainly in the answers. This being the case, the interview schedule was structured diachronically, taking the interviewee through the pre-trial and then the trial process. This was not intended to place any constraint on

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[91] *R v Dlugosz* [2013] EWCA Crim 2, [2013] 1 Cr App R 32.

the final analysis of data collected, but was judged to provide a more intuitive basis for the interview structure, thus improving rapport and richness of data generated. Of course it was anticipated that the data generated would cross-cut key areas of interest, however it was anticipated that these different types of data could be adequately separated during analysis.

We now move on to the structure and style of the interview schedule. The interview schedule itself may be examined in Appendix B. The initial part of the schedule was designed to provide a brief introduction and recap of research objectives and to provide participants with a high level view of the structure of the interview. The first substantial section of the schedule asked interviewees a number of mandatory questions about their background and their experience. These were structured as closed questions designed simply to generate essential data regarding subject 'type'. It will be recalled that an essential component of the sample design was that the different sub-sets of subject samples would be monitored to ensure adequate coverage of the research population. This section was also designed to ease the interviewee (and researcher) towards the main body of the interview, and to build essential rapport.

The next two parts of the interview schedule comprised the main body. These were separated into the main sections of Pre-trial and Trial. At the start of each section, a concise and standard introductory statement was made, delineating the scope of this section and data required. As an example, the Pre-trial section commenced as follows:

> I'd like to ask you now about your experiences of the pre-trial process. The scope of my research is the use of DNA evidence in Crown Court trials, however I want to understand how the cases presented by both prosecution and defence counsel have been developed, and the various flows of information that lead to this point.

After the introduction, a number of questions were posed. Whilst these were 'open' in style, they were designed to limit the interviewee to the specific area questioned. For example, the first question within the Pre-trial section read as follows:

> When you appear for the prosecution, at what stage in the pre-trial process do you become involved, and how are you involved in the development of the prosecution case?

A number of prompts then followed, for use by the researcher in the case that it was judged that the area had not been sufficiently explored. As an example of prompts accompanying the above question:

Prompts if necessary

Could you tell me about your involvement with other parties relevant to the development of the prosecution case?

For example, Police, CPS

In total seven questions were asked in the Pre-trial stage, and eighteen within the Trial stage.

As a final section, interviewees were then asked five questions regarding potential improvements in the process that they could identify. A formal thanks for their participation was then made before termination of each interview.

The third major consideration within the interview schedule was to ensure that good style was adopted within the questions. This was so that both breadth and depth of the interviewees' experience could be properly explored.[92] This involved careful 'mapping' of the interview schedule as described in the previous sections, however it also involved effective question style.[93] Most questions were designed as open, that is, inviting something other than a yes or no answer. The challenge with these questions was to encourage the right breadth and depth of response. Good phraseology was needed to limit the questioned area, and various prompts, as described above, were designed to further probe if necessary.

Questions were carefully constructed so as not to lead an answer. An example of a leading question would be 'what problems have you seen in the presentation of DNA evidence?'. This could have suggested to the interviewee that there were indeed problems, when in fact they may not have thought that that was the case. It could be argued that almost any question has the potential to lead an answer, however care was taken to minimise this as much as possible.

Lastly it was necessary that the questions were clear, and gave the interviewees a clear idea about what was being asked, and the scope of this.

4.8 Pilot Interview

It was important to ensure that the interview schedule achieved its objective of providing a platform for the generation of data of interest and

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[92] Berg (n 5) 102.
[93] ibid 99-103.

usefulness.[94] Whilst a ‘pre-test’ would have the objective of assessing a small portion of the interview (for example, a subset of questions) and a ‘pilot study’ would have the objective of assessing whether the whole study would be likely to be effective (for example, by running an entire study with limited numbers), the objective in this case was limited to the effectiveness of the interview itself, the administration of the interview, and the subsequent coding and analysis.[95] These objectives are now detailed, along with an assessment of the effectiveness of the interview design in achieving these objectives.

A single interviewee was identified and processed in line with the detailed design method. After interview the data generated were recorded, transcribed and coded in line with the research design.

There were three primary objectives for the pilot interview. The first of these was to assess the substantial content and structure of the interview schedule, specifically its ability to generate the required quality and quantity of data within the constraints of the interview. This included an assessment of whether the interview had allowed the identification of new aspects of the research area. These could have been at a fundamental level (for example additional main elements of the overall structure) or detailed level (for example an improvement or missing question could be identified). This objective also included an assessment of the estimated timing required for the interview, and the practical flow through the individual elements of the interview. In fact no changes were judged to be necessary to the interview schedule, or to the timing and flow after the pilot interview.

The second objective was to assess the ‘administrative’ aspects of the process. This included recruitment, obtaining informed consent, recording, transcription, data recording and storage. Although no changes were made to any of these after the pilot interview, one detail of the informed consent form was changed after a query from the seventh interviewee: the interviewee pointed out that although an existing element of the form was technically unambiguous, its meaning might not be clear to all signatories.

The third objective was to assess whether the transcribed interviews provided data that was suitable for analysis by the planned method. No change was made to the analysis process after the pilot interview.

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[94] Arksey (n 69) 95.

[95] Sarantakos (n 14) 266.

It was intended also to use data generated from the pilot interview as part of the overall data generated for analysis, unless for any reason (for example significant reworking of the schedule or method after the pilot interview) it was judged to be incompatible with the full study sample data generated. As there was no significant modifications made to the interview schedule or its implementation, the data generated was integrated as part of the study population data, with no exceptional treatment. This interview is included in the total of twenty-five subjects interviewed.

4.9 The Interview Process

Although the interview has been defined as a 'conversation with a purpose',[96] it has been pointed out that any conversation in which one participant has an explicit or implicit script, and yet the other does not, is an 'extraordinary (if not unnatural)' one.[97] Indeed the interview has been likened more to a dramatic production, with elements of symbolic language, stagecraft and stage management, in the creation of a 'social performance'.[98] Within this representation, it may be seen that the interviewer cannot easily be regarded as an independent, unbiased, agent, and it has been argued that, therefore, however much the interviewer resists involvement, all interviews result in 'interactional' rather than 'neutral' communication flowing from interviewee to interviewer.[99]

Having said this, the fact that the interview process has many symbolic elements, does not mean that valuable data may not be generated. As has been stated, 'the primary issue is to generate data which give an authentic insight into people's experiences'.[100] The interviewer should act as a facilitator in this process, and should endeavour to ensure that the interview process (as well as the design, discussed earlier) does not introduce bias into the data.[101]

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[96] B Webb and S Webb, 'Methods of Social Study' (Longmans Green, 1932), 130.

[97] Berg (n 5) 90.

[98] ibid 91.

[99] J Gubrium and J Holstein, 'Animating Interview Narratives' in D Silverman (ed) *Qualitative Research* (3rd edn, Sage Publications, 2011) 150.

[100] D Silverman, *Interpreting Qualitative Data: Methods for Analysing Talk, Text and Interaction* (Sage Publications, 2001) 87.

[101] Brenner (n 1) 151-152.

Challenges also lie at other levels. It has been suggested that interviewees sometimes respond to questions using well-rehearsed, culturally accepted, narrative constructs, rather than provide deep insights into their view.[102] Somewhat similarly, the 'availability heuristic' may mean that interviewees might erroneously assess the frequency of any particular event. The 'availability heuristic' describes the psychological preference for easily recalled facts. For example, if a person vividly recalls an experience, then their assessment of that event's frequency is irrationally large. In the same way, lack of experience of any particular event may mean that an interviewee falsely assesses that event as being less likely than it actually is.[103]

Again, rigorous design and implementation was judged to minimise and contain the effect of such heuristics. For example, whereas an interviewee might well give a 'rehearsed' answer to a simple question, the interview schedule was designed so that, where judged necessary, open questions with appropriate prompts were used. Along with a rigorous interview technique, (for example, active listening), this meant that any superficiality within answers could be explored and assessed.

Regarding other challenges, it has been pointed out that the very interview itself further fragments (beyond the fact that it already comprises a fragmented story in the interviewee's mind, given that it can only be of finite length) the story in the way it is understood by the interviewee.[104]

It has been suggested that a key factor in maintaining validity of, and minimising bias in, such studies is the strong use of relevant interview techniques.[105] To that end, not only was care taken to remain within the scope of the interview schedule design, but also to be actively aware of, and apply best practice in such regard. This included ensuring that questions were asked according to the design (that is, not rephrased), and not altering the order of the questions.[106] A number of specific guidelines were borne in

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[102] NK Denzin, 'Representing Lived Experiences in Ethnographic Texts' (1991) 12 Studies in Symbolic Interaction 68.

[103] Amos Tversky and Daniel Kahneman, 'Availability: A heuristic for Judging Frequency and Probability' (1973) 5.2 Cognitive Psychology 207.

[104] Jody Millar and Barry Glassner, 'The 'Inside' and the 'Outside': Finding Realities in Interviews' in D Silverman (ed) *Qualitative Research* (3rd edn, Sage Publications, 2011) 101.

[105] Arksey (n 69) 247.

[106] Gray (n 11) 220.

mind. It was important to 'actively listen' to responses (and to things that were not said), so that the interview could be steered correctly.[107] Failure to do this, by, for example, assuming that a certain response would be forthcoming, would potentially have led to important missed data. It was important to build and maintain rapport, but at the same time not to proffer opinion, or to comment on, the interviewee's response: the danger arose of leading the interviewee's responses (for example by appearing to approve a certain response), and thereby potentially building in bias.[108] Lastly it was important to maintain an awareness of the need to actively manage the overall interview process, simultaneously bearing in mind all the above points. As an example, it was important not to be tempted, during the interview, to start to think about implications or potential analytical constructs, at least until the interview was complete.

It was important also to be ready to probe for further information where necessary, asking, as appropriate, for clarification, amplification, explanation, and perceived impacts, also to challenge contradictions, all whilst being careful to remain within the scope dictated by the interview schedule.[109] Bias may creep into data generation through careless probing, or careless use of the interview schedule. A number of specific sources of this type of such bias have been suggested, including, altering factual questions, rephrasing of attitude questions, careless prompting, biased probes, asking questions out of sequence, or indeed poor maintenance of rapport with the interviewee.[110] Such errors have the potential to lead to generation of inconsistent data, or more subtle bias, such as a differently worded probe question leading an interviewee to proffer an example, where another might not have thought so to do. As a control mechanism, it was borne in mind that, because the interviews were recorded, it was possible to make an assessment during analysis as to whether any part of the interview had fallen into this trap.

The majority of interviews were carried out at the subject's place of work. Although, in one case, four participants were interviewed on the same day, in the majority of cases a single interview took place each day. After

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[107] Alice Yeo and others, 'In-Depth Interviews' in Jane Ritchie and others (eds) *Qualitative Research Practice: A Guide for Social Sciences Students and Researchers* (2nd edn, Sage Publications, 2014) 185.

[108] ibid.

[109] Berg (n 5) 101.

[110] Babbie (n 61) 249.

confirming the subjects' understanding of the study, and obtaining signature against participants' informed consent, the interview took place. The interviews were recorded, with only two exceptions. In one of these the environment was not conducive to recording. The second instance was the only interview not carried out face to face. This interview was carried out by videoconference, and the interviewee preferred that the interview not be recorded.

In these cases, comprehensive notes were taken during the interview, however it should be noted that the quality of data generated during these two interviews was subsequently judged to be of a lower standard than for recorded interviews, and was processed with this in mind.

Some additional notes were taken during and after the interviews. The main content of these concerned sometimes additional information submitted by the interviewee after the close of the recording. These were assessed against ethical considerations before making use of such data within subsequent analysis. No use of such material was made where it was judged that the subject had believed that the comments were outside of their informed consent.

4.10 Data Analysis

The storage and the processing of data generated from interviews had to take into account legal (data protection) and security considerations. The data were in the form of digital recordings and handwritten notes. It was ascertained that, having incorporated the data security recommendations of the University (including appropriate physical security, digital security and data backup steps), the study was compliant with the University Of Leeds Data Protection Policy, which in turn was compliant with the requirements of the Data Protection Act 1988.[111] Digital recordings were transcribed into word-processed format, and handwritten notes were appended to such files. The names of participants were associated with code numbers in a secure file, and using these code numbers, anonymity of participants was maintained throughout.

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[111] http://www.leeds.ac.uk/secretariat/data_protection_code_of_practice.html, accessed at 17:45 on 22 March 2011; Correspondence to author from Faculty IT Management, Faculties of PVAC & ESSL, University of Leeds, 22 March 2011.

It should be remembered that a transcription of a recording is necessarily partial, in that it does not capture surrounding data such as body language or the way that things are said.[112] In many other ways, too, it is simply one interpretation of the interview. For example a transcriber makes a judgment as to how to represent pauses, punctuation, non-language utterances (such as ‘errr’ or ‘um’), the placement of paragraphs, and how to treat incomprehensible words.[113]

The first interview was transcribed by the researcher, however the time taken to do this was considerable, given that very high accuracy was required. In light of this, subsequent interviews were transcribed by a professional service. The specific professional service was chosen for two main reasons. Firstly, the transcriber had worked previously within the police service. This meant that they were already familiar with common acronyms mentioned by the interviewees. They also understood that the content of the interviews may be occasionally distressing, and also the necessity of confidentiality. Secondly, the accuracy of the transcripts was confirmed by the researcher after the first three transcripts had been checked. Transcription was done under signed confidentiality agreement, and all data held by the service were subsequently destroyed.

Regarding the accuracy of the transcripts, and the question of how the transcripts interpreted the recorded interviews, approximately fifty percent of the transcripts were listened to during the analysis whilst reading the transcripts. A very high degree of accuracy was determined regarding the capturing of recorded words within the transcriptions (in fact no errors were detected – the transcriber had flagged any passages which they deemed uncertain). In addition, it was judged that the layout and style of the transcription (including representations of non-language sounds) provided an acceptable realisation of the recorded interviews, and sufficient for analysis. Due to the professional nature of the interviewees, and the professional environment, it was judged that no additional value could have been achieved through any type of textual or other meta-analysis. Within the findings chapters, interviewee quotations are reproduced exactly as recorded, without any ‘neatening’ correction of grammar. Punctuation designates the transcriber’s and researcher’s perception of the flow of the recorded interviewee verbal responses.

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[112] Mason (n 2) 77.

[113] Arksey (n 69) 141.

It must be recognised that analysis did not start at the point at which all the data had been generated. Rather, it had to be recognised that analytical thinking informed the whole of the study.[114] For example, during the design of the research instrument (the interview schedule), the analytical implications of, for example, the scope of the questions asked, had to be considered. Similarly, the analysis itself, whilst linear in principle (for example, sorting then analysing), in practice happened, to a degree, in parallel. A number of aspects of the analysis must therefore be regarded as having been both iterative and, at the same time, simultaneous.

Analysis of collected textual data allows the significance and meaning of the information contained within the collected data to be elicited, through a process of abstraction and interpretation.[115] This overall process has been described in terms of starting with data in the form of:

> … a 'seamless sequence… (which) we ourselves must cut the bits of the puzzle… in ways which correspond with the separate facets of the social reality we are investigating, but will also allow us to pull them together again to produce an overall picture.[116]

Before describing the specific analysis approach used, it is worth underlining the over-riding basis, and objectives of the analysis. Three modes of analysis have been described in terms of organizing and analyzing data: literal (substantive), interpretative and reflexive.[117] Following this approach, the approach taken in this study was to initially assess the data from a direct (literal) point of view (that is, what was actually said), but at the same time to take an interpretative view, where, for example, common themes repeating could indicate a particular area of issue. It was also important to regularly take the 'reflexive' view, in which consideration was given to the relative positions of the researcher, interviewee and the generated data, in order to be sure that pre-conceptions did not introduce bias into the analysis, and to identify any indirect patterns.[118] This reflexive analysis was critically important in the analysis of the data and conclusions made: in an interview

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[114] Mason (n 2) 37-38.

[115] Liz Spencer and others, 'Analysis: Principles and Processes' in Jane Ritchie and others (eds) *Qualitative Research Practice: A Guide for Social Sciences Students and Researchers* (2nd edn, Sage Publications, 2014) 279.

[116] I Dey, *Qualitative Data Analysis: A User-Friendly Guide for Social Scientists* (Routledge, 1993) 40.

[117] Mason (n 2) 109.

[118] Mason (n 2) 149.

many things may become apparent but may be unsaid. An example of this (discussed in detail in the findings and discussion chapters) was an apparent distrust by a number of experts regarding the 'opposing' expert.

A number of different specific objectives have been described in qualitative analysis. In this study these objectives could be best described as 'contextual' in that a description of participants' experiences were to be captured, 'explanatory' in that explanations for behaviours and other events were to be proposed where possible, and 'evaluative' in that it was sought to evaluate how effectively, in this case, DNA evidence was presented in court.[119] An important point that was borne in mind throughout the analysis was that the danger of bias was not restricted to the creation of the interview schedule and interview process. It remained of importance throughout the analysis. It was critical that conclusions reached were shown to be valid, and objective, and not falling into the trap of building a pre-conceived case using convenient evidence.

A number of different analysis traditions have been described in qualitative research.[120] A description of the approach used in this study would be 'thematic analysis' in which patterns in the data are first identified, indexed and sorted, and then abstraction and interpretation is carried out. These are distinct processes, although, as mentioned above, may happen simultaneously in practice.[121]

For both the processes of identifying and sorting, and then interpreting data, labels must be created. These have variously been referred to as 'labels', 'themes', 'categories' and 'codes'. In this study no distinction is made between these different concepts, and the term 'code' is used to signify headings of data. To be specific, a 'code' has been defined as a 'short word or phrase that symbolically assigns a summative, salient, essence-capturing and/ or evocative attribute for a portion of language based… data'[122], in

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[119] Jane Ritchie and Rachel Ormston, 'The Applications of Qualitative Methods to Social Research' in Jane Ritchie and others (eds) *Qualitative Research Practice: A Guide for Social Sciences Students and Researchers* (2nd edn, Sage Publications, 2014) 31-37.

[120] Rachel Ormston and others, 'The Foundations of Qualitative Research' in Jane Ritchie and others (eds) *Qualitative Research Practice: A Guide for Social Sciences Students and Researchers* (2nd edn, Sage Publications, 2014) 1 – 25.

[121] Spencer (n 115).

[122] J Saldana *The Coding Manual for Qualitative Researchers* (Sage Publications, 2009) 3.

other words classifying things that seem alike together. Similarly, the process of applying code to the data may be referred to as ‘coding’ or ‘indexing’. The term ‘coding’ is used during this discussion, as it has a wider implication than ‘indexing’.

QSR International NVivo10 software was used to assist with both indexing and interpretation phases of the analysis. This enabled flexible, consistent and reproducible coding, indexing, searching and cross-referencing.

A truly ‘constructive’ approach to coding would have meant that themes and concepts, and then descriptive codes could only be created from the data set, and need not pre-exist,[123] however it was acknowledged that the research design itself, informed by the research questions, already suggested key themes of interest, and therefore codes. Examples of codes pre-created on this basis before commencement of analysis were ‘Adversarial’, ‘Disclosure’ and ‘Pre-trial Conference’.

Broad approaches to coding the data include ‘categorical’, ‘cross-sectional’ and ‘non-cross-sectional’ coding.[124] Firstly, data were coded from a categorical perspective using the predefined codes described above. This included many central research questions (for example, as noted above ‘Pre-trial Conference’). Secondly (and in practice largely in parallel), cross-sectional coding was carried out, this time coding for themes cutting across areas (for example ‘Fragmentation and Dysfunction’, and ‘Don’t trust other side’). Many themes required new codes to be created as they arose, and analysis included splitting, redefinition and merging of codes as the analysis progressed. Lastly (and again, somewhat in parallel), data were coded from a non-cross-sectional perspective. This applied to specific and usually unpredictable data that sometimes arose, for example, data regarding a specific case, or comments regarding an exceptional policy. This type of data was neither categorical nor cross-sectional, and always required a new code to be created. An example of this was ‘New New Paradigm’ (briefly an unexpected reaction to some recent legal rulings). Usefully, descriptions were produced for each coding ‘node’ (referred to as ‘memos’ in NVivo). It was discovered that it was easy to allow the meaning and scope of nodes to ‘drift’, particularly those with significant, yet not well-defined meanings, and this process controlled such drift. Such descriptions allowed close fit of the codes with the data. These descriptions were regularly refined (but not

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[123] Wilkinson (n 33) 76.

[124] Mason (n 2) 107.

changed), however this regularly meant that codes needed to be split or merged to maintain cohesion and close association between the data and the coding.

A number of criticisms of computer-aided analysis have been made, including the suggestion that the software may dictate or at least limit the approach taken to analysis.[125] Of course no software package is capable of actually performing data analysis of itself, despite the availability of 'automatic-coding' tools within the software,[126] and the use of software cannot, of itself, ensure rigour of analysis, or sound interpretation.[127] However, critics have claimed that computers may lead to the 'mechanisation' of the analytic process, making it similar to a quantitative approach.[128] More subtly, it has been suggested also that bias may be introduced by the software itself, for example in the way it presents different types of information, or the way in which the researcher uses the software, for example, simpler routines may be preferred over more complex routines.[129]

These risks were mitigated, firstly, by ensuring that the methodological details of the study were fully elucidated before considering how software would or could be used to assist with the analysis. Secondly, it was ensured that the researcher was very familiar indeed with the use of the software, by the study of a method-free instruction manual,[130] and practice upon sample data. Lastly, it should be stated that an important overall mitigation was simply to be aware of the potential limitations just discussed and, throughout the analysis, to regularly reflect upon the use of the tool and the ongoing analysis.

In practice, it was judged that substantial advantage could be gained by the use of the software, allowing both closeness to, and distance from, the data

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[125] Pat Bazeley, *Qualitative Data Analysis: Practical Strategies* (Sage Publications, 2013) 18; Pat Bazeley & Kristi Jackson, *Qualitative Data Analysis with NVivo* (2nd ed, Sage Publications, 2013).

[126] A Coffey, P Anderson, *Making Sense of Qualitative Data* (Sage Publications, 1996) 166.

[127] Bazeley (n 125) 3.

[128] ibid 7.

[129] LS Gilbert, 'Going the Distance: 'Closeness' in Qualitative Data Analysis Software' (2002) 5(3) International Journal of Social Research Methodology, 222.

[130] Bazeley (n 125).

as appropriate, allowing the researcher to remain rooted in the data. Despite the potential weaknesses described above, it was judged that the practical tools allowed by computer-assisted analysis vastly increased the rigour of analysis compared to manual methods. Specifically, NVivo allowed highly flexible coding, which was able to cope with multiple layers of code (this was a significant advantage, as many passages were relevant to multiple, overlapping and non-overlapping themes); it was able to support dynamic merging and splitting of codes; it allowed easy search, where, for example, it was desired to find a previously analysed passage; it was able to support production of graphics aimed at understanding the linkage between ideas; it was able to flexibly capture text around coded areas, in order to ensure that passages were not taken out of context; it was able to organise and store complete data and the basis of analysis, allowing transparency, in that such information potentially remained open and accessible after the study (subject to data protection requirements).

4.11 Ethical Issues

Research ethics inform all types of research, and ethical principles should be taken into account at all stages of any research study. Ethics is ‘a generic term for various ways of understanding and examining the moral life’.[131] Ethical principles include concepts such as moral right and wrong, fairness and justice, and offer norms against which actions or intended actions may be compared. The philosophical basis of ethics includes principles properly within the realms of philosophy, however within any individual area, researchers are supported by existing and accepted best practices and accepted codes of practice, supported by appropriate regulation.

Most academic legal research remains text-based,[132] and the ‘Law in the Real World’ report in 2006 by the Nuffield Foundation pointed out that whilst the law was becoming more important in day to day life, there was a decreasing ability to keep it under empirical examination.[133] In addition legal

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[131] T Beauchamp, J Childress, *Principles of Biomedical Ethics* (4th edn, Oxford University Press,1994) 4.

[132] J Flood, B Morgan, A Bradney, ‘Responses to the Consultation Document: Inquiry on Empirical Research in Law’ (2004) Socio-Legal Studies Association.

[133] H Genn, M Partington, S Wheeler, *Law in the Real World: Improving our Understanding of How Law Works* (Nuffield Foundation, 2006) 2.

academics do not generally receive training in empirical studies.[134] Perhaps for these reasons, the development of an accepted ethical approach within legal empirical studies has lagged behind that of scientific research, where ethical principles, processes and regulation are highly developed.

Whilst empirical research undertaken under the auspices of any academic institution must be approved through an ethical review process, it is important that this is not simply regarded as a 'gate', through which, after passing through, the researcher gives no more consideration to ethical issues. Rather, ethical issues must be taken into account right from the initial planning of the research project, through design to reporting and after.[135] Ethics should therefore inform the entirety of the project.

Ethical responsibilities to society, the research community, colleagues and participants, were of fundamental importance to this study and on that basis these responsibilities were analysed and actions taken to ensure that this study was compliant with relevant ethical and mandatory requirements.

A basic primary assumption was made that it was ethical to carry out research on the judicial process, by view of the precedent set by similar studies. Relevant ethical considerations were identified and prioritised. Ethical issues dictated by law took precedence, for example obligations under data protection legislation. University of Leeds, and School of Law ethical requirements took precedence after the above. Subsidiary to these mandatory requirements, best practices were identified. The considerations so identified were incorporated and tested during all stages of the research, taking place as a parallel activity to research study methodological design and implementation, with continuous assessment as to ethical compliance. Ethical risks, that is to say, events that were possible, but not certain, but may have had ethical implications, were identified, and if assessed as of high impact and/ or probability were planned for within the method. A hypothetical example would have been if an interviewee had identified an unreported criminal act. In the event no such event arose. Even if not directly

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[134] ibid.

[135] Stephen Webster and others, 'Ethical Considerations in Qualitative Research' in Jane Ritchie and others (eds) *Qualitative Research Practice: A Guide for Social Sciences Students and Researchers* (2nd edn, Sage Publications, 2014) 108-109.

legally applicable, equality legislation was taken account of at all stages of the study.

Regarding legal requirements, it was ascertained that, having incorporated the data security recommendations of the University, the study was compliant with the University Of Leeds Data Protection Policy,[136] which, in turn, was compliant with the requirements of the Data Protection Act 1988.[137]

University of Leeds guidelines were applied in determining ethical issues within the study.[138] It was ascertained that, because the study did not contain any high risk ethical issues, then the University of Leeds light touch ethical review process was applicable. An application was made on 8th April 2011, and approval was granted on 18th April 2011.

A number of sources of best practice were identified, including '*Code of Ethics for Researchers in the Field of Criminology*', (February 2006), published by the British Society of Criminology,[139] '*Ethical Guidelines*', (December 2003) published by the Social Research Association,[140] '*Statement Of Principles Of Ethical Research Practice*', (January 2009), published by UK Socio-Legal Studies Association,[141] and the '*Framework for Research Ethics (FRE)*', (2009), published by the Economic & Social Research Council (ESRC).[142]

A number of specific considerations were drawn from the above guidelines and taken into account in the study. Firstly, general responsibilities towards advancement of knowledge in the field, and the integrity thereof.[143]

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[136] Correspondence to author from Faculty IT Management, Faculties of PVAC & ESSL, University of Leeds, 22 March 2011.

[137] http://www.leeds.ac.uk/secretariat/data_protection_code_of_practice.html, accessed at 17:45 on 22 March 2011.

[138] University of Leeds, The Council, University Research Ethics Committee, 'Guidance on Identifying Ethical Issues' (1 April 2008) Agendum 3 (a) UREC/07/12.

[139] British Society of Criminology, 'Code of Ethics for Researchers in the Field of Criminology' (February 2006).

[140] Social Research Association, 'Ethical Guidelines' (December 2003).

[141] UK Socio-Legal Studies Association 'Statement Of Principles Of Ethical Research Practice' (January 2009).

[142] Economic & Social Research Council, 'Framework for Research Ethics' (2009).

[143] B Soc Crim (n 139) s 1; UK Socio-Legal (n 141) s 2.1; ESRC (n 142) principle 1.

Secondly, responsibilities to ensure the physical, social and psychological well-being of participants and their interests, sensitivity and privacy.[144] Thirdly, responsibility to ensure anonymity and, where applicable, confidentiality and to protect identities.[145] Fourthly, responsibility to ensure freely given informed consent, to ensure that participants understood their right to withdraw at any stage from the research without reason given or penalty, and to ensure that participants understood the extent of anonymity and confidentiality.[146]

4.12 Informed Consent

Information sheets and consent forms were produced based on University of Leeds guidelines and templates.[147] These documents may be examined at Appendix A. Participating (and potentially participating) interviewees were given information sheets before the day of the interview detailing the objectives of the research, expectations regarding the interview process itself, the processing of the data generated, and the uses to which it would be put. The information sheet also informed participants that their participation in the research would remain confidential, and any opinions quoted would be anonymous. They were also made aware of the fact, however, that it might be possible to identify their contribution at a later stage where their particular opinion was well known within the expert community. (It should be noted also that during the process of writing up the findings, diligence was maintained to ensure that the content of quotes could not have led to identification of the interviewee, for example where it contained reference to a situation or case). Participants were made aware of the fact that they could withdraw from the interview process, or at any stage before submission of the final thesis, upon which any data generated from their interview would be deleted.

Participants were asked to initial to confirm their understanding of the information sheet detailing the above considerations, that they could ask

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[144] B Soc Crim (n 139) s 4.1; Soc Res Ass (n 140) s 4.4; UK Socio-Legal (n 141) principle 6; ESRC (n 142) principle 5.

[145] Soc Res Ass (n 140) 4.6, 4.7; UK Socio-Legal (n 141) principle 8; ESRC (n 142) principle 3.

[146] B Soc Crim (n 139) s 4.3 Soc Res Ass (n 140) 4.2; UK Socio-Legal (n 141) principle 7; ESRC (n 142) principles 2, 4.

[147] University of Leeds Research and Innovation Service, ‘Preparing your Participant Information Sheet’ and ‘Example Low Risk Participant Consent Form’ (20 January 2012).

questions, that they were willing to participate on that basis, that they agreed that an audio recording was made of the interview, and that the data collected were analysed and used as part of the final research publication.

One copy of the information and consent form was left with the interviewee after the interview, and another retained by the researcher. This was filed and stored in a locked cabinet.

Regarding other ethical issues, consideration was given to the possibility that interviewees may feel pressured in some way to agree to all the terms of research involvement. This risk was mitigated in two ways. Firstly, potential interviewees were supplied with the information sheet and consent form before the day of the interview, and asked to read the information: it was assumed that this would give the interviewee ample opportunity to formulate queries as to their involvement, or withdraw their involvement. Secondly it was known that all interviewees were trained experts experienced in asserting their views in court. It was therefore judged unlikely that they would have been willing to be involved unless completely willing.

4.13 Conclusions

As described above, the concept of ‘validity’ within qualitative studies has been widely debated. From a methodological point of view, the objective in this study was to develop and apply a methodology and detailed study design that would accurately reflect the reality studied. This chapter has described the theoretical foundations of the methodology chosen, as well as the design considerations at each stage of the design development process required to achieve the methodological objectives.

The chapter has also described how these theoretical foundations have informed all aspects of the fieldwork itself, from recruitment through to the practical implementation of the interviews themselves. It has further described implications of these principles for processing and analysis of the data generated.

Finally, it has described ethical issues informing methodological and detailed design development, and shown how the study has identified and addressed such issues.

Chapter 5
The Unbiased Expert

5.1 Introduction

Most concerns regarding scientific evidence in court centre on claimed detrimental effects of the adversarial system.[1] The critical danger has generally been held to be bias on the part of the expert in favour of the party who instructed them.[2] This chapter examines this issue from the perspective of the experts themselves.

The study examined the basic assumption that experts had the intention of remaining unbiased, and investigated interviewees' perceptions as to how the adversarial system impacted upon that intention. The study also addressed whether, and how, experts attempted to counter any adverse pressures upon them in this regard, and how effective any such measures were perceived to be. Significant to these questions were exactly what interviewees understood to be the meaning of, and obligations relating to, their responsibility of remaining 'unbiased'.

Whilst experts should remain unbiased, and not obliged to the person instructing them, they are (unless appointed by the court as a joint expert), nevertheless, instructed by either prosecution or defence. For clarity and brevity in the following findings and discussion, experts are referred to simply as 'prosecution experts' and 'defence experts'. Most interviewees who had worked with the Forensic Science Service ('FSS'), or were working with the police, only had experience of working from the prosecution point of view, although in some cases they now worked within consultancies with a mixed load of defence and prosecution instructed work. Despite this, and as detailed below, two clear and distinct 'schools' were recognised, with few, if any, experts setting out from a point of true 'neutrality' between prosecution and defence, in terms of background or workload.

It was not felt to be an over-generalisation to state that prosecution and defence 'schools' each conformed to commonly held experiences and

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[1] Mike Redmayne, *Expert Evidence and Criminal Justice* (Oxford University Press, 2001) 198-205.

[2] J McEwan, *Evidence and the Adversarial Process: The Modern Law* (2nd edn, Hart Publishing, 1998) 162 - 163.

perceptions. Additionally, they each held strong views about the other. Examination, therefore, of each of these viewpoints, gave valuable insights into the potential pressures within each school for association with, and bias towards, that party's perspective.

This chapter first reports the very different roles in which prosecution and defence experts found themselves. It describes a 'schizophrenia' reported by prosecution experts in moving from the investigation phase to the trial phase, and the pressures that they felt for association with the prosecution within the trial. The chapter moves on to report the viewpoint of defence experts, and the interplay between prosecution and defence in the judicial process. Importantly, the chapter examines whether there was any evidence for biased behaviour on the part of experts, and what experts understood the meaning of 'unbiased' to be, in practice.

5.2 Prosecution and Defence Expert Roles

Not only do prosecution and defence come from different 'schools', but, have significantly different roles within the judicial process. It is important to understand the practical differences between these roles, as each provides the context from which the respective experts' responsibility to give objective and unbiased opinion arises. In principle, the objective of the prosecution is to build a case that shows guilt beyond reasonable doubt, and the objective of the defence is to cast reasonable doubt upon that. From the point of view of DNA evidence, interviewees stated that the fact of a simple match was rarely disputed, the case revolving around explanations for the crime-scene sample being present.

> Int7: DNA is still seen as the Holy Grail if you like, because if you have got a full DNA profile it is incredibly powerful… The prosecution's case is hinging on the fact that it came from him. From a defence point of view (what we are) looking at (is) what does that DNA actually mean, and is it pivotal to my case, or is it actually inconsequential?… the defence… acknowledge it came from him, what we want to know is what does it actually mean?

The prosecution expert generally became involved early in the investigative process:

> Int7: You are working alongside the police, very much a part of the police team and looking at the investigation as a whole… You quickly identify somebody, they are charged, that work is done urgently, so you are working to very tight

> timescales, quick results… then obviously the CPS system kicks in, things are slowed down.

Prosecution interviewees described significant delay before any appearance in court, with various other activities continuing:

> Int19: (After I write my statement) I will hear nothing for ages and ages then probably just before the case I will then get notified that Joe Bloggs wants to come and do a defence examination… they (opposing counsel) might disclose the report to you because the prosecution or defence are now contesting some element… they might ask you to produce another statement, which, sometimes you do, answering some of the questions (this sometimes requires additional forensic tests).

It should be noted that 'defence examination' referred to an apparently standard procedure in which, as part of a disclosure requirement, the defence expert met with the prosecution expert to view the evidence and ask questions about it. This was distinct from any pre-trial discussion, whose intention was to identify issues at dispute.

Interviewees stated that there was a high attrition rate during this entire process, so that, often, they simply did not hear any more about a case after a certain point. They assumed this was because the CPS had decided not to proceed, or because there had been a guilty plea:

> Int10: But there are quite a lot of cases that you deal with and you write a statement, and it disappears and you never see it again and you don't know what has happened.

Interviewees were generally describing serious crime: in the case of, for example, burglary, or vehicle crime, they were not involved. In these cases, DNA samples were collected by scene of crime officers, who submitted these to a private or police laboratory. If a match was obtained, then this was passed to the investigating officer and, if necessary, to the CPS. Forensic experts were not generally involved in these routine DNA tests.

If the impression was given above that the prosecution expert was at the heart of the development of the case, then this was far from their reported experience. Whilst this may have been the situation in high profile and/ or cold cases, experts in general reported an ongoing lack of information, for example of why a particular sample was ordered for testing (for example, a number of experts commented that DNA tests are sometimes, indeed often, ordered when the activity is not denied by the defendant, and a DNA result therefore meaningless), what the circumstances surrounding the sample

were, and what related evidence there was. An example given of the latter was where an expert had provided evidence that DNA from the scene matched that of a suspect. The expert was not given, or asked to comment on, additional evidence in the form of a blood spatter pattern, which pointed against the suspect's account of events.

Defence experts reported being involved in a very different way. Although, again, in high profile cases they may have been involved significantly in the development of the defence case (sometimes, but infrequently, carrying out additional forensic work), most experts reported that they were typically engaged by the defendant's solicitor, at the stage where the solicitor understood that the prosecution intended to adduce forensic evidence. At this stage the expert was typically asked to answer questions on the DNA evidence. As reported in Chapter Six, defence experts reported being called to give evidence very seldom within the trial itself (often, they deduced, because their evidence was not incompatible with the prosecution case), but, rather, assisted counsel in their cross-examination of the prosecution expert.

Interviewees were asked about pressures that they perceived might compromise their duty of remaining unbiased. Without exception, all interviewees stated that this duty was fundamental to them, and whilst there were pressures, they felt that they were able to overcome them:

> Int15: I would say without exception people go about their work trying to be clear and unbiased in the way they carry out their work.

The nature of these pressures, and, perhaps more importantly, the meaning that interviewees put to acting in an unbiased way are discussed below.

In summary, expert responsibility to offer objective and unbiased advice can only be understood in the context of the role played by that expert in the judicial process. The roles of prosecution and defence experts are not only very different, but evolve in different ways throughout the process.

5.3 Changing Role of Prosecution Expert

One particular pressure that was mentioned was the changing role, throughout the case, on the part of prosecution scientists. A number of interviewees used the term 'schizophrenic' to describe their feelings on moving from the investigation to the prosecution phase:

> Int19: Well, you've got schizophrenia as a DNA expert… instructed by the Crown. For quite a while in a (bigger) case, you may be working alongside investigators helping direct, helping build cases and helping identify a particular suspect. At the moment that person is kind of charged and goes for trial you are supposed to take that cap off and put this other cap on which just says neutral servant of the court, with no vested interest one way or the other.

> Int21: … this is where I say it is schizophrenic, because the client switches, it might be police there and court there. So as an expert witness my primary duty is to the court, but prior to it going to court, my primary duty might be to assist an investigation, with technical expertise, scientific expertise, conversations, whatever it happens to be.

Experts described these two stages as the 'investigative' stage (when no-one had been charged), and the 'evaluative' stage (when there had been a charge, and the expert was assessing the forensic evidence from the prosecution and defence points of view prior to trial). Interviewees stated that their duty to be unbiased arose when the evaluative stage commenced, although this line was not always clear:

> Int22: I mean obviously the scientist has to decide at any point whether what they are doing is helping with the investigation or helping with the evaluation and they are very different roles. Investigation, you are trying to help direct, but once you have moved away from that… .

In summary, one particular challenge for prosecution experts was their changing role from investigation to evaluation and trial, and the different duties associated with each.

5.4 Pressures for Bias towards Prosecution

In principle, the line between investigation and evaluation/ prosecution may have been a simple one: after all, the suspect has been prosecuted. The question arose, however, as to whether experts felt that they were able to overcome the 'schizophrenia', described above, in order to be of objective and unbiased assistant to the court.

By way of definition, once a prosecution has occurred, the prosecution expert identifies, and is associated, with the prosecution, because it is by them that they have been consulted, with a view to building a prosecution case (indeed, they have probably already been associated with the case during investigation). The question arises, however, as to whether the

expert's position may be biased, that is 'unduly or improperly influenced or inclined'.

Comments from some interviewees clearly indicated an unbiased approach at the evaluative, pre-trial stage:

> Int7: … defence's right is… to comment… right before the trial and that is when you then need to look at it, because they might be able to explain the evidence.

However, other comments did, at least, suggest that they might be pre-disposed to favour the prosecution case:

> Int11: Because especially in cold cases you may have a piece of evidence that you think broke or solved the case and then you might spend a year or two years trying to find things that will block off any defence avenues.

> Int14: … you don't want to cause anybody (the prosecution) any problems.

These potential conflicts applied also to the defence-appointed expert, however, given that the defence expert was involved in the process in a different way, it might be reasonable to assume that the effect was different. This assumption is examined separately below.

Interviewees suggested that they were subject to a number of forms of adversarial pressure. Firstly, most interviewees recognised the significant effect that cognitive biases of various types may have had:

> Int6: There is a natural desire to please the people that you are working for, that I think people have. You are working as part of a team and you want to do as well as you can in your job. It is odd because you are working as part of this team but you are not really, you are actually an independent. And so I think there can be quite easily a subconscious bias that can sometimes creep in to any of us. What we do, our peer review, the way we write our statements, the way we consider everything should combat that, and telling yourself time and time again that you are an impartial witness. But I think it does need to be constantly drummed into us rather than assume that it will be.

Secondly, many interviewees mentioned a significant source of bias in the system in that they were largely asked questions that would support the prosecution case:

> Int10: … the majority of the time we are being commissioned by the police, and the aim of the police at the end of the day is usually a prosecution, is a successful outcome as far as

> the police are concerned. The police obviously in quite a lot of cases they have got a certain amount of information related to an individual, and you know either the scientific evidence is there or it is not. We can't make it but you know… very often in their minds a particular person is quite likely to be involved, so they are looking for the scientific evidence that links that person. So in some ways it is biased because you have got that person's clothing, so you are looking for the evidence, you are not looking on the clothing of all the other people in the country, you are looking on the clothing the person whom the police suspect.

Several interviewees gave examples of cases in which selective testing requested by the police could be justified only as a means of building a specific case, and was not justified scientifically. For example, Int22 mentioned a case in which the police wished to eliminate two suspects from a pool of three. They therefore commissioned DNA tests on samples from the two which eliminated them from enquiries. A later DNA test also eliminated the remaining, previously untested, suspect.

Lastly, one ex-FSS expert with extensive experience as prosecution expert, but who now worked predominantly on defence cases made an interesting comment:

> Int22: … my role in working for the defence (is to) make sure that however good or bad the case is, or your opinion, if you have one, of the defendant or the victim or anyone, is that the science has been done properly and has been presented properly.

Although not entirely encapsulated within the quote itself, the implication made by the interviewee was that they felt discomfort working for the defence in a case where the defendant was accused of a particularly bad crime. This was not a concern mentioned by any experts whose background was routinely defence work. This arguably supports the proposition, discussed below, that the cultures of prosecution and defence experts were very distinct and ingrained.

In summary, prosecution experts identified sources of pressure for bias upon them to be the nature of the adversarial system itself (in only being asked to build evidence to support the prosecution case), various cognitive biases, and, on the part of one interviewee, an indication that the seriousness of the alleged crime was a pressure on the responsibility to be objective.

5.5 Adversarial Experts

Naturally, experts instructed by prosecution and defence are instructed to help counsel build their respective cases. On that basis the experts are part of opposing sides. The question arises, however, as to the degree to which the experts themselves are 'opposing', that is, does the expert see the 'other expert as an opponent, or as another independent expert with whom they may work together to identify facts at issue, and the conclusions that may be drawn from the evidence. This is examined in this section.

Prosecution experts expressed frustration at the lack of a timely defence version of events. It should be remembered that lacking this, it was difficult to interpret results and create a report, because they did not know what question they were supposed to be answering. Interviewees stated, variously, that they were not given a defence version of events by investigators, and they were not updated by investigators where new information emerged, for example, at interview. Some experts said that they often only received this information upon demand. Further, although they recognised that defence experts (if one were appointed) were engaged typically just before trial, necessitating late exchange of information, they complained at being given either no defence version, or a changing defence version, even up until the court appearance.

> Int13: The defence scenario isn't always, you often have very little information about what is happening with the defence, they are kind of keeping it close to their chest.

> Int7: … the defence make no comment interviews until a few days before the trial… you are working blind almost…. Defence's right is to either make no comment or not to comment until right before the trial and that is when you then need to look at it, because they might be able to explain the evidence.

However, comments from a number of interviewees regarding the interplay between prosecution and defence before trial, arguably suggested some 'adversarialism' between experts. Specifically, they suggested that the defence not only provided late, and changing, innocent versions of events, but also 'expert-shopped' and did not disclose adverse expert opinion:

> Int19: If you don't hear anything you pretty well know that the other expert has probably agreed with you and it has gone straight into the shredder they are never going to disclose it…. If experts are not partisan, right, and you choose to have an expert, my view is… you have to accept their

> decision whether it helps you or not. And you should disclose that to prevent expert shopping: I don't like your report, I'll get that guy over there to come because he has been a bit more plastic in the past… When I floated that one at [UK Name] University (to the 'legal beagles') they nearly lynched me.

It should be added, however, that such comments seemed predominantly, but not exclusively, directed at defence counsel, rather than the expert themselves.

This desire for a 'level playing field' might seem reasonable in an adversarial contest, however it is hard to reconcile with the concept of remaining unbiased or neutrality.

> Int22: It is my opinion and always was that if the defence were to actually provide their alternative to the prosecution scientist, then they would consider it because they are looking for an alternative and if someone gives you one then of course you'll use it and so it would actually speed things up. But I can see the reasons why it doesn't happen… . Lack of trust because they see the scientist as the prosecution scientist.

Having said that, interviewees did recognise that prosecution and defence experts' necessary roles did restrict their actions. For example, it was suggested by a defence expert that it was not the responsibility of the prosecution to feed the defence with alternative innocent versions of events:

> Int17: … but (the prosecution expert) won't ever pursue other alternatives and say if this happened that might be likely, if that happened that might be likely… . Which is fair enough I guess because otherwise you will just spend all day theorising options of how it could have happened. And one could argue giving options to the defence to say, you know if this happened… , then they will come back: oh that is exactly what happened… .

In summary, interviewees expressed a general acceptance of the fact that prosecution and defence experts fulfilled different roles that constrained their actions. Prosecution experts bemoaned what they perceived as 'slippery' behaviour by the defence (for example, in terms of late, changing counter versions of events).

5.6 Evidence of Bias towards the Prosecution

Despite the experts' general acceptance that potential for bias existed in the system, both in terms of cognitive biases and biases inherent under

adversarial control, in general, experts stated that they were largely able to act in a neutral and unbiased way within the constraints of that system. Yet, the language used by the interviewees sometimes suggested an implicit bias. Some examples are reproduced and discussed below:[3]

> Int9: … it is important to speak to the barrister beforehand because you don't want (him) to think **(why) am I saying this now**, and this is **really going to annoy him because he has got some strategy for leaving that out.**
>
> Int24: And then they want… to clarify what they can and can't ask, what you are likely to say. Any areas of what they would see as danger because **clearly we are speaking for the prosecution**.
>
> Int3: … that is a weak link in our case, **we need to tighten that up before we go to court**… and it may be at that stage in the conference you only become aware that that is actually a weak area that hasn't been addressed. And it may be something as simple as we need such and such an item examining as well as what we have already done, and that then secures that weak link because **what you don't want is a case falling apart once you are in court**.
>
> Int3: Definitely, **I have definitely had cases where the wheel has wobbled**.
>
> Int3: And basically what you do is you sit behind the barrister, **whichever side you are batting for**…
>
> Int14: You might have a bit of a chat with the defence scientist although there tends to be a bit of reticence (on the part of the prosecution counsel)… they don't like you doing (it, and) **you don't want to cause anybody (the prosecution) any problems**.
>
> Int9: (Counsel) need to **make sure that I am not going to say anything that (they) are not expecting**.

Contrary to the judgment in *R v Ward*[4] regarding expert neutrality, the above comments do, *prima facie* suggest that some experts believed that part of their role was to 'help the police'.

Disclosure of scientific evidence generally took place during a defence examination, during which the defence expert visited the prosecution expert to carry out an examination of the evidence. This is discussed in detail in the

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[3] Bold emphases added.

[4] *R v Ward* [1993] 1 WLR 619 [53] – [54].

next chapter (6.3 Pre-trial Discussions), however, given the conflicting guidelines upon the expert, mentioned in the literature review (2.9 The Expert, Unbiased, Impartial, Objective or Independent?), it was perhaps unsurprising that some prosecution experts expressed caution regarding this meeting, especially regarding what they could divulge. Some stated that they needed to, for example, check with the CPS that the meeting could take place, or that certain exhibits could be released. Some rationalised this in terms of the evidence 'belonging' to the Crown.

Certainly, some descriptions suggested that the prosecution expert at least leant towards the prosecution case:

> Int25: A colleague was just saying they had a defence expert here last week who has taken a bunch of additional samples and she said she was going to… notify the CPS… He had sort of agreed they weren't of much use but… requested that they be taken because then they would show that there was an absence in other areas. But absence doesn't necessarily mean that it is not there. … reminded her to check the statement or report if it comes out and what is challenged in court because the wrong meaning can totally be put in front of the jury.

That is to say, the defence expert had alerted the prosecution expert to a tactic that the defence may use, and that the prosecution expert thought to be illegitimate. The expert was to warn the CPS about this and flag this tactic should it appear in a defence statement.

Certainly, interviewees were clear that their role during any defence examination was to provide information that was disclosable, but not to 'assist'.

When asked whether the expert would volunteer information to the defence expert, if the prosecution expert thought they had missed something, a typical response was:

> Int11: There is no duty to you to raise it to the defence because there is already a duty on you to raise it to the court, if you find something that actually changes what you thought originally… you should write another statement… . When they turn up… . There are certain things that are disclosable and certain things that aren't disclosable.

In summary, despite the fact that prosecution experts stated the importance of an unbiased position, there were a significant number of comments that suggested a partisan association, and 'adversarialism' between experts from

an early stage. Certainly, some comments suggested that the expert was 'out to win' for their side.

5.7 The Defence Experts' View

The experience of the defence expert in terms of their instructions was that they were required to act in a number of possible different ways, for example for ad hoc advice, for further forensic work or analysis, for development of defence case or ultimate appearance in court, either to take the stand or to act as advisor to defence counsel in court. However, defence experts also stated that frequently they would issue a report and hear nothing more about the case. This may be assumed to be similar to the experience of prosecution experts, who may have correctly assumed that the case had been otherwise disposed of. However, with defence experts the general supposition was that their evidence was not favourable to the defence and therefore had not been used, or disclosed.

> Int4: Yea, what I do find, we sometimes write statements when our evidence would be stronger for the prosecution than the prosecution evidence has been and that doesn't get disclosed. We write the report and send the report and I know that doesn't get to the prosecution for obvious reasons.

Int7 mentioned a case in which during a pre-trial meeting, a defence expert suggested to the prosecution expert that the prosecution evidence was stronger than that expert had suggested:

> Int7: … as soon as he told his barrister that, he wasn't seen in the courtroom again, he just disappeared. Yea, generally if you agree with the prosecution scientist as a defence scientist then you are nowhere near the court.

Unlike the prosecution expert, whose evidence was adduced in support of a case that must have been showed to be beyond reasonable doubt, the defence expert's role was simply to cast doubt upon that case. In some cases, experts described this in mirror image terms to that of the prosecution, proposing other explanations and sometimes commissioning new forensic tests, however in others, experts described simply trying to find gaps in the prosecution evidence:

> Int23: … for the defence they don't have to come up with a coherent defence do they, and also they can run a couple of different ones together… . So when I write my statements I do point out… even a full profile is not a unique identifier. …

> it may be a very remote possibility but there is a possibility of contamination and mix up… (at) times they say well we all know he is as guilty as hell but we have still got to just go with what he says… . But there is always something… (the) DNA profile (could have come from) saliva or something like that… . I put a lot of research papers in my statements to back up what little we do know… . I did have… an armed robbery… they'd sent a few latex gloves… it could be a glove he had worn elsewhere, somebody else had used at the crime, somebody else had left in the car, all that sort of thing… .

One interviewee rationalised this type of conflict by saying that unbiased meant to them offering the defendant a fair trial, by balancing the uneven playing field that was in favour of the prosecution. However, such persistence as demonstrated by the defence expert above, in the face of admitted strong adverse DNA evidence, did support the prosecution vision of the defence expert acting like a 'hired gun'.

In any case defence experts frequently associated strongly with the defence case:

> Int13: I must admit I was absolutely flabbergasted when they found him guilty, I felt awful you know because I spoke to the solicitors afterwards and said you know if he can he needs to appeal because you know I will do anything I can to support you, but that is just not right.

In summary, although interviewees reported examples of circumstances in which there had clearly been an unbiased approach (for example, in cases where their evidence supported the prosecution case), it was clear that some interviewees saw their role simply as casting reasonable doubt upon the prosecution case.

5.8 A Cultural Gap between Two Schools

The foregoing discussion describes experts' perceptions from a 'prosecution' or 'defence' perspective, however, this does not simply describe the party who happens to have instructed the expert on any particular occasion. In fact, and as mentioned in the introduction, two clear 'schools' identified themselves during the course of the interviews, comprising a prosecution/ FSS school of experts (despite the fact that many now worked primarily within predominantly defence consultancies, since the break-up of the FSS) and defence experts from outside of the FSS system. All the prosecution experts interviewed (and as far as is known, most prosecution experts),

gained their experience in the FSS, or one of the private, largely prosecution orientated, providers such as LGC. As such, their training, experience and organisational culture had been very similar and consistent, and their views regarding prosecution versus defence expertise was unsurprisingly consistent. Historically the background of defence experts has been more disparate, with a number (perhaps most, prior to the break-up of the FSS) coming from non-forensic disciplines (also some never having worked in a forensic laboratory).

A ‘cultural gap’ between prosecution and defence witnesses was apparent between these schools. One defence expert described prosecution experts as ‘Home Office scientists’ (not now literally true, however referring to the state origins of the FSS), and some prosecution experts described the defence expert as ‘hired guns’:

> Int16: And then there are people out there who will just say anything to do the job for the person that is paying them.

Although there was general respect between prosecution and defence ‘cultural’ viewpoints, this was not universal, and, particularly some prosecution experts expressed (sometimes, very) disparaging views regarding DNA defence experts. These views often conflated doubts concerning the reliability of the defence evidence itself, with suspicion as to the competence, qualifications and motives of the defence expert.

> Int15: And it may be that one has just been doing this day in and day out for years and is thoroughly up to date with the literature, and knows their stuff and so on. And (for the defence expert) it is a bit of an academic hobby.

> Int16: It is almost not even scientific in a lot of situations, you know, they reel off qualifications that actually when you drill down into it mean diddly squat and will say whatever they think is a means to an end to muddy the waters, and are very defence biased.

> Int16: … because you know a lot of these people have been almost discredited… , and then although rumours spread around the industry and we all know who they are… . Unless it is a really massive mess-up and is splashed all over the news and so on, people can continue to practice essentially.

Although it was a minority comment, some prosecution experts did bemoan the demise of the one-time forensic practitioner register:[5]

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[5] Council for the Registration of Forensic Practitioners (CRFP).

> Int16: No, I think we need regulation of the defence industry, and ours, I mean the CRFP was, OK it wasn't perfect, but it was a register of sorts and there was some control what your experience and your qualifications in order to be registered to practice. And that was a good thing and it has just been completely taken away… there is no way for a court to check… .

Meanwhile defence experts did not attack prosecution experts on a similar level, however did express frustration at attacks on their competence:

> Int2: And then other cross-examinations have been very persistent on you know my expertise or the way I do things, or have done things as a way of trying to… they may not have had the opportunity to question my science but if they can undermine my credibility… .
>
> … the way they justified things was totally wrong but you know they didn't say I was an idiot but they just said that, you know, the other guy he's been at it for years.
>
> Int20: I do not understand why they attack the man rather than his evidence.

Whilst defence counsel did not largely hold prosecution experts in low regard or criticise their scientific capability, they did suggest that they were highly susceptible to confirmation bias. They were also perceived to be inflexibly aligned with the single prosecution case.

In summary, not only were two clear schools identified, but (particularly for prosecution experts), they had sometimes strongly disparaging feelings about the other party.

5.9 What Experts Understand by 'Unbiased'

Although interviewees were not asked directly as to their definition of 'unbiased', responses to various questions indirectly indicated the meanings that they put to this. These meanings were not identical. There were differences between prosecution and defence experts, which will be described separately.

Many prosecution interviewees seemed to mean 'good and objective science', when describing acting in an unbiased way:

> Int22: … (if) the science has been done properly and has been presented properly… . Now I have no problem in thinking that that went well, the questions were reasonable, I think I answered them well, then that is a success and the verdict is irrelevant to that. If I think that went badly, I don't

> think I got my points across clearly… that would be a failure regardless of the verdict.

It may be noted that this view does not require the expert to have been 'impartial' in terms of association with the prosecution case.

Interestingly, one interviewee suggested that prosecution experts may appear to be biased in court simply because they were put in the position of defending attacks on what they felt was good scientific work:

> Int15: The tricky bit then is you get to court having tried to be entirely clear, scientific and unbiased, and the nature of the adversarial system is that then your work is necessarily impugned by someone standing there trying to knock it down. … almost the work at being unbiased has gone on before court, you get to court and then you have to basically defend that what you have done is appropriate. And it is very difficult to come across as very clearly unbiased when you are being asked extremely biased questions because that is the nature of the adversarial system.

Regarding 'good science', interviewees specifically mentioned their training (particularly within the FSS), their procedures, and quality assurance, including the value of 'peer review'. This is discussed more fully in Chapter Seven where some experts expressed criticism of such review on a scientific basis, as often it involved no more than informal discussion with colleagues.

Other interviewees implied that their responsibility was better defined as ensuring that there was a 'level playing field', for the prosecution and defence:

> Int19: … it can be very easy both ways… for a defence to suggest outrageously unlikely (versions)… and equally you could end up with the opposite, which is the prosecution massively over-egging the pudding… . So I see us as a check in the balance in that respect.

> Int19: … if I feel that the prosecution barrister is eliciting from me unbalanced testimony, I will often rectify it myself rather than wait for the defence to pick up on the point because I don't see myself as a puppet to be played to get the prosecution-only story over. And if the defence is inept, sometimes I will try and rectify the balance myself… .

Critics could, however, argue that this approach implied acting as advocate, a role explicitly prohibited by the expert's duty of remaining unbiased.[6]

Some interviewees felt that such a playing field should be level, despite the fact that English law defines different rules for prosecution and defence, for example, in terms of disclosure, and burden and standard of proof:

> Int19: Whether you are a defence scientist or a prosecution scientist your cards should be on the table.
>
> Int4: There is a bit of me that would think… everything should be disclosed to everybody for a fair trial.
>
> Int16: It is a bit unfair really when the prosecution have to disclose absolutely everything.

Defence experts were in a different position to prosecution, as they were not involved in the pre-charge phase. Where they were asked to give advice on the prosecution's case, then they did not believe that it was hard to make an objective case, stating that sometimes their report made a stronger case for guilt than that proposed by the prosecution, even though they knew that this would probably not be disclosed:

> Int4: … [W]e sometimes write statements when our evidence would be stronger for the prosecution than the prosecution evidence has been, and that doesn't get disclosed.

However, the very position that most defence experts found themselves in, meant that, rather than being asked to assess prosecution versus defence cases, they simply aimed to cast reasonable doubt on the prosecution case:

> Int23: Yes, I mean there is a lot of cases where really there is very overwhelming evidence against the defendant but they still want to plead not guilty… sometimes (counsel) are fighting tooth and nail and they won't admit their man is guilty. … And you just do your best really… there is always something (to challenge). I mean things like attribution… (tissue type, transfer etc).

Notwithstanding the fact that the terms 'unbiased' and 'impartial' are frequently used as synonyms,[7] this thesis takes the position that these terms (as well as 'neutral', 'independent' and 'objective') have distinct meanings. It

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[6] Forensic Science Regulator, 'Legal Obligations' (FSR-I-400, Issue 3, 2015) para 5.3.4.

[7] For example, Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325, 2011) para 4.9.

seems safe to say that experts are, of course, not driven by dictionary definitions, but it is apparent that, whatever words they use, they understand that they have a duty to the court, and to 'justice' rather than directly to the instructing counsel.

Most interviewees appeared to equate their responsibility to be the 'objective science', although some felt that the duty equated most closely with ensuring that the defendant had a fair hearing. Arguably, neither of these could be held to equate to true lack of bias.

5.10 Conclusions

Reflecting long-established common law, the 'Expert's duty to the court', as described by The Criminal Procedure Rules, commence by stating that 'An expert must help the court to achieve the overriding objective by giving objective, unbiased opinion'.

As detailed in the literature review, although there is much inconsistency regarding how the expert's duty of being 'unbiased' is described ('impartial', 'unbiased', 'independent', 'objective', 'neutral', 'overriding obligation to the court'), sources are consistent in stating that the expert's ultimate responsibility in this regard involves working in the interest of the overriding objective,[8] that is, that 'criminal cases be dealt with justly'.[9]

With such fundamental statements of mandatory requirements, and the weight of the explicit policy considerations underlying these, it would be tempting to assume that the expert was seen by themselves, and by others in the criminal prosecution process, as a truly independent individual. A purist might even suggest that an external observer might not be able to determine whether an expert had been instructed by prosecution or defence, other than from their procedural position within the trial. Indeed, as long ago as 1901, it was suggested that, in order to be truly unbiased, experts should be drawn by both prosecution and defence counsel from a constituted pool of qualified expert witnesses.[10] As such, they would reside outside of the cut and thrust of the adversarial process and be able to offer unbiased expertise

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[8] Criminal Procedure Rules 2015, pt 19.2 (1).

[9] Criminal Procedure Rules 2015, pt 1.1. (1).

[10] Learned Hand, 'Historical and Practical Considerations Regarding Expert Testimony' (1901) 15 No. 1 Harvard Law Review 40, 56 – 58.

in the service of the court. The findings reported in this chapter suggest that. experts found many challenges in this regard within the adversarial process,

The key questions posed in the current study were whether and how experts believed that the adversarial system impacted upon the performance of their responsibility to be unbiased, and how exactly experts understood that responsibility. Questions also arose concerning whether and how experts attempted to compensate for any adverse effects that they perceived, and how effective they believed those compensatory actions to be.

Experiences of experts reported in this chapter were consistent with findings described in earlier studies. As reported in Chapter Two, earlier studies have reported consistent findings regarding the way in which expert witnesses addressed the challenge of remaining unbiased within an adversarial environment. Characterising these findings, the Roberts study reported that experts displayed the highest integrity from a scientific point of view, however, accepted that this brought them into conflict with criminal process values.[11] Specifically, the Roberts study reported that lawyers sometimes briefed experts on selective facts, then pressed them to come up with definite conclusions in their reports and in their testimony.[12] The more recent, but limited, study by Sallavaci, including forensic experts testifying as to DNA evidence, reported similar findings, describing feelings of powerlessness on the part of expert witnesses, for example in the face of trying to explain evidence in the face of the 'wrong' questions.[13] In this way, they felt frustrated that they might have been seen to be biased simply as a result of answering the questions that they were asked, and, further, felt themselves drawn into abetting counsel strategies. Supporting this, previous studies, such as the Henderson and Wheate studies, also reported that experts found themselves subordinate to investigators, unable to do anything other than support the investigator-chosen case,[14] and, again,

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[11] Paul Roberts and Chris Willmore, *The Role of Forensic Science Evidence in Criminal Proceedings* (Runciman Report CM2263, Research Study No. 11, Royal Commission on Criminal Justice 1993) 107 – 108 (Roberts Study).

[12] ibid paras 2.3 – 2.4, 2.6(b), 2.8, 3.5, 3.6 and chs 4-5.

[13] ibid.

[14] Emily Henderson and Fred Seymour, 'Expert Witnesses under Examination in the New Zealand Criminal and Family Courts' (The Law Foundation, New Zealand 2013) para 2.1.3; Rhonda Wheate, 'Australian Forensic Scientists: A View from the Witness Box' (2008) 40:2 Australian Journal of Forensic Sciences 130-139.

consequently feeling powerless in appearing to be biased for that side.[15] A general feeling of lack of information, common across all reported literature concerning expert witnesses, including from their 'own side' (perhaps through 'selective briefing'), exacerbated the situation.

It should be noted that reports of experience in the current study (specifically examining DNA testimony) showed no exception from experiences reported in previous studies of expert witness reports, whatever their specialist testimony area. As discussed within the Chapter One, although DNA epitomises scientific proof, it is still dependent, as evidence, on its context within the trial. It may, therefore, not be found surprising that DNA experts reported themselves to be under similar pressures as previously reported.

A significant qualification regarding previous studies was that, in those studies, there was little, if any, investigation of any apparent *actual* bias towards 'their side'. Put bluntly, and perhaps simplistically, the question arose as to whether any experts appeared to be 'out to win'. This lack of investigation was surprising, as there appeared clear indirect indications of, at least, association of experts within previous reports with 'their side'. For example, in the Sallavaci study, an interviewee mentioned the need to 'understand' their counsel's strategy, impliedly so that the expert could assist with it;[16] in the Wheate study, interviewees expressed frustration that their prosecution counsel had not made the strongest case that was possible;[17] in the Henderson study, interviewees talked about 'the other side'.[18] Instead, most, if not all, previous studies reported that witnesses claimed to be unbiased, and then, given this, now assumed lack of bias, investigated how interviewees attempted to achieve this.

This study discovered a more fundamental cultural difference between prosecution and defence roles than reported in previous studies. This manifested itself as a deeper association between experts and 'their side', and one that appeared to exist beyond individual cases, existing as prosecution and defence 'schools of thought'. Not only did, particularly prosecution, experts sometimes imply a strong association with the

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[15] Henderson (n 14) para 3.4.1.

[16] Oriola Sallavaci, *The Impact of Scientific Evidence on the Criminal Trial: The Case of DNA Evidence* (Routledge 2014) 121.

[17] Wheate (n 14) 133.

[18] Henderson (n 14) ch 3 para 3.4.2.

prosecution case, but expressed somewhat disparaging views about experts from the other school.

The finding of this study, that there appeared to be a cultural gap between opposing experts, not only in terms of their role within the adversarial process, but also in terms of their objectives, and even view of what it meant to be 'unbiased' (discussed below), may, arguably, be seen to be logically inevitable, given the role and responsibilities thrust upon the expert by the English legal system, and the fact that they enter the process, and continue within the process, instructed by 'one side'.

Exploring cultural differences between prosecution and defence experts further for a moment, although most criticisms of prosecution and defence of each other were of a minor nature, and were explicable in terms of the judicial process, a significant number of prosecution experts expressed strong and disparaging views of defence witnesses, conflating criticisms of their competency, their evidence and their motives. These criticisms were specifically aimed at 'defence' experts, rather than 'other experts'. One might expect there to be generally criticisms in any profession about professionals who were felt to fall below the desired standard, however, these criticisms were about 'the other side'. The strength of these views was surprising and can only underline the vastly different cultures described as being discovered in the above findings.

In this study, the prosecution and defence cultures identified could be characterised as 'FSS/ Institutional' (prosecution) and 'independent non-forensic consultancy' (defence), and this showed no exception compared to previous studies, even in non-forensic areas of testimony. In Henderson, for example, a medical expert for the prosecution described defence experts in highly disparaging terms.[19] As reported above, one (ex-FSS) interviewee, with significant prosecution experience, implied that they found it a particular challenge to act in defence of serious cases. This reflected a comment made by one defence barrister in testifying to the House of Commons Science and Technology Committee when he stated that:

> I will not use an FSS expert when I am defending because I believe—whether I am right or not is not the point— there is

[19] Henderson (n 14) ch 3 para 4.1.

> a corporate spirit that will mean an expert from the FSS will not go against the party line.[20]

As reported above, although interviewees were not asked directly as to their definition of 'unbiased', responses to various questions indirectly indicated the meanings that they put to this.

Although interviewees unanimously stated the importance of their duty to remain unbiased and felt that they managed to achieve this despite the pressures upon them, they did not generally describe situations in which they were 'not favouring one party or side more than another',[21] that is, 'impartiality'. Further, it was hard to align either prosecution or defence experts' views with the requirement of their duty being to override 'any obligation to the person from whom he receives instructions or by whom he is paid'.[22] Rather, they tended to describe their duty in terms of objectivity and 'good' and 'defendable' science.

There was also evidence that some interviewees understood a duty to 'act in the interest of justice', even if they did not explicitly state this. As examples, several interviewees stated that they believed that they should ensure that their testimony was 'balanced', and would look for ways to put in counter-arguments (against 'their side's' case if necessary), where they felt that they could achieve such balance.

Perhaps mirroring this, a small number of defence experts described situations in which they believed the defendant to be guilty (or, to be very specific, 'had a very strong case against them but refused to plead guilty'), however, considered that their role in this situation was to attempt to 'balance the playing field' and give the defendant a fair trial by putting forward as strong a scientific challenge to the prosecution as possible. One interviewee stated that, given their role was simply to cast reasonable doubt 'there was always something' they could bring up scientifically to try to do this. It is hard to argue that such an approach represented 'neutrality' and not an attempt to win for their client.

Both prosecution and defence experts' attempts to 'contribute towards the justice of the hearing' might be well-intentioned, however do not apparently

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[20] Science and Technology Committee, *Forensic Science on Trial* Seventh Report (HC 2004-2005) para 155.

[21] Oxford English Dictionary, December 2015.

[22] Criminal Procedure Rules 2015, pt 19.2. (2).

operate in the interests of adversarial procedure and the explicit rule that experts should not act as advocates for their instructing party.

Such actions on the part of some interviewees did suggest that experts saw some difficulties with discharging their responsibility to be unbiased. Having said this, all experts stated the importance of remaining unbiased, and believed that they achieved this, as far as possible, within the constraints of the adversarial process, and the limits of their involvement within it.

As an example, experts accepted that they were simply required to answer evidential questions that supported a single prosecution case, and it was accepted by the defence that prosecution experts had no reason or duty to 'feed' them potential defence hypotheses. Prosecution experts accepted that they faced challenges of confirmation bias, possibly, and significantly, exacerbated where the crime had been serious, but felt that their knowledge of this effect allowed them to compensate for this.

The question might arise as to whether any expert had a duty to raise points to the 'opposing' expert, or indeed the opposing party. On the one hand experts indicated criminal procedure limited their actions. For example, although guidelines concerning disclosure state that prosecution experts should 'make evidence available' to the defence,[23] it is also a requirement that this be done via prosecution counsel, and not volunteered (even if in discussion with the opposing expert).[24] Also, during the trial they could only answer questions put to them, and, from their own counsel, questions in support of a single case.

On the other hand, and as reported in the next chapter, interviewees indicated that they did suffer challenges when they had been unable to make a point (possibly counter to their side's case).

It remains hard to see how experts could be 'impartial' or 'independent' whilst being instructed by one party, and constrained by legal privilege, and only answering only questions asked of them. Most interviewees indicated that the most they could aim for was to testify as to good science, objectively produced and reported within the constraint of their adversarially dictated role.

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[23] Crown Prosecution Service, 'Guidance on Expert Evidence' (2014) 27; Forensic Science Regulator (n 6) para 1.4.11.

[24] Forensic Science Regulator (n 6) para 1.4.11.

It might be noted that the miscarriages of justice described in earlier chapters were, generally, attributed to bad science, rather than a lack of independence. On that basis, perhaps scientific objectivity is both a sufficient and practical objective, instead of the, arguably, hard to achieve, and possibly unnecessary general impartiality.

Optimistically, perhaps it could be said that the natural association with one or other side engendered by adversarialism does not constitute ‘improper’ influence, indeed such ‘partiality’ might better be seen in terms of partiality towards prosecution and defence cases rather than to the state or defendant individually. From a practical point of view, professional, transparent and objective science may be all that can be achieved or is needed.

Chapter 6
The Experts' Experiences in Court

6.1 Introduction

In Chapter One, it was suggested that the trial could be described as the 'presentational surface' of the criminal prosecution, with the evidence presented, and the verdict reached, heavily dependent on myriad contingencies in the pre-trial process.[1] Having said this, it is the trial itself at which such contingencies become focused. As such, events at trial formed the heart of this study. The focus of this chapter is the forensic experts' experience of the trial.

The chapter commences by investigating the number of cases with which the expert witness was involved, how many of these cases resulted in a court appearance, and the degree to which the expert was involved. Basic familiarity with the English criminal process should have led one to the conclusion that popular media representations of the 'forensic expert' (for example in the TV programme 'CSI'), exaggerated such involvement by the expert.

In Chapter Five, it was reported that interviewees expressed some frustration, not necessarily at lack of involvement, but at the lack of information that they had prior to the trial. Of interest within this chapter, is the number of trials in which they were actually involved, how active their role was, as events moved towards a trial, and, whether their reported lack of information continued into the trial. Of prime importance was an understanding of any perceived challenges that this presented, and how experts addressed such challenges.

Great store has been placed on the provisions of part 19 of the Criminal Procedure Rules,[2] regarding expert evidence, in terms of their potential to improve the quality, and particularly the admission, of expert evidence.[3] part 19.6 provides for the court to order pre-trial meetings between experts, a

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[1] Paul Roberts, 'Introduction' in P Roberts (ed) *Expert Evidence and Scientific Proof in Criminal Trials* (Ashgate, 2014), xiv.

[2] Criminal Procedure Rules 2015, pt 19.

[3] T Ward, 'Expert Evidence and the Law Commission: Implementation Without Legislation' (2013) Criminal Law Review 561.

provision given great import by both the courts,[4] and, it is indicated, by the Crown Prosecution Service (CPS).[5] This chapter moves on to investigate the nature of such pre-trial meetings, whether court ordered, or otherwise.

Even if the popular media representation of the forensic expert as being in close co-operation with their 'side', may be, for a moment, assumed as exaggeration, it might still have been expected that the expert had close contact with their respective counsel prior to any appearance in court. This chapter reports experts' experiences of such contact.

The chapter moves on to examine interviewees' perceptions and views concerning their role in court, and their responsibilities. It then goes on to report interviewees' views regarding the degree to which they considered that they were able to discharge such responsibilities. Interviewees were asked to describe any challenges that they perceived, and, also, any strategies that they applied in order to overcome any such challenges. Also reported are interviewees' perceptions as to the effectiveness of such strategies.

Although observations by prosecution and defence experts were distinct, comments made by interviewees within each of these groups were highly consistent. This was true despite differing professional backgrounds, the types of organisation for which interviewees worked, and their experience in terms of the number and types of cases with which they had been involved. This reflects the description of the distinct 'schools' of prosecution and defence, described in Chapter Five.

6.2 Appearances in Court

Interviewees were asked how many times they had appeared as an expert witness in court, and the number of cases with which they had been involved. Although the main objective of this question was to ascertain the relative experience of interviewees, and perhaps to make some judgment as to the validity of each interviewee's experience, the finding was that most experts appeared in court seldom.

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[4] *R v Reed* [2009] EWCA Crim 2698, [2010] 1 Cr App R 23.

[5] Science and Technology Committee, *Forensic Science*, Second Report Volume 1 (HC 610, 2013–14) Ev 31, Q172 response by Karen Squibb-Williams (HC Forensic Science Report Evidence).

Different answers were obtained from prosecution and defence experts in response to the question of the numbers of cases with which they had been involved. It should be noted that ‘cases’ did not equate directly to DNA samples tested: a single case may have had multiple DNA samples, including elimination samples, and in other instances there may have been a number of individual offences for which a single perpetrator was suspected. More accurately a case could be defined as an instance in which an expert report was produced, containing expert opinion on the analysis of one or more samples concerned with a single alleged offence, and intended as potential expert testimony.

Regarding prosecution, few interviewees were able to accurately estimate the number of cases with which they had been involved in total, however, an approximation was possible: one interviewee (Int1) with 10 years’ experience with DNA stated that she had been involved with over 1000 cases, and an interviewee (Int3) with 18 years’ experience stated that they had been involved with several thousand cases. This would suggest an average number of two cases per week, a figure consistent with most interviewees’ responses. This number of cases suggested that the interviewees would have attended a large number of trials. This was not the case, however. Although only one expert was able to give an exact number of trials attended - 82 cases over 24 years, typical responses to this question indicated the number of court appearances for each interviewee to be in the same general low range:

> Int8: I have been on the stand once; I have been called to court three times… . And the other time I got called I got told I wasn’t needed as I was walking into the court room.
>
> (Note that Int8 had experience of six and a half years of working with DNA evidence).
>
> Int9: Been to court – probably not that many, I would probably say about thirty, something like that… but over sort of like twenty (years).
>
> Int19: In number of cases it is difficult, I mean I provide evidence, I will have provided evidence in thousands of cases. … So in actual court appearances your attrition rate is very very high. I would say you would be lucky if you appeared in one percent of the cases for which you provide testimony in.

No interviewee reported significantly more court appearances than these examples suggested. Interestingly, Int19’s estimate of one percent of cases

did seem to be close to the average number of trial appearances relative to total cases reported over the whole pool of experts interviewed.

Interviewees reported that it was difficult to predict in which cases they would be called to court, and, when there, whether they were called to give testimony:

> Int7: I've written statements quite a few times where the DNA evidence is crucial to the case, but I have not been called to give evidence… I have been to court and not got on and I have also just not been called at all, it has just gone through.

Additionally, some interviewees reported that appearances in court had now reduced substantially. A number of possible reasons were given for this by the interviewees. Firstly because of the way in which expert reports had become standardised by both the FSS and other providers:

> Int3: It has changed over the years. …Historically we went to court more often because they wanted to ask you more questions about what was written in the statement and you know try and dig through to quite what the value of that statement meant. … But the FSS drove a few years ago to redesign the way we did statements and retrained all the reporting officers to do the new style statement and since then we have found the number of times we are called to court plummeted quite considerably to the extent certainly, I have had murders where I have never been called to court, you know my statement has sufficed.

(Note that the interviewee may have been referring to 'Streamlined Reporting', or an early version of it. Streamlined Reporting is a two stage reporting process, introduced by early 2013, aimed at delivering proportionate reporting by allowing early identification of issues. Put simply, the objective is that minimal forensic work is done where the results are not at issue).[6]

Secondly, several interviewees suggested that, in addition to the objective of improving scientific reporting, such initiatives also had a budgetary objective:

> Int3: Whereas now, and again there is probably a cost side as well you know, it is expensive to take people to court, you know the hourly charge for all the experts in a courtroom is actually phenomenally high.

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[6] Crown Prosecution Service, 'National Streamlined Forensic Reporting Guidance SFR – Section 1 - Supporting Information Version 3.0' (2015).

> Int19: I suspect although I don't know this that the reason you are often not called is for matters of expense. If we call an expert to lead evidence orally right he or she will be billing us a grand a day.

Int19 suggested also that trial lawyers were pressured to call experts only when they had something substantial to say, that is, presented value for money:

> Int19: So my feeling is that … the lawyers are leant on saying before you call these experts make sure it is to ask them something rather than just we don't want people to rock up to court and just come in and ask a few bland questions and go home again. Let's get them here for a reason.

Thirdly, because, as most interviewees stated, simple DNA matches were now rarely challenged:

> Int19: … but it has got less and less frequent should I say simply because these days DNA is seen as a tried and tested evidence type.

> Int10: Yes, you assume that your statement is read out in court and you know the defence don't have any challenge to it and it is just read and accepted.

No clear picture emerged regarding the number of cases in which an expert was instructed by the defence team, however it was safe to say that this was considerably lower than for prosecution experts. This may be explained possibly by the very different role that the defence expert played in the process (detailed below), and the fact, described above, that only in exceptional cases were DNA matches challenged. Regarding appearances in court, however, defence experts were reasonably consistent in stating that they attended court in approximately ten percent of cases with which they were involved, although, counsel tended to use them for advice in court, rather than to ask them to testify.

The observation that experts attended court in only a relatively low number of cases, underlined an important qualification of the current study. That is, its scope included only those trials in which the forensic expert was present. As one interviewee stated, in response to the question of how his written statement was presented in court when he was not present, he replied:

> Int19: I don't know because I am not there … I assume that they just read out if it is not contested… .

In summary, prosecution experts stated that they reported on between 50 and 100 cases each year, and testified in court between one and three times per year. Defence experts were instructed in far fewer cases, and were called to court in approximately ten per cent of these, although not usually called to the stand. Interviewees suggested that the apparently low number of court appearances was due to the high attrition rate (for unknown cause) during the time between investigation, prosecution and trial; improved processes; and, possibly, budgetary constraints. These findings underline a qualification of the study, in that it can only provide knowledge of the use of DNA evidence in court in cases in which a forensic expert has been called to testify in person. It would be tempting to assume that these represented the most contentious proceedings, as this would seem a logical conclusion, however there was no evidence to support this. Indeed, interviewees expressed some puzzlement at why they were not called to some cases in which the DNA evidence seemed contentious to them, and they were sometimes called to court for apparently routine cases, and either not called to testify in person, or called to testify as to apparently routine evidence. Presumably such events are explicable by contextual events outside of the experts' knowledge, however I does not seem true to say that the experts' experiences reported in this chapter simply represent contentious proceedings.

6.3 Pre-trial Discussions

Part 19.6 of the Criminal Procedure Rules provide that the court may order that a pre-hearing discussion takes place between prosecution and defence expert witnesses, in order to discuss the issues, identify areas of disagreement and prepare a joint statement.[7] The importance of this early identification of issues in dispute has been underlined in case law,[8] and by the Law Commission, amongst others.[9]

The interviewees were asked for their experience of pre-trial meetings (excluding 'defence examinations'). In response to this question, interviewees described many pre-trial interactions aimed at resolving disputes over scientific evidence. Broadly there were three major categories

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[7] Criminal Procedure Rules 2015, pt 19.6.

[8] For example, *Reed* (n 4).

[9] Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325, 2011) para 7.52 (Law Commission Report).

of dispute: firstly, regarding areas of seeming detail (one interviewee mentioned the example of dispute over the use of the phrase ‘unable to exclude’ written by the defence, as opposed to the phrase ‘could have’, written by the prosecution regarding the same scientific findings):

> Int4: Scientifically it could be very, very small, but to the lawyer it is a huge thing.

Secondly, to eliminate uncontested evidence, and reduce the evidence to that addressing issues at dispute; thirdly, where there was significant dispute regarding the opinion of the other expert. In practice, there was apparently little difference in the experience of prosecution and defence experts regarding such meetings, and this analysis does not, therefore, differentiate between these on that basis. The only concrete difference was that in some cases, although there was a prosecution expert, there may have been no defence expert called with whom to have a meeting, so that any meetings were with defence counsel alone.

Interestingly, however, almost all such interactions which the interviewees described, were driven by, and involved, counsel. When pressed regarding their experience of pre-trial discussions conforming with the requirements or implied intentions of part 19.6, there was a consensus that this was a rare occurrence:

> Int16: Not really, I wouldn’t say a pre-trial conference as such. In fact I don’t think I’ve… I think maybe on one occasion I have had to do a sort of sit down in a room with the defence expert and come up with a consistent opinion.
>
> Int13: Right, ok well my experience is that it doesn’t happen all that often.
>
> Int21: Very rarely, I would suggest.
>
> Int16: (Meetings) happen quite frequently, it is just that I have not come across… (them) that often myself.

These comments were consistent: when asked to make an estimate of the total number of times that interviewees had attended such a meeting, most stated that they had never been in such meetings or on only one or two occasions. Several interviewees stated that they thought that such meetings happened more often, but gave no specific reason why they thought this was the case.

Many of the interviewees seemed unfamiliar with the nature of the meetings provided for in part 19.6:

> Int13: Well, there should be (a pre-trial discussion), and I think that has been recommended a few times.

Int22 supported this with the observation that she had recently been receiving increased requests from other experts asking for advice on how such meetings should be conducted. This, of course, also suggested that these experts did not have much experience of such meetings to date.

On the one hand, given that this provision has only existed since November 2006, and that, as discussed above, actual attendance at court was infrequent, the number of such pre-hearing discussions may not be judged disproportionally low, however, even for the meetings that the experts considered complied with the provision of part 19.6, it was apparent that these were often, if not usually, driven by counsel, who, typically were also present at the meeting.

> Int9: The only case where that has really happened… and the most in-depth was that both advocates had a meeting with both of us experts.

> Int9: I remember being put into a room by the CPS and said the barristers want you to go in here and come to some sort of agreement.

> Int1: ... I have been to maybe three where there have been both sides of counsel have been there and both experts have been there.

> Int19: … the second time I had the lawyers wanted to be involved; we want to be there we want to hear everything you say, and I was like hang on a second, I am sorry this is not an area that I think you should be getting involved with… .

These types of meeting failed in their compliance with part 19.6 on a number of bases: firstly, such pre-trial discussions should be ordered by the court rather than driven by counsel, secondly, that a joint statement should have been prepared for the court and thirdly that ‘the content of that discussion must not be referred to without the court’s permission’.[10] These considerations will be examined in turn:

Counsel have a duty to understand and isolate the facts at issue in the case, and meetings with opposing counsel and experts would be a method of achieving this. Having said this, such meetings, involving and being driven by counsel, appeared to substitute, in many case, for meetings of experts.

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[10] Criminal Procedure Rules 2015, pt 19.6.

This would apparently be counter to the apparent intention of the rules. The implied intention of rule 19.6 is that the experts come to an agreement regarding the nature of the uncontested evidence, and of issues regarding contested areas, this in the service of the court.[11] Additionally, in *R v Henderson*, it was stated that it was preferable that others 'particularly legal representatives' did not attend.[12] Incidentally, the rules also provide for the court to appoint a single joint expert, but no interviewee had ever seen or heard of this happening. Such an implied duty of joint service to the court appears to be at odds with the way in which counsel appeared to control such meetings. Indeed, some interviewees implied that counsel were in overall control and censure of such meetings:

> Int8: … the barristers were there initially, but the judge had said it was ok for the two of us to discuss it, because I know sometimes there are rules around discussing your evidence with another witness potentially. But in this instance I think the barristers had both agreed that they were happy to just leave the two of us experts in the room to talk.
>
> Int16: In that particular case it wasn't ordered by the judge at all, I think, it was just that the barristers were in agreement and they were privy to everything that was being said, so it wasn't like we were having conversations behind closed doors.

These two quotes are interesting in that interviewees suggested that a meeting between 'opposing' experts would have been, in some way, illegitimate.

Secondly, that a joint statement was prepared for the court:

> Int6: … there are occasions again but much more when you are at court that if you have met with the defence expert and you agree an agreed statement you may both then meet with your respective counsels, all of you together or you may each go off to speak to your counsel to inform them of your discussions.
>
> Int8: … had a meeting to discuss, to just clarify between the two of us, that we actually were making the same interpretation essentially, so that the barristers knew how much to question us on it, or question me on it while I was on the stand. … slightly different interpretation, we have formed slightly different conclusions, so in that instance the

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[11] ibid.

[12] *R v Henderson* [2010] EWCA Crim 1269, [2010] 2 Cr App R 24 [210].

> barristers did want to be more involved in seeing what we were coming…what we were saying.

These reports implied that any statement was certainly not simply jointly prepared by experts alone, and, impliedly, although a joint statement might have been prepared, it did not appear to be primarily for the court, but, appeared to be primarily for adversarial strategic purposes on the part of counsel.

Indeed, there was also evidence that such meetings are sometimes prevented for tactical purposes:

> Int13: (I could have prevented her) say(ing) what she did in front of the jury. And maybe we could have agreed that and then there wouldn't have been any problem but we were kept apart, I mean I was told not to speak to her… by the defence barrister. And I suppose it is just the way counsel, how they see the case, how they want to play it, and what strategy they want to use.

Thirdly, although the provision that the content of the expert discussion must not be referred to without the court's permission is seemingly more relevant in the case where there has truly been a discussion between experts alone, one interviewee indicated that pre-trial discussions involving both experts and counsel, might, in fact, have as its outcome an agreement between counsel as to what may be presented:

> Int13 … defence counsel the prosecuting counsel had made some concession and said ok I won't lead her, we will talk about the six confirmed and I won't lead her through bands that are masked or bands that are unconfirmed. But when she was being cross-examined she mentioned some of the bands that were unconfirmed, so during re-examination because the cat had been let out of the bag, the prosecution barrister then went straight into it, I mean he wanted the court to hear this so he had kept his side of the bargain if you like by not leading her through it but because it was mentioned during cross-examination he could talk about it in re-examination and (he did so).

In this particular example the interviewee opined that:

> Int13: And basically the last thing she said was there was only one band missing, one of his bands missing from the mixed profile which you know a jury hears that and I think it could potentially be prejudicial or misleading.

Interviewees were asked, when such meetings had happened, how useful they found them. A typical response was:

> Int22: … (they) have been helpful I think because either they have made all of the issues go away or they have focussed them on just a few points and so saved everyone's time.
>
> Int5: And there was some major differences of view but what we found very quickly and bearing in mind the prosecution had written something like five reports, some of which were quite lengthy, and I had written one or two reports. So we are talking about fifty or sixty pages of expert evidence from the prosecution and perhaps ten from me. And some quite complex interpretations of issues around trace evidence and so on and so forth. This was rapidly reduced to a page of relevant material, and relevant I should say was matters in dispute, matters that ought to be in front of the jury whereas the other ninety per cent of it was not in dispute, it was process, it was methodology or it was simply agreed facts, whatever we'd found.
>
> Int7: In my experience a lot of the barristers that I have worked with or come across don't want to have a scientific argument in the witness box, it is no advantage, and it is of no advantage to the court, they want it cleared up before it gets there, so we have the discussion beforehand. And it has been very useful.

Despite the fact that few interviewees had experienced (or were even aware of) the provision for the court to order a pre-hearing expert conference, many mentioned that they were unaware of the expectations on them, and said that guidance was necessary:

> Int19: Right, but there is no real, I have never seen any real guidance about how a (19).6 is run because the second time one I had the lawyers wanted to be involved; we want to be there we want to hear everything you say, and I was like hang on a second, I am sorry this is not an area that I think you should be getting involved with…
>
> Int22: … I do think that because so many scientists haven't been exposed to them yet some guidance for the scientists on what their responsibilities are would be helpful. Yes and for a lot of other things the Criminal Procedure Rules, the responsibility of experts is quite helpful and quite thorough, you know about the retain, reveal, record, all of these. But it doesn't really give much guidance as to what is expected as the outcome of a pre-trial conference.

In summary, despite the provision in part 19.6 of the Criminal Procedure Rules for the court to order a pre-trial discussion between experts, the evidence gathered here indicates that this rarely happened. Although meetings between experts did happen, these appeared to be driven largely

by counsel. Indeed, most interviewees appeared largely ignorant of any pre-hearing discussion that did not involve counsel. Interviewees suggested that counsel not only drove, but also control such interactions, even prohibiting contact on occasion. Indeed, one interview seemed to suggest that any such meeting in the absence of counsel might be illegitimate in some way. The interviewees who had some experience of such meetings also made the point that there was no guidance available to them as to how such meetings should be organised and conducted. These findings were highly significant: the provisions within the Criminal Procedure Rules concerning expert evidence, including for pre-trial meetings between experts, have been heralded as a major step forward in addressing a number of key issues regarding expert evidence in general.[13]

6.4 Engagement with Counsel and Others

The interviewees were asked when their first contact with counsel took place, and the nature of that contact. Prosecution and defence experts reported slightly different experiences, and will be discussed separately below. The experience of interviewees within each group, however, was very consistent.

For prosecution experts typical, and consistent, responses were as follows:

> Int25: But I would say 99% of the time there is little or no communication until the day you are at court and they ask for you to get there an hour before. You know the court starts at 10 o'clock they ask you to be there for 9 o'clock to have a discussion about your evidence and other parts to make sure that you have got material and you know a quick run through…Yea, most of the time on the day and sometimes you might not even speak to them beforehand at all, when you first walk in and start answering questions for them.
>
> Int14: I would say it would be extremely unusual to have any contact with the counsel until the moment you are being asked questions on the stand.

Furthermore, interviewees reported (further to comments in Chapter Five), that, in addition to their frustrations regarding late notification of the defence position, they still may not be aware of the defence position by the time they were in the witness box:

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[13] For example, HC Forensic Science Report Evidence (n 5).

> Int14: Most of the time you just turn up and you have got no idea whether (the defence have submitted a case) or what the bones of contention are or what the main issues are, or what the areas they have agreed and what areas they haven't agreed on, you have got no idea, you just turn up and give your evidence.

In very high profile cases, interviewees reported attending:

> Int10: … two or three case conferences in chambers, with all the police and barristers to discuss the evidence beforehand.

However, even in serious cases:

> Int10: More often on a more sort of standard case, which you know is probably a murder but less high profile, you will be called to court, told you are needed in court next week. And you get to court at midday and the barrister comes and chats to you for a quarter of an hour and then you have your lunch and you get on some time in the afternoon. So that is very often the way it will go, they will ask you to be in court a little while before you are needed, and they are obviously very very busy people, and they manage to squeeze in a sort of ten/ fifteen minute chat with you to say these are the things that I want to talk about, these are the key points of your evidence and I will probably ask you this question.

> Int19: Oh yea, half the cases I go to you meet them on the morning that you are going to do and that is even in serious cases, so just before I finished at the FSS you know I did a murder trial and you know I turn up and the first time I met the barrister you know I had five minutes with him and he said I am going to call you in and ask you these questions and that's it.

Interviewees explained one aspect of this late engagement as being due to the very late engagement of counsel themselves:

> Int19: … what you'll find is lawyers are last minute, right. They have got a trial today and they are not interested in that trial next week so what you find is that your involvement will often be very close to the trial because all of a sudden everybody's mind is focussed on this trial and then you are called and all the things happen at a very late date. I mean not in every case and so the bigger the case the less likely that is to happen but mostly in most run a day cases you probably won't be engaged with until the morning of a trial… barristers will be briefed at the last possible moment.

> Int24: I don't know how they do it but they get their head around these things very quickly, they are just finishing off

> one and they are about to pick up another one next week and they sit up all night reading the papers.

Some interviewees reported that the situation has improved over the years, and that more engagement now took place. Nevertheless a number of interviewees expressed frustration with late engagement:

> Int1: Sometimes you get the impression that everybody is very busy and they have not got time to talk to you and I get a bit frustrated because I want to say you need to at least, I need to make sure that you understand this… .

> Int9: These days more and more you do (have earlier contact with counsel). But years gone by you literally sat outside court and had your name called and went in, and it frustrated me so much because that's why on occasions it is a case of excuse me, your honour, can I say something else. So that pre-trial encounter to me is essential, and once or twice it has given me the ability to say has anything else come out at court that I am not aware of; and if it has you can turn round and say to them I am sorry but given what you are saying my evidence means nothing now.

> Int21: I would love for a barrister to say let's go through this case, tell me about the technique you have used, tell me what it means, tell me how I best explain it and let me explain to him what I am going to tell him and to help him frame his questions, that is the best way to do it. It is not helpful when you have these random questions fired at you, nor is it helpful if you get fired questions that you can only answer yes or no to because it doesn't help.

From the defence perspective one might have expected that the 'hired gun' was closely involved with defence counsel in the development of the defence case, but rather surprisingly, defence interviewees (unless actually brought into the process by counsel with whom they had worked previously) again reported late engagement with counsel. Typically this might be at the court itself, with the defence expert asked to appear, but still not being clear about whether they would be called, asked to remain outside the court to answer questions, or to sit with counsel within the court.

Int7 offered an additional rationale for late engagement with counsel:

> Int7: And it is not until the point that the defence team are instructed that they understand whether they want to have a look at the forensic evidence or not, so usually it is very quick.

> Yes, they see (the forensic evidence) as part of the evidence pack… they have read it, and they need assistance because

> they don't understand the content, or they feel it doesn't cover the area. I mean typically the sort of questions we get are just because they don't understand fully what has been presented there.

Many of the prosecution interviewees offered the same additional rationale for late and seemingly superficial counsel contact, namely that the forensic evidence was regarded simply as part of the evidence pack, and the expert was only needed before the court room where the instructing counsel had questions about it. Very interestingly, from the prosecution experts' point of view, such questions may not be directly addressed to the expert, with the investigating officer being seen as the point of contact with the expert:

> Int1: What sometimes happens is that they will have a case conference without you and come out of that with a list of questions and then that usually gets emailed to you, it is usually the investigating officer is perceived to be the point of contact to the expert, so you will usually get an email from the investigating officer saying they have had a case conference, CPS or whoever… .

In this case, the lack of direct contact further frustrated the interviewee:

> Int1: Sometimes the barristers just want the answers verbally but they want the expert to tell the officer and the officer will then tell them, and I think that is a bit pointless, especially if it is a complex issue.

In summary, the findings indicate that routine DNA evidence, even within serious cases, is regarded simply as part of the evidence pack, to be assimilated by counsel and incorporated into the case developed by prosecution and defence legal teams. The DNA expert on that basis is simply the resource who may advise on scientific questions and present evidence if and when asked. Other than in high profile cases they are not involved in the development of the overall case. Interviewees reported frustration with the lack of contact with counsel, and the lack of certainty that this gave them, however, most stated that they understood that this was inevitable, given that counsel were typically appointed at very short notice (for example less than one day) before the trial.

6.5 The Expert's Role

Before examining interviewees' experience in the courtroom in detail, it was important to examine interviewees' perception of their overall role in the court. This section describes these perceptions both from the prosecution and defence points of view. It goes on to describe interviewees' comments

on *how* they discharge their responsibilities, given the exigencies of the adversarial trial, and the constraints placed upon them by legal process.

Despite evidence of apparent association with the instructing party discussed in the last chapter, on the part of both prosecution and defence experts, interviewees unanimously and unequivocally stated that their role within the court was as unbiased assistant in the service of the court. Although this was true for both prosecution and defence experts, interviewees did report differences in the practical role that each side played.

Whilst in complex cases there might have been competing evidence regarding the validity of the science and the opinions formed on the evidence, in the vast majority of cases interviewees reported that there was little scientific disagreement on the fact of a DNA match.

> Int19: … there are four basic questions in a criminal trial: whose DNA is it, what biological material did it come from, how did it get there, and when did it get there? The first two now seem to have almost disappeared in terms of contested issues at a trial. And it nearly always now falls to three and four which is 'I am not disputing that it's my DNA; what I am arguing about is how and when it got there'.

In practice, prosecution interviewees described their responsibility as presenting the DNA evidence supporting the prosecution case. Although they presented this objectively, their role throughout was only to answer the questions put to them by the investigator, and prosecution, and not to consider alternative hypotheses. One defence interviewee pointed out that this made logical sense:

> Int17: … the prosecution … just say … we have got a profile, it matches, given what (we) are alleging it does coincide with what we found …if there are alternative explanations then I will consider it. But they won't ever pursue other alternatives …which is fair enough I guess because otherwise you will just spend all day theorising options of how it could have happened. And, one could argue, giving options to the defence to say you know if this happened then they will come back oh that is exactly what happened, that is exactly what happened.

Defence interviewees' description of their role mirrored this accordingly:

> Int17: I now might say I completely agree, (the DNA evidence) is completely consistent with what the Crown is alleging… But there might be an alternative explanation … and that would also explain how this evidence … came to

> be. … whether they say it is more likely or less likely or equally likely or whatever… .

In other words, defence experts described their role as proposing alternative innocent explanations for the agreed evidence.

In summary, prosecution and defence had already reported (in Chapter Five) first becoming involved in cases in very different ways. Now they reported playing significantly different roles in the court room. The role of the prosecution was to testify as to evidence supporting the prosecution case, whilst the defence expert's role was to support the defence case by presenting alternative, innocent, explanations for that same evidence.

Given the opposing roles in which they found themselves, it was not hard to understand interviewees' frustrations, reported in Chapter Five, that they might appear biased towards their instructing party. This chapter moves on to investigate how interviewees viewed their responsibilities, and, with the above factors in mind, how they attempted to discharge them.

6.6 The Expert's Responsibility

Interviewees were clear and unanimous in their view that their responsibility was to ensure that they presented their evidence in an effective way, and ensured that the jury understood it sufficiently to be able to consider it in the light of the other evidence in the case.

> Int12: It is your job to make them (the jury) understand (the DNA evidence), without a doubt, I think it is our responsibility. Presentation is part of the skill of the forensic scientist, without presentation skill you are actually missing an essential component of the job description. If you can't present the data then you shouldn't be a forensic scientist, it is as simple as that.

Interviewees described a number of significant challenges that they perceived in the discharge of such a simply described responsibility. These centred on two key and related areas. Firstly, conflicts between counsel's line of questioning and the expert's desire to properly explain their evidence. Secondly, regarding the jury's understanding of the DNA evidence, and how it related to the other evidence.

Exacerbating this, interviewees reported situations in which they perceived that counsel, particularly prosecution, were leading and examining DNA evidence in scientifically unreliable ways, in the interests of advancing the state's case.

In response to these challenges, interviewees reported compensatory behaviours on their part. Whether these were effective or not, interviewees rationalised the adversarial environment in which they found themselves and, as reported in detail in Chapter Seven, ultimately appeared to disengage themselves from the judicial process.

It should be noted at the outset that each of these challenges logically arose simply by virtue of the adversarial system. Each party presented a partisan case to the jury, and experts could only give evidence in response to counsel's questions in support of that. Arguably, the problem arose when scientifically unreliable evidence was accepted as reliable, and for whatever reason was not challenged. It should be noted that 'unreliable' in this sense did not simply mean that the science was wrong or untested, but rather that the conclusions drawn from it might be unwarranted, for whatever reason. These reasons might include, for example, misunderstandings regarding the significance of the evidence, or the probabilistic implications of the match probability presented). The potential for miscarriage of justice became significant in this situation.

In summary, all interviewees were clear that their responsibility was to explain the DNA evidence in a way that was accurate and allowed the jury to use it accurately. However, all interviewees perceived challenges deriving from counsel's use of such evidence. Details of these challenges will now be considered.

6.7 Experience in the Witness Box

Before considering these key challenges in detail, it is worth noting that many interviewees stated that counsel almost always attempted to avoid scientific argument in the witness box, so that scientific issues would normally be identified and resolved prior to the court case.

> Int7: In my experience a lot of the barristers that I have worked (with) … don't want to have a scientific argument in the witness box, it is no advantage, and it is of no advantage to the court, they want it cleared up before it gets there.

Although interviewees stated that counsel may not want a scientific argument, arguably, this could have been more accurately described as the fact that counsel were keen to control the delivery of evidence, and did not want to risk adverse scientific evidence (for example, agreement by the prosecution expert that the DNA evidence was, at least, consistent with the defence case, or vice versa).

This apparent desire to control expert testimony was also reflected in the observation that the majority of the time in which defence counsel appointed an expert witness, interviewees reported that they were not called to the witness box. Instead the expert sat behind counsel, listening to testimony concerning the DNA evidence and passing comments and questions to defence counsel.

> Int23: I usually just sit behind the barrister and more often I have been asked to sit in all day really and listen to complainant's version of events, so that I have been given the defendant's account and they want me to listen to every detail of the complainant's account just in order to check if there is anything in the findings that can tell the difference between the, you know that is more supportive of one account or the other.

One expert suggested that this was to 'keep the prosecution expert honest':

> Int12: Somehow the counsel are wise enough to say I want you in court because I want you there to keep them honest…. in fact, one uses me to spook them because he wants me to be in their eye-line, I don't agree with that.

However, a significant number of interviewees stated that the reason that defence experts were called to court, but were often not called to give evidence, was that the defence counsel was concerned about how their testimony would stand up under cross-examination:

> Int3: The barrister has not wanted to call you to court because he felt that that was in danger when you were cross-examined, then you could be challenged and weaken the defence case because you are not disagreeing with what the Crown is saying… (if) the defendant is coming up with another alternative which is equally likely, then that cancels out your prosecution side because it is supporting the defence as well you know, either of them are equal… But what they don't want is for you to go into court and the prosecution to really sort of beef up the prosecution bit.

> Int23: … you know if the Crown barrister got to me he would be saying but you agree it is a match, you agree it is one in a billion, you know then we would be just reinforcing the strength of their case.

It is important to report interviewees' general experience of appearing in court. Simplistic pre-suppositions concerning experiences in giving evidence-in-chief and under cross-examination turned out to be largely unreliable. For example, interviewees did not report that examination-in-chief

was more straightforward or less challenging than cross-examination, and they did not report having an easier experience with the counsel calling them than with opposing counsel. For these reasons experiences of examination-in-chief and cross-examination are discussed here together, highlighting where there were differences between interviewees' experiences. Interviewees described a wide range of experiences in the witness box, although these were consistent in relation to the specific circumstance described.

Interviewees for whom appearance in court was a relatively new experience described the anticipation of appearing in court as being very stressful:

> Int8: It is quite nerve-wracking. I mean I actually found the whole process of making sure you get there on time, and knowing where to go when you get there, and things like that are quite nerve-wracking. … and then once you are there you kind of then get nervous about the giving evidence bit… Yeah and everybody is looking at you, and people don't necessarily realise, if they are on the jury, that when there is twelve of you and one of the other person it can be quite intimidating.

This was not the general observation of more experienced interviewees, however, who, despite the remark that they might be 'a bit nervous that you are going to get a hard time' (Int8), reported that the experience was not generally stressful:

> Int9: During evidence in chief the vast majority of cases they will go through your statement almost page by page, to the point where you get a little bit bored with yourself going: that's correct, yes. It does get a little bit repetitive. You do get the odd barrister who might go a little bit off script and you are a bit like hey, hello, I didn't say that. But I would say the vast majority will go through your statement.

Regarding cross-examination, despite the assumption that cross-examination might be more hostile, in fact, this was described as usually being an easier experience. This was explained as being because the point of questioning was clear to them, and they felt very comfortable defending their opinion.

> Int4: Again, I think it is easier, I think is much much easier because I think usually during a cross-examination they have a point. And you can get into a bit more of a discussion about things, so they are asking you questions, you are explaining your answers to the jury rather than just saying yes, no, maybe. Yeah, I personally, I don't know about other

> people, I personally find that much much easier to have something specific to talk about.

Having said that, interviewees reported that sometimes some lines of questioning, particularly in cross-examination, made them anxious as to counsel's objectives:

> Int10: And especially if they lead you down a certain line of questioning and you are always waiting for them to reach a conclusion and to spring that trap and for you to have a chance to answer it. But what is worse sometimes is when they lead you down a line of questioning and then they just stop and you don't know what information you have given them, and how they will use it.

> Int4: You tend to when the defence first ask you tend to go oooh, right here we go and then you get half way through and you think oh fine, quite nerve wracking when they say oh we will come back to that, and you think gosh what have I just said. Or when they start reading if they go back to what you have been talking about and they start reading back to you what you have just said and you think please let me have said the right thing.

Generally, though, interviewees reported that they did not experience aggressive questioning from the opposing counsel, although some suggested that this might be as much to do with opposing counsel making sure that they were seen to be reasonable.

> Int8: … (T)here is the sort of massive myth that the prosecutor will be lovely and the defence barrister will be horrible, but actually you know I found them both to be perfectly pleasant.

> Int2: But on the whole I think the cross-examination has been always respectable, respectful I should say. Some of them have been a bit more persistent you know and pressured, but they have never been you know outright rude or anything. And usually they are just trying to get clarification you know.

> Int9: Touch wood, I can honestly say I've never really had what I would consider a massively hard time in court.

The preceding discussion described interviewees' experience of examination and cross-examination in general, however interviewees were also asked about their perception of the efficiency of counsel in eliciting evidence. As will be detailed below, on the one hand, interviewees reported that they made a judgment on the evidence that they had 'been allowed' to give, and attempted to compensate where they felt that an incomplete picture had

been given. On the other hand, however, there were many examples of perceived ‘boundaries’ to this, that is to say, a limit to the degree to which the interviewee felt able to communicate or clarify their evidence. In these cases, interviewees described various rationalisations regarding the eventual outcome, or their response to the situation.

It was mentioned in the previous chapter that, despite early pre-suppositions, interviewees reported that they were not substantially involved in the development of the legal case. Despite this, it might have been supposed that there had been some co-ordination, or at least pre-appearance contact with counsel regarding the direction of their case. It was mentioned above that most interviewees reported minimal contact with respective counsel before appearance in court, however we now examine interviewees’ views on the problems caused by that:

> Int9: … (a) pre-trial encounter to me is essential, and once or twice it has given me the ability to say has anything else come out at court that I am not aware of; and if it has you can turn round and say to them I am sorry but given what you are saying my evidence means nothing now… that’s why on occasions it is a case of excuse me, your honour, can I say something else.
>
> Int3: Where you know you are part way through giving evidence and you are asked a question where you have no idea of that part of the case because nobody has told you about it and that is the first time you are aware of it.
>
> Int9: I always if at all possible try to trip them up on the way into the court, you know hi I am here, to have at least a conversation with them.

The examples above demonstrate that certainly from the interviewees’ perspective, lack of pre-trial contact with prosecutors presented real problems. As described below, interviewees reported problems with the ‘correctness’ of presenting the DNA evidence, however, of more concern, they reported occasional scientific inaccuracy which they were not always able to correct.

Counsel pursue legal truth, but this does not necessarily equate with scientific proof, for example, they may not have adduced evidence that was unhelpful to their case. However, it was hard to argue that confusion on the part of the expert, because of lack of information, was conducive to justice (or, indeed, necessarily furthered the respective party’s case).

The statement by one interviewee (Int9) that they ‘trip(ped) up counsel on the way to court’ could have been seen as a throwaway comment, however, it did accurately represent a feeling held by the majority of interviewees, that, although they would not have expected to have control, they did feel powerlessness regarding their ability to bring the scientific expertise to the service of the court.

These observations went some way to explaining the general perception that interviewees described regarding their experience in giving evidence-in-chief (and indeed cross-examination). In fact, interviewees were consistent in describing the process in terms of both negotiating sometimes doubtful lines of questioning, and negotiating apparently strategic lines of questioning on the part of counsel.

> Int4: I think if you get simple evidence with a good barrister and a good scientist they will understand it. If you get really complex evidence with a bad scientist and a bad barrister they really won’t, and then you have got everything in the middle.

The over-riding impression given by interviewees was that of finding a way of communicating their evidence whilst negotiating the constraints mentioned above, and placed on the process by an adversarial counsel, particularly by the fact that they were only allowed to answer the questions put to them:

> Int19: So it is a difficult thing because you are not allowed to make speeches… .

> Int12: We are only allowed to answer what they want us to answer. So in that sense the most successful trials are those where counsel and the expert are working well together, if one or the other is not good, then it is a major problem.

Regarding counsels’ lines of questioning, some interviewees reported that sometimes it was straightforward to communicate the evidence to their satisfaction:

> Int7: Some barristers are easy to work with and it is a good experience; you can interact with them, you can present the evidence in a way that hopefully the jury can then make a decision which is ultimately your purpose, to present an unbiased view.

However, this was not always the case:

> Int7: … (sometimes) the barrister doesn't seem to understand what information they want out of you so it's very difficult.
>
> Int4: Whereas prosecution often… they don't really have a point. Sometimes they will take you through this huge statement and there is only one item that is of interest, and it can just be a lot of yes, that is correct, yes that's right, yes, and there is only so many times you can say yes without sounding quite odd. … sometimes it just gets a bit wishy washy.

Being examined where the interviewees believed that the barrister did not have a clear direction was one thing, however, interviewees also described lines of questioning that did not make logical sense, for example, where it was apparent to the interviewee that the question being asked did not address the question of interest to the court:

> Int5: I say that because the prosecution sometimes ask you questions that don't make any sense and I mean genuinely don't make any sense. I mean I know that they can ask you questions that are relevant and you don't understand the relevance, I am talking about questions that you think now don't ask me that, you are going to make this more complicated than it needs to be… .
>
> Int12: …because the worst thing that can happen to you is you are in the box and your own counsel is … asking questions which are grammatically OK but they are meaningless. You know it is like is Tuesday married, that is grammatically correct but it makes no sense.
>
> Int7: And that was an example of being led down (the wrong path), in that case I did actually turn round and stop and said look I am not sure what your point is, but this result is meaningless and I can't interpret it for these reasons, and therefore we shouldn't take it any further. And he just got all flustered and sat down and that was it with the questioning, it stopped it. But that was an example of answering questions truthfully, being led down by the barrister who didn't seem to know where he was going either, but almost leading you (to give) answers that were misleading in what you were giving, but actually didn't mean anything at all anyway, and just needed just closing off.

Defence experts did not express the same frustration, and indeed experts who had worked for both prosecution and defence felt that it was easier to give defence evidence because the direction of questioning was clear to them:

> Int4: I sometimes think defence is easier because there is a point to it. So when you are on defence it is generally either the defence knows your opinion on something and they want to bring that out in court so you kind of know why you are there. Or there has been a disagreement so you have to go in and you just have to say what your views are, why you think them, the evidence behind that and to give your conclusions and that is it.

In summary, interviewees identified that some lines of questioning were clear and relevant, and others were assumed to be so by the interviewees in the light of other evidence to which they were not privy. However, interviewees reported also that some lines of questioning betrayed either a lack of direction or a misunderstanding of the relevance of the evidence, or were simply incomprehensible to them.

As a separate category, a number of interviewees observed that sometimes counsel's line of questioning appeared be more related to a strategic approach than intended to be a simple method of eliciting testimony. Some of these strategies were regarded by interviewees as a legitimate part of the adversarial process with the objective of presenting the party's best case, however other strategies were perceived as communicating an incomplete or misleading picture. The interviewees did not seem to regard these strategies, generally, as being 'illegitimate', presumably because they understood the adversarial nature of the process, however they did regard these as an additional obstacle which they had to surmount in order to discharge their responsibilities in terms of properly presenting their evidence. Some of these strategies will now be described, along with interviewees' responses to these strategies.

Regarding 'legitimate' strategies, experts made a number of observations regarding the *way* in which experts were used in court, as opposed to the elicitation of evidence from them. For example, interviewees stated that counsel commonly staged the timing of their witnesses:

> Int10: … they say you know I can take this witness up to coffee break and then I will be ready for the next witness. So it is very. very staged, very manipulated, and you know each barrister wants to use a witness to get the best of them and sometimes that is according to how long they'll take, and how that fits in with the proceedings of the day. So you know you are part of that theatre and that game playing and role playing… .

Many also observed that counsel sometimes called them simply to re-energise their case and add interest for the jurors:

> Int7: And other times I have been called literally because the jury are falling asleep they want to put a scientist in the box, and they want to try and spice the trial up a bit just to keep everyone awake and alert as to what is happening.

However, a common theme mentioned by almost all interviewees was that they felt that frequently they had been asked to appear because of a presumed 'CSI' effect on the jury, including sometimes additionally the intention of underlining the strength of a case and the effort that had gone into building it by underlining the scientific elements of it:

> Int19: … defence are not really disputing anything you are saying but they want the impact of the jury to hear the scientist giving this evidence about we have found this, we have done that, we have looked at this, we have looked at that and we have got this, this, this and this. And it has got a very strong impact these days in the CSI era to know that the Crown has gone to some lengths to build a case around forensic evidence.

It was mentioned above that interviewees clearly stated their prime responsibility to be presenting their evidence in a way which the jury could understand. Despite the pre-supposition that interviewees might have perceived juries as ill-equipped to deal with DNA evidence, in fact, they generally felt that a typical jury was familiar with the principles of DNA evidence:

> Int19: I think properly presented as it is a jury should be able to understand the basics of DNA and I know people tend to sort of pooh pooh popular television, you know CSI and things like that and say it has created false expectations about what science can do in criminal things. But what it also has done is it has put into people's awareness these things so now most people you don't have to explain DNA because most people get it, they know what it is and they know what it can do and they know the basics and it is not some new-fangled thing that they have never heard of.

Regarding more complex DNA evidence, however, interviewees started from a position of concern that a lay jury may be unable to understand DNA evidence, especially given the current technological advances:

> Int25: … some parts of the evidence these days it is … at that level where even as simple as you can possibly make it, it might not be understood by the greater part of the population.

> Int14: When it gets more complicated, I think it becomes really, really tough for (the jury). And I do worry that they

> don't necessarily have the opportunity in court to have it explained at sufficient levels for them to actually understand the real issues. Things can happen quite quickly in court when you are being questioned and I think the problem is that because the barristers are such clever people they can grasp a point that you are talking about much quicker than the average jury member.

Many interviewees also started from a point of concern that the jury may be prejudicially influenced by the simple fact of a match particularly given the large random match probabilities quoted (one in a billion as standard). Specifically, interviewees were concerned that, firstly, the jury confused weight of evidence with probability of guilt (the 'prosecutor's fallacy'):

> Int9: It is very very difficult, very difficult. And I think the jury don't understand the concept, I think they immediately do what the barrister does and they immediately say well it is his blood then.

> Int6: I think everyone takes it as a billion times more likely it is from him even though that is not what we are saying. But I think however carefully we phrase it, I don't think people hear it any differently.

Secondly, that they believed that such overwhelming numbers must mean something (otherwise why would the prosecution be quoting them?):

> Int7: DNA is still seen as the Holy Grail if you like, because if you have got a full DNA profile it is incredibly powerful and there is still quite a lot of misunderstanding as to what it actually means, so it probably carries a lot more weight than it should.

> Int16: So in a courtroom people are putting weight on, you know significant weight, certainly jury members, on a person's DNA profile being detected on an item, means they must have touched it, means they must have held it, means they must have used it as a weapon.

Thirdly, that the jury did not always understand the specific nature of the question being addressed, or at least would be improperly influenced in their reasoning upon this due to the prejudicial fact of the match. As a simple example of this, interviewees were concerned that the jury may not have realised that the fact of a match might not be disputed, despite the prosecution's presentation of a match statistic, and the question at issue might be *how* the defendant's DNA came to be at the crime scene, or which tissue type it originated from (neither of which considerations should be associated with the one in a billion match probability).

Further, interviewees were also concerned that the jury may not realise that questions of transfer and persistence were not usually addressed by rigorous scientific database as used for simple DNA matches, and the evidence presented to them was simply the opinion of the expert. This is explored in detail in Chapter Seven.

Interviewees did, however, mention counsel strategies that they believed were counter-productive to the proper presentation and examination of DNA evidence, albeit with the intention of building a stronger case. Some of these will be described below.

Firstly, regarding lines of questioning. It was mentioned above that interviewees noted that counsel sometimes pursued apparently pointless lines of questioning, ascribing this to misunderstanding or lack of preparation. However, in other cases, interviewees stated that sometimes a line of questioning was apparently aimed at imparting (or, at least reckless as to) a fallacious message:

> Int4: … they want the jury to see it because the jury will believe something from it but actually scientifically it doesn't make sense. So for example if drugs wraps are taken from a suspect, if the policeman picks the drugs wraps out of the pocket the prosecution might still do DNA work to show the suspect's DNA is on it. Well the policeman has pulled it out of his pocket, you don't need that DNA work to be done.
>
> Int16: (Where drug wraps with Mr X's DNA were found in Mr X's pocket) you just get 'it matches … Mr X – and with a probability of der der der der de'. So that almost hints that there is some evidence against that person.
>
> Int25: Yeah and I think that is a part that myself and a lot of colleagues struggle with a lot of times is the questions that they are asking. When we come back with 'the answer I am going to give you doesn't assist' or 'you are asking the wrong question', … they will still use the result and say that it indicates one way or the other. And it is up to the defence to be sufficiently switched on to (adequately respond).

These examples return to the concern of the interviewees that the jury may not have understood properly how the DNA evidence related to the question at issue. In these examples the fact of a DNA match was not at issue (indeed it was expected – in the example above, the defendant's DNA was found on an item found in the defendant's pocket), and interviewees implied that counsel's intention was to imply that the DNA match implied the answer to another question, that is, at the level of action or indeed guilt of the crime.

In the first example above, the interviewee indicated that not only was this a scientifically and evidentially irrelevant line of questioning, but that unnecessary forensic work had been done to achieve it, although Int4 went on to point out that this was sometimes 'defensive' in nature:

> Int4: At the same time if the prosecution hadn't done work on a case the defence might say we want to prove his DNA isn't on it, … scientifically both those two things as far as I am concerned aren't helpful to the case but both sides would see the effect of that on the jury and they think the jury could make decisions even though scientifically it doesn't mean anything.

The observation by interviewees that prosecution counsel apparently tried to underline the point that there was DNA evidence, however much that evidence may not be probative, was of particular concern because of the interviewees' perception of the strength of DNA evidence in the jury's mind:

> Int17: … you see how heavily the jury can rely… on DNA evidence, it can be a bit scary sometimes because it is so strong as evidence, it can be seen as so irrefutable, and it is such a powerful tool… if you have a case that is so heavily reliant on DNA over everything else, so we have got like a single plank kind of case, then that is when problems can occur. Not in terms of how it got there, but just the fact you have got a DNA profile… .

A minority of interviewees described what they regarded as illegitimate tactics on the part of the opposing counsel. One prosecution expert described a situation in which he, as prosecution expert, appeared to be being pressurised by the defence counsel into making a mistake in his testimony (that is, fallacious reasoning):

> Int7: In that case the defence barrister, he tried every tactic in the book just to dislodge me, just to try and get me to say something that wasn't correct… and tried to lead me down lots of paths. So ye(s), you do have that quite a lot… .

On the part of the prosecution, interviewees reported that counsel would avoid any explicit fallacious statement, on the basis that it would potentially form grounds for appeal. It should be noted, however, that fallacious reasoning in the form of over-reliance on DNA evidence (put rather simplistically: 'there is a DNA match, it must mean something or they wouldn't present it' or, alarmingly, 's/he must be guilty'), is not the same thing as the explicit 'prosecutor's fallacy' and would not give grounds for appeal on the same basis. Even so, interviewees did, however, state that

prosecution counsel did sometimes still appear to fall into the ‘prosecutor’s fallacy’:

> Int10: Yes, they (counsel) very very frequently transpose the conditional, and although you try to correct it and say it in the correct way, I don’t think they understand the subtlety… .

> Int9: … you are saying it in the right and proper way, avoiding the ‘prosecutor’s fallacy’, and the barrister will say so what you are saying is….and you’ll go no, I am not, what I am saying is that the matching results….and they immediately fall into the fallacy, and saying so what you are saying is that the semen stain is a billion times more likely that this semen stain has come from him. No, no I am not saying that, I am talking about …the likelihood of the matching profiles having originated from someone else other than… .

Indeed, a number of interviewees stated that, in a number of these case, it appeared that counsel were deliberately trying to lead the expert into a statement close to that of a ‘prosecutor’s fallacy’ without it being explicitly so:

> Int9: … and they want you to say something short and snappy. I can’t, I have to be… at least two or three occasions I have said we have to be very careful how we express this because forensic scientists have been criticised in the past for misleading the jury… And you can see almost like a glint in their eye and it is like is this what you are trying to get me to (say)… I do think some barristers are a bit naughty trying to trip people up because that is not going to assist the jury.

These quotes are particularly interesting because in these cases it was the counsel who had called the expert who was perceived as attempting to lead the expert towards the ‘prosecutor’s fallacy’, presumably with the intention of not stepping right over the line. Interviewees explained that it was possible to imply the ‘prosecutor’s fallacy’ into the jury’s mind, without it being explicitly fallacious:

> Int6: Yes, and I think as a scientist you are trained so much not to do it, but in the end I don’t think the jury particularly hears the difference … because I think everyone takes it as a billion times more likely it is from him even though that is not what we are saying. But I think however carefully we phrase it I don’t think people hear it any differently.

> Int21: And I think that sometimes the number itself becomes the evidence and the juries don’t perceive the difference between the probability of the evidence and the probability of guilt.

Returning to the subject of simple DNA matches, even assuming that the jury understood the DNA evidence and the nature of the question which it addressed, interviewees expressed concern regarding the influence on the jury of the specific words used (for example, ‘could have contributed’ or ‘cannot be excluded’). In some cases, this may have been agreed by experts prior to the case:

> Int17: I remember we literally spent the whole day arguing the toss over one word to say that more likely or as likely, just that kind of an issue of wording means, to have that reported to the jury… .

However, interviewees still expressed concerns regarding the effect in court of whatever specific form of words was eventually presented to the jury.

Given all these concerns, many interviewees reported that they attempted to gauge jury understanding and indeed interpreted body language displayed by the jury at face value:

> Int9: So when you talk about your interpretation it is always good to see somebody nodding because you think oh somebody is with me. … you know that they are following you.

> Int1: Yes, it is nice, I always try to sort of make eye contact with the jury and occasionally you can sense how well it is going because you will see someone in the jury kind of nodding and understanding what you are saying. That doesn’t happen in every case but I love it when that does happen, it is a good feeling because it makes me think that I have done a good job in explaining this. But there are some cases when it doesn’t happen or you just don’t know, you have no concept.

> Int4: I mean it is lovely, you can see juries sitting sometimes just looking at you and nodding as you are talking, you know it is absolutely fantastic. And other times certainly if you are going through a long prosecution statement you can almost see them nodding off … frankly you feel like clapping your hands and saying come on, stay with me, if I have to do this, you do!

> Int17: … you know sometimes you see juries you know you can see their eyes and they have completely glazed over and you think… .

Whether or not someone nodding or indeed nodding off is a good indicator of comprehension is arguable. Indeed, in many ways, this observation, by a number of interviewees, was rather surprising: at an intuitive level, one might

assume that in the course of day to day communication, one party might gain a grasp of another party's comprehension of statements made. However, the assumptions that would have to be made in order to show that this was also true in the course of communicating evidence to a jury at trial would seem to be considerable. Further, it would seem surprising that, given the interviewees' significant scientific expertise, that they would think it so. At best, a nod from a juror might indicate real comprehension, at worst it could signify complete false comprehension, or indeed even be unrelated to the testimony at hand.

Be that as it may many interviewees reported that they actively responded to apparent jury comprehension (or lack of) in the way that they presented their evidence:

> Int9: Whereas if you see like a puzzled expression you might give a longer more enhanced answer to a question that you are asked, or you might try and incorporate an answer to that question with another question later on. So you have to be quite good at sort of reading them.

Several interviewees mentioned that jurors had the opportunity to ask questions of the expert. On pursuing this apparent 'inquisitorial' feature of the trial, it transpired that such questions were infrequent, passed via the judge, and usually concerned minor clarifications or repeats of previously given evidence. There were no reports of more substantial questions for example, regarding how DNA evidence should logically impact the case.

To conclude, interviewees reported that, although for less experienced witnesses, appearing in the witness box have been nerve-wracking, in general, they did not find it a stressful experience. They reported sometimes persistent questioning, but not aggressively so. Interestingly, they reported that cross-examination was, if anything, easier than examination in chief, they felt, because the direction of questioning was clear to them.

If anything, for prosecution experts, this was the most commonly mentioned source of frustration. Despite the fact that questioning may not have been 'stressful' this did not mean that they understood the line of questioning, or believed that it allowed them to give clear evidence necessarily. The purpose of some lines of questioning remained a mystery to them, and others they believed were potentially misleading, sometimes illegitimately so. Many interviewees stated that, although they understood that counsel took a necessarily partisan stance, some lines of questioning betrayed a lack of understanding. They believed that this could have been prevented, and the

quality of their evidence improved, if they had had the opportunity to speak to counsel before the trial. Indeed, they reported a surprising lack of contact before the trial, and in a number of cases stated that the first time they met their instructing counsel was when they were answering questions in the witness box. Defence experts did not state the same frustrations, presumably because they tended to have been more involved in the cases in which they appeared.

Another key contributory factor to interviewees' frustration at presenting evidence was the fact that they could only answer questions that were asked of them, and could not state the evidence in the way that they would like. They accepted, however, that this was a necessary constraint of the adversarial trial.

Lastly, all interviewees were particularly concerned regarding their ability within the adversarial trial to give their testimony accurately, because they felt that the complexity of DNA evidence was now such that it had become, on occasion, very difficult for the lay person to understand.

6.8 Interviewees' Compensatory Behaviour

Given on the one hand, the interviewees' clear views on their role and responsibilities in court, and on the other, the interviewees' observations regarding the way in which DNA evidence may potentially have been misunderstood, or indeed presented in a way that deliberately or otherwise, led to misunderstanding, it was not surprising that interviewees described strategies that they applied in court in order to correct what they saw as erroneous uses of DNA evidence. It should be noted that these perceived erroneous uses were described on the part of both prosecution and defence counsels, as well as other experts. Examples of such behaviours are described and discussed below. Of particular concern was the observation that, although interviewees felt that generally they were able to convey their evidence in the way in which they would like, this was only whilst they were in the witness box.

Another important issue was interviewees' behaviours on encountering 'boundary' conditions, that is to say situations in which they found themselves to have no control over the presentation of DNA evidence to the court, either because of court procedure, or through the exigencies of the adversarial trial.

Although generally speaking, it did not appear to interviewees that counsel tried to use unfair questioning tactics (that is, 'trick questions'), and that counsel might have appeared more persistent where they wanted to push for clarification, interviewees did report that they needed to maintain focus:

> Int11: I think the thing to remember is that barristers are trickier than a barrel load of monkeys, they are bright people. So if you do say anything that is not quite right they will pick you up. But they won't pick you up straightaway necessarily; they will come back to it.

> Int10: Yeah, I think sometimes you would like to know where they are going with your evidence because they may take what you say and then interpret that in a particular way. Whereas if you knew what they were doing with it then you might have a chance to say yes, that is right, or no, your understanding is wrong. Because they have taken almost some sort of factual information from you and then they are going to interpret that and then maybe represent it to the jury in a particular way, and you haven't had a chance to know quite what they are going to do with it.

Interviewees also reported that had to remain firm and fall back on their training if they felt that they were being pushed into a corner:

> Int11: … he said: 'Mr Int11 if you just answered yes or no to my questions we would get through your evidence a lot quicker.' I said, I am just ensuring that none of my…that my answers don't mislead the jury. And then he said are you suggesting I am trying to mislead the jury, and one of the jurors said 'yeah'.

Interviewees were specifically asked whether they felt constrained within the court as to the evidence they would like to give. All interviewees stated that they were trained to appeal to the judge where they felt that their evidence might have been incorrectly construed, or that they would like to correct a previous incorrect statement:

> Int21: Yes, I think that falls under the responsibility of an expert witness… you might have to say excuse me, My Lord, I think perhaps I can assist the court here. You might be told to shut up, but you know. And similarly if you've got a barrister who says I just want a yes or no answer… you just say I am terribly sorry, My Lord, whilst Mr such and such might like yes or no I don't think it is that black and white and I really need to explain the background.

(Regarding the training referred to, although expert witness training was not addressed within the interview, a number of interviewees with an FSS

background volunteered that they had undergone specific training as reporting scientists. This included case management and course presentation. Typically this took place after approximately two years' experience as forensic scientist, and was of four weeks' duration spread over one year).

Furthermore, they stated that, although a judge may rule some of their testimony inadmissible for reasons that they disagreed with, they had never been in a position or foresaw the position where the judge did not allow clarification on their part.

Similarly, they reported that they were trained not to be hurried into answers without due consideration, nor to be forced to answers lying outside of their expertise. Furthermore, they were trained not to be forced to compromise their evidence in response to a demand for yes/ no answers. They did, however, point out that the confidence to take such a stand only arose with experience:

> Int6: I think you can feel constrained, it is a very intimidating atmosphere, especially the first few times you give evidence, your main focus is getting through it rather than how well you do it… I think the first few times you do it you are probably less likely to (speak up). And I think it is quite an alien environment for a scientist to then be expected to be able to present which you are not naturally gifted at… .

Generally, therefore, interviewees stated that they had never been in a position where they were not able to correct a misconception whilst they were in the witness box, and most stated that in practice there was no problem correcting or clarifying their evidence, or claiming lack of expertise.

An interesting qualification arose, however, in that a significant number of interviewees regarded a more significant constraint to be the fact that they sometimes felt unable to provide balanced testimony. For example, one interviewee reported a case in which the prosecution (who had called him) had suggested that the defendant had been involved in a kicking attack, the DNA being found matching that of the defendant. Defence failed to present alternative scenarios, such as the defendant being a bystander. In this case, the interviewee stated that he felt that it was his professional duty to balance the evidence accordingly:

> Int19: … if I feel that the prosecution barrister is eliciting from me unbalanced testimony I will often rectify it myself rather than wait for the defence to pick up on the point because I don't see myself as a puppet to be played to get the

> prosecution-only story over. And if the defence is inept sometimes I will try and rectify the balance myself… .

His opinion, however, was that not every expert in this position would do this:

> Int19: I don't know how many other experts would have the… would step outside it like that. I feel that not many would, that they would just go in and answer the questions put to them and walk out if that means an unbalanced or one-sided view of the world is perpetuated as a result then that is a weakness in the system not any responsibility for them.

A second factor qualifying the ability to present a balanced picture arose in the fact that this ability to clarify was limited, in that their contribution was limited to answering questions that they were asked whilst in the witness box. Interviewees typically reported that they attempted to clarify earlier parts of their testimony by waiting for a subsequent question that would allow this:

> Int7: I have had that and you always do your best to try and get the conversation round so that you can answer it.

An example of the explicit attempt to provide balanced testimony was given by an interviewee who indicated that he was actively considering at which point he would be able to make the points he wanted:

> Int19: And if they are already on cross you might not get another chance to put the balance in… .

A number of interviewees reported that, if they felt that specific points had not been made, then they raised it with their counsel rather than with the court:

> Int22: … yes, I suppose it is difficult to know why didn't they ask me that when maybe there is a good reason to. Yeah if you have pointed out to them that it is something they could ask, then it is up to them.

Informing counsel of concerns might have been considered to be an additional compensatory behaviour, however it might be argued that this was less concerned with compensating in the courtroom itself than rationalisation of a challenge that the witness felt unable to correct whilst in court. On that basis, this observation is examined in more detail in Chapter Seven, in discussing various rationalisations voiced by interviewees in the face of apparently insurmountable challenges. Needless to say, there were some potentially troubling implications.

Of course, no witness is able to intervene at any time other than while they are giving testimony. However, it will be recalled that expert witnesses are permitted to be in court whilst not giving testimony, and it was reported as common for defence experts to be in court simply to listen to the prosecution expert and to pass questions to defence counsel.

> Int3: And I have seen some evidence given where you know writer's cramp because there is so much that you could challenge but of course verbally you can't say a thing although you are listening to these howlers in court. You know that is the system.

> Int15: … my blood pressure has been sky high just listening to another expert say things that I really believe are not true. And to listen to that and not be able to respond in any way is extremely frustrating.

There is no system for the expert to insist that their counsel takes notice or raises to the court's notice any points that the expert raised outside of evidence in chief, or cross-examination.

> Int12: I frequently sit behind counsel but it is kind of difficult when he is in mid-flow and he has got his strategy and all the rest of it. I have learnt that, you have got to usually give the post-it to junior counsel and then junior counsel decides whether it goes to counsel and so on, and frequently he misunderstands what is on the post-it.

In summary, interviewees reported that, although they felt that they had no personal problem in ensuring that the evidence they gave was presented accurately, there were certain caveats. Particularly they stated that they believed that this came with experience, and that it was necessary to overcome the temptation simply to answer questions and no more. A significant number of interviewees stated that, in addition to ensuring that their evidence was accurate and not misstated, they attempted to 'balance' the testimony, if they felt that it was not balanced.

However, interviewees were clear that they were powerless to correct any misleading testimony if they were not in the witness box, and, of course, had no control over the use that their evidence was put to when they were not in court.

6.9 Conclusions

This chapter has pursued the second central line of investigation within the study, that is, the investigation of a range of reported 'trial pathologies'.

It will be recalled that this term refers specifically to a model, defined by Nelken, in which dysfuntions between the law and science in court could be reduced to individual ‘trial pathologies’, as opposed to science and law being described as ‘competing institutions’ or ‘incompatible discourses’.[14]

In Chapter Two, recent commentary was discussed that listed commonly quoted ‘pathologies’, but, at the same time, made a case that many pathologies may be misunderstood, and may be better understood as features of a functioning adversarial system.

The current chapter sought to describe experts’ perceptions of pathologies that may distort their ability to testify as to DNA evidence, strategies that they used to attempt to overcome the challenges presented by such pathologies, and whether they believed these to be effective. It also sought to identify whether DNA testimony presented any exceptions to previously reported studies on expert evidence in court. Most significantly it attempts to identify potential impacts on justice.

The finding that experts attended court in only a small proportion of the cases in which they were involved, mirrored the findings reported in earlier studies.[15] Regarding defence experts, previous studies reported that they were called in a smaller proportion of times than prosecution. This was strictly true in the current study also, however, in the current study, where a defence expert was instructed, they actually attended court in a larger proportion of times than prosecution, but in only in the capacity of advisors.

This finding underlined an important qualification of this and similar studies. Whilst the findings may contribute to knowledge of the forensic expert’s experience in court, it could, only indirectly, generate knowledge regarding the use of DNA evidence in court generally. An assumption that, in the absence of an expert witness, their written statement was read out, and accepted, seemed logical, but the truth of this assumption remained unknown. Interviewees reported frustration at witnessing perceived misuse of scientific evidence whilst they were in court, however, arguably, they should, perhaps, have expressed greater concern regarding why they were sometimes not called to court in apparently contentious cases.

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[14] David Nelken, ‘A Just Measure of Science’ in Michael Freeman, Helen Reece (eds), *Science In Court* (Ashgate, 1998) 14-18.

[15] Roberts Study (n 11).

The importance of a pre-trial discussion between experts has been underlined in case law,[16] and by the Law Commission Report on Expert Evidence.[17] Additionally, it was suggested, in evidence to the House Of Commons Science and Technology Committee that the Crown Prosecution Service considered that the provision for a court-ordered meeting within the Criminal Procedure Rules acted to alleviate many of the problems with forensic evidence that the Law Commission Report identified.[18]

Previous studies offer no basis for comparison. The Royal Commission on Criminal Justice Report 'Role of Forensic Science Evidence in Criminal Proceedings'[19] predated the provision for a 'part 19.6' expert discussion,[20] however it did describe informal contact between experts, and counsel-controlled defence examinations.[21] The description of such meetings within the Roberts study suggested that they were carried out partly in order to comply with disclosure requirements, but also to further perceived adversarial advantage. The identification and agreement of issues at dispute did not appear to be a primary purpose.[22] The study determined that in such meetings, most experts felt bound to conform with their adversarial role.[23] The Sallavaci study did not address pre-trial meetings of experts.

It was evident in the current study that the 'defence examination' has now apparently become routine. It also now (unlike as reported in the Roberts Study) has a clear purpose and content, in that it is not controlled by counsel, and that it was purely for disclosure of evidence, and not for discussion of points at issue. However, that is not to say that the current study uncovered a more 'collaborative' approach: mirroring an example in the Roberts Study, the current study uncovered an example (detailed in Chapter Five) of the prosecution commissioning more work after leakage of a defence argument to the prosecution expert.

The Criminal Procedure Rules state that a 'part 19.6' meeting would be court-ordered, and between experts. The rules do not state that counsel

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[16] *Reed* (n 4) [129 – 130].
[17] Law Commission Report (n 9) para 7.52.
[18] HC Forensic Science Report Evidence (n 5).
[19] Roberts Study (n 11) 141.
[20] Criminal Procedure Rules 2015, pt 19.6.
[21] Roberts Study (n 11) 108-114.
[22] ibid.
[23] ibid 108.

should not be present,[24] however case law suggests that, preferably, counsel did not attend.[25] In the current study there were a few examples given of counsel-driven and controlled meetings, but, significantly interviewees stated that expert alone meetings were rare in the extreme. Interestingly, there was still some evidence of informal contacts driven through the defence expert. This did not happen for prosecution experts, who appeared to remain reactive. Interestingly, most interviewees, when asked about pre-trial discussions, described alternative meetings with their own counsel, or, occasionally with the opposing expert but with counsel present.

Perhaps of more concern was the fact that only a minority of interviewees even understood the provision for such meetings, or, if they were aware, how they should be organised and managed. Interestingly, the Forensic Regulator's Information on Legal Obligations itself, (published since the empirical part of this study), stated the legal provision for such meetings, but gave no guidance as to how these should be organised or managed.[26] Indeed, a significant number of interviewees suggested even that contact between opposing experts before trial was somehow 'illicit'.

The Criminal Procedure Rules state that the discussion should be court-ordered, however it was apparent from the preceding paragraphs that this was not taking place. As stated in *R v Henderson*, 'Generally, *it will be necessary* that the court directs a meeting of experts so that a statement can be prepared of areas of agreement and disagreement'.[27] Despite the fact that in *R v Reed*,[28] the judge decried excuses on the part of experts, that they didn't have time for such a meeting, the judicial will required, as reported by interviewees in the current study, appeared equally to be so far absent.

The question remained as to whether the absence of such pre-trial discussion was important. This study suggested that it was very important. Interviewees described great concern that DNA evidence had not been

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[24] The Criminal Procedure Rules 2015, pt 19.6 (2).

[25] *R v Henderson* [2010] EWCA Crim 1269, [2010] 2 Cr App R 24 [210].

[26] Forensic Science Regulator, Legal Obligations, FSR-I-400, Issue 3, 2015, [8.21].

[27] *Henderson* (n 25) (italics added).

[28] David Reed, Terence Reed, R v Neil Garmson [2009] EWCA Crim 2698 WL 4872664, [131] (vi).

properly understood in court. Interviewees indicated that, in the absence of information regarding the context in which the DNA evidence was being adduced, it was impossible for them always to be sure what the issues at dispute were, never mind to be able to give accurate evidence probative of that. It is hard to imagine a type of expert evidence for which a pre-trial discussion of opposing experts would be more useful. As stated in *Henderson*, 'Absent a careful record of the true issues in the case, it is difficult to see how the trial can be properly conducted or the jury properly guided as to the rational route to a conclusion.'.[29] It may be convincingly argued that this was never less important than for DNA matches.

Previous studies, including Roberts, Wheate, Henderson, Sallavaci, and others, have consistently reported limited, or no, contact with counsel prior to the trial itself.[30] Indeed, first contact has frequently been reported as being when under examination. Even in studies of lay witnesses, such as in the Franklyn[31] and Hamlyn[32] studies, contact between witnesses, including victims even, and counsel has generally been attenuated or absent. Previous studies have concerned themselves, largely, with expert evidence in general. It might have been expected that, with the great complexity of DNA evidence, counsel may have a need for greater contact with their expert, however, the findings reported in this chapter showed that this is far from the case. Even in high profile cases, contact between expert and counsel appeared minimal. Interviewees reported that contact might typically

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[29] *Henderson* (n 25).

[30] Roberts Study (n 11) 57 – 63; Rhonda Wheate, 'Australian Forensic Scientists: A View from the Witness Box' (2008) 40:2 Australian Journal of Forensic Sciences 126 (Wheate Study); Emily Henderson and Fred Seymour, 'Expert Witnesses under Examination in the New Zealand Criminal and Family Courts' (The Law Foundation, New Zealand 2013) ch 3 para 3.1.3 (Henderson Report); Oriola Sallavaci, *The Impact of Scientific Evidence on the Criminal Trial: The Case of DNA Evidence* (Routledge 2014) 77.

[31] Ramona Franklyn, *Satisfaction and Willingness to Engage with the Criminal Justice System: Findings from the Witness and Victim Experience Survey, 2009–10* (Ministry of Justice Research Series 1/12, February 2012) para 3.3, 26-27.

[32] Becky Hamlyn and others, 'Are Special Measures Working?: Evidence from Surveys of Vulnerable and Intimidated Witnesses' (Home Office Research Study 283, Home Office Research, Development and Statistics Directorate June 2004) 45.

be just for a few minutes outside the court room, and, often, there might be no contact at all before the expert was called to testify.

Interviewees expressed frustration at often not understanding lines of questioning that they were subjected to, and not being asked the questions that they believed would draw out the 'right' evidence. Most interviewees stated that they found the experience of examination by their own counsel much more difficult than cross-examination, simply because they understood the line of questioning that defence presented them with. In the Roberts Study, it was reported that experts attempted to gather case information through informal channels,[33] however there was no evidence of this occurring in the current study. From the defence perspective, experts did not state such concerns, possibly reflecting the report in the Roberts Study that defence teams apparently worked as a more coherent unit.[34] One prosecution interviewee in the current study reported that they tried to 'trip up' counsel outside the court, however, this could certainly be described as dysfunctional in terms of a reliable expert-counsel discussion method.

The question arises as to the impact of such poor pre-trial contact between counsel and prosecution expert. This study would suggest the potential impact to be great. Interviewees pointed out the great and increasing complexity of DNA evidence, and the associated challenges of communicating this to a lay jury. For reasons of either simply lack of comprehension, or, on occasion, reasons of adversarial advantage, they reported examples in which, sometimes probative evidence had not been adduced, and, perhaps worse, non-probative evidence had been adduced. There was no apparent upside to lack of counsel contact. In the Roberts Study counsel stated that they might sometimes avoid contact on the basis that they did not want to be seen to influence the expert adversely,[35] however interviewees did not identify that as a factor within the current study. However, it seems true to say that lack of contact between expert and counsel can only detract further from jury understanding of complex DNA evidence.

In considering interviewees' experiences of appearing in the witness box, it should be borne in mind that many of the points raised applied only to the prosecution expert. As described above, not only did the defence expert

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[33] Roberts Study (n 11) 138.

[34] ibid 140.

[35] Roberts Study (n 11) 138.

enter the witness box less often, but, because the defence team appeared to work more consistently as a team, many of the frustrations described, below, by prosecution experts, did not apply. Regarding the general experience of testifying, interviewees with less experience reported that they found the experience to be very stressful, however this did appear to be more in connection with their anticipated appearance, rather than their actual experience under examination. In the witness box itself, most interviewees reported that they were treated respectfully and fairly, and were simply asked to read their report or to answer questions. A small number of defence experts did report, however, that they had experienced what they felt to be unfair questioning, which they perceived was aimed at undermining their qualifications and therefore credibility. In any case, all interviewees stated that they had never faced aggressive questioning, however some ascribed this to the desire of counsel not to appear to be unfair, rather than to any ethical consideration!

Interestingly, reports within the current study were at odds with reports in most other previously reported studies. For example, in Wheate, cross-examination was described as ‘gleeful, rude, sarcastic and offensive’.[36] In Henderson, experts described the environment as ‘very, very threatening’, ‘intimidating’, and ‘distressing’,[37] with experts unwilling to appear unless necessary. Studies of lay witnesses, too, have reported the trial process to be difficult for the witness, being described as ‘terrifying’, ‘intimidating’, ‘confusing’ and ‘stressful’ in the Riding study.[38]

DNA evidence is scientifically rigorous, unlike most other forms of expert or other evidence. The fact that, on this basis, it presents a ‘harder target’ than more subjective (for example, medical), evidence, may be a contributory factor in explaining the generally easier experience reported by this study’s participants. However the explanation is likely to be multifactorial.

Most interviewees stated that they found cross-examination to be easier than examination in chief, because, they stated, the line of questioning was clear to them. In a significant number of cases, interviewees reported that lines of questioning were unclear, and it was not always clear how far they were expected to go, or, with open questions, what was expected of them.

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[36] Wheate Study (n 30).

[37] Henderson Report (n 30) ch 2 para 2.2.1.

[38] Allison Riding, ‘The Crown Court Witness Service: Little Help in the Witness Box’ (1999) 38.4 The Howard Journal 411, 411.

Also, they sometimes found that lines of questioning sometimes abruptly terminated without apparent resolution. Interviewees presented a number of explanations for this impression. There were clear examples, in their opinion, of cases in which it had become obvious that counsel did not understand the evidence; in other cases, it appeared that counsel was using the DNA evidence for adversarial effect, for example, by implying it had greater significance than it actually did. Beyond this point, however, interviewees simply assumed that the questions must have had a significance to the case, for reasons to which the expert was not privy.

Whether interviewees felt that counsel had not allowed them to present the DNA evidence in a clear way; whether they felt that counsel had deliberately (and sometimes illegitimately) used the evidence for adversarial gain, or whether they felt that defence cross-examination had not adequately exposed flaws in the evidence, interviewees shared great concern that DNA evidence was not properly presented to, or understood by the jury.

These findings closely mirrored those from previous studies. In Wheate, it will be recalled that forensic scientists suggested that counsel appeared incompetent in terms of examination and cross-examination, however suggested that sometimes this apparent incompetence appeared deliberate (for example, to leave a false impression in the jury's mind).[39] A very similar finding was reported in Henderson, in which medical experts reported similar apparent incompetence, especially stating that, in their opinion, important evidence had not been elicited.[40] In the Roberts Study, interviewees reported finding themselves drawn into counsel's adversarial strategies against their will. Interestingly, in studies of lay witnesses, similar findings were reported. In Hamlyn, for example, 57% of witnesses stated that they were unable to say everything that they would have liked.[41]

All interviewees stated that they would have (and had had) no hesitation in correcting any misunderstandings regarding their evidence, whilst under examination, but stated that this confidence came with experience. Again, this closely mirrored the findings in previous studies. For example, in both the Roberts and Henderson studies, interviewees reported that the confidence to challenge came with experience.[42] In any case, however,

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[39] Wheate Study (n 30) 131 – 132.
[40] Henderson Report (n 30) ch 3 para 3.1.3.
[41] Hamlyn (n 32) 51.
[42] Roberts Study (n 11) 36; Henderson Report (n 30) para 3.4.2.

interviewees within this and previous studies stated that their major frustration was the inability to clarify when they were not in the witness box, and feared for the use to which their evidence would be put once they were not in court.

The picture that interviewees presented was one of 'navigating' their presentation of evidence in court, and its examination, attempting to answer questions in a way which was helpful to the court. Their tools to do this appeared limited in that they could sometimes only guess the reasons for the line of questioning, and appeared to place confidence in their reading of jury body language as a measure of jury understanding. As similarly reported in the Henderson study,[43] the current study expresses great caution regarding such a measure of comprehension.

Several interviewees stated that, where they felt that an important point had not been made, they considered that their duty had been discharged once they informed their counsel of this. Of course, the expert has a duty to their instructing counsel, under legal privilege, not to approach the opposing party or court with their party's strategy, but this is hard to reconcile with the concept of primary responsibility to the court, also under common law. It seems that either the expert genuinely feels that this discharges their responsibility, or simply rationalises it in this way as they recognise that they are powerless to raise points of their choice with the court.

Additionally, several interviewees stated that within court they would attempt to correct a perceived imbalance, where they felt that the opposing expert had not made the best of their case. They may even have waited until cross-examination, and planned how they would do this. *Prima facie* this might have appeared to be a method of remaining unbiased, in that both sides' cases were presented, however, this was arguably illegitimate in that the expert appeared to be usurping the role of the advocate.

Beyond their best efforts, it was the view of most interviewees that there was little they could do, and that the judicial system knew best what to do with their evidence. This apparent disengagement from the trial process is discussed in detail in the following chapter.

This study has described substantial policy considerations concerning the admissibility, and reliable use of expert evidence. Procedural rules and case law have underlined the importance that legislative, judicial, and review

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[43] Henderson Report (n 30) para 3.1.1.

bodies have placed on unbiased and objective expert evidence. DNA evidence arguably provides a test case for the effectiveness of such provisions, in that it is not only highly complex, but also scientifically rigorous. The simple observation within this study, was that, despite these policy considerations and procedural rules, DNA evidence remained subject to the cut and thrust of adversarialism. The Roberts Study reported that experts found themselves caught up in a 'conflict-confusion' strategy adopted by counsel.[44] In the current study, DNA evidence did not appear to have presented an exception to this position. Whilst the Roberts Study concluded that "whilst some experts play the system, others are played by it",[45] unfortunately, the current study found that, whilst experts tried to play the system, they could only do so whilst in the witness box, and with limited apparent success on their own terms.

Pursuing the argument, quoted above, that many trial pathologies might be better understood as features of a functioning adversarial system, the findings in this chapter support a contention that some pathologies might be viewed in this way, however others appear genuinely pathological. For example, the fact that interviewees reported that they could only answer questions that they were asked, and sometimes felt that their evidence had been misrepresented, might, arguably, be seen as normal adversarial practice. However, if counsel had wilfully (as seemed the case to some interviewees) misrepresented the evidence, then this would clearly not be in the interests of a functioning adversarial system.

Similarly, the reported experience that experts did not have the opportunity for communication with counsel before the case, whilst apparently commonly reported in other studies, would appear to be counter-productive to a functioning adversarial system. It should also be recalled that many interviewees reported not simply answering the questions they were asked, but actively attempted to 'balance the playing field', even by looking for opportunities later in their evidence to do this. This was distinct from correcting a misunderstanding in their evidence, and can only plausibly be described as experts attempting to act as advocates, in pursuit of justice as they saw it.

Roberts suggested that, whilst pathologies might be legitimate features of a functioning adversarial process, this assumed that procedures were carried

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[44] Roberts Study (n 11) 142.

[45] ibid.

out correctly, and individuals understood and carried out their responsibilities correctly.[46] The findings in this chapter report some difficulties with that.

It is evident that the procedure for ordering and carrying out a pre-trial meeting of experts has not been properly understood by the judiciary, or the forensic experts. Regarding pre-trial communication between experts and counsel: whilst it might be regarded as inevitable that this communication is poor, due to the traditional late appointment of counsel, this is certainly counterproductive to the recent drive to streamline cases by early identification of issues at dispute. Regarding apparent poor understanding of DNA evidence by counsel and judiciary, whilst it might be argued inevitable that counsel and judiciary cannot (generally) be expert in DNA profiling, that is not to say that extensive training opportunities have not been offered to both these groups, but with poor take up.[47] Regarding both examination and the presumed safeguard of cross-examination, interviewees reported that they felt that this was sometimes ineffective in drawing out relevant evidence. Whilst counsel may be expected to act in the best interests of their clients, the fact that their primary responsibility is as ‘master of justice’ in service primarily to the court means that they should not wilfully misrepresent evidence.

The question remains as to whether DNA evidence is different. The conclusion that the current research reaches is that it is. There is a strong argument that the ‘residual’ pathologies described above (that is, the pathologies that cannot be argued to be adversarialism in action) are magnified in the case of DNA evidence. The absence of a pre-trial meeting between experts means that early identification of facts at issue is not carried out, so that complex but irrelevant DNA evidence may be placed in front of the jury; poor communication means that counsel may not be able to properly elicit relevant testimony; because of general poor understanding of DNA evidence, counsel may be able to inculcate misleading conclusions in the jury’s mind. For their part the expert may try to compensate for perceived misrepresentation of their evidence, despite the fact that acting as advocate on their part is not permitted

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[46] Paul Roberts, ‘Paradigms of Forensic Science and Legal Process: a Critical Diagnosis’ (2015) 370 Philosophical Transactions of the Royal Society B 1, 9.

[47] Sallavaci (n 30) 134.

Not least is the fact that DNA is qualitatively different from any other identification evidence in that, somewhat paradoxically, it cannot uniquely identify an individual. In being obliged to be rigorously scientific, the expert must testify in terms of hierarchies of propositions, and statements of strength of evidence expressed in probabilistic terms. The magnification of the effect of the pathologies by the immense increase in scientific complexity leads this study to conclude that DNA evidence is different on that basis.

Chapter 7
Science and Law – Incompatible Discourses?

7.1 Introduction

Whilst much has been written about the philosophical and theoretical differences between science and the law, this chapter seeks to describe interviewees' experiences and perceptions of the practical manifestation of the interface between the forensic expert with his scientific evidence, and the reality of the trial.

A number of distinct, and, at first sight, disparate, areas are considered in this chapter. A common thread binds these together, for, in each area, the chapter describes experiences in which either the world of the forensic scientist meets the world of the court, or the scientific rigours of forensic evidence meet the legal rigours of adversarial examination.

First, this chapter reports findings regarding observations and opinions on the way in which DNA evidence was presented in court. Forensic experts' observations and opinions regarding these developments were of particular interest in this regard because of recent rulings that have admitted subjective opinion on DNA match evidence.

Next, the chapter reports findings regarding interviewees' rationalisation of both their relationship with the court, and of events which, to them, presented challenges that they felt unable to resolve.

The chapter moves on to consider findings regarding interviewees' opinion regarding the degree to which forensic experience (as opposed to evidence of scientific observation) was, and should be, admissible in court. This was of special interest because of recent cases in which prosecution and defence experts had taken distinctly polarised positions on this question.

Lastly the chapter reports rather unexpected findings regarding the degree to which forensic experts both found themselves engaged, and engaged themselves, with the judicial process as a whole.

7.2 Flawed Presentation of DNA Evidence?

As detailed in Chapter Three, the Court of Appeal in *Doheny*[1] stipulated the method by which DNA evidence should be presented in court (the '*Doheny* direction'). One might have expected that, because of the significant technical development in DNA profiling since this ruling (some seventeen years before the current study), the *Doheny* direction may have become superseded. This might have been particularly expected in light of the fact that the direction has been widely regarded as being flawed, even meaningless, from a scientific perspective, since its inception.[2] On that basis, expert opinions as to the continued use of the *Doheny* direction, were of great interest.

Regarding the presentation of simple DNA matches, The Royal Statistical Society Guide to Statistical Evidence recently suggested that there had been a *de facto* move towards the use of likelihood ratios (the 'correct' method of presentation according to scientific commentators) by some experts.[3] No evidence was found for this within this study. Interviewees reported that during examination they were typically led through their written report, which was routine and based on accepted formats, compliant with the *Doheny* direction, and standardised within their organisation. The exact format suggested by *Doheny*,[4] in which it was suggested the expert may relate the statistics to the number of potential perpetrators ('… probably only four or five white males in the United Kingdom… .'[5]) was no longer given because this had been superseded by the large random match probabilities now attached to DNA matches. Standard statements for investigative purposes still contained bracketed sections containing adjectival statements of

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[1] *R v Doheny* [1997] Cr App R 369.

[2] For example, IW Evett, 'DNA profiling: a discussion of issues relating to the reporting of very small match probabilities', Criminal Law Review, 2000, 355 Mike Redmayne, *Expert Evidence and Criminal Justice* (Oxford University Press, 2001) 71-74; A Semikhodskii, *Dealing with DNA Evidence: a Legal Guide* (Routledge Cavendish, 2007) 135; Roberto Puch-Solis and others, 'Assessing the Probative Value of DNA Evidence: Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses' (Royal Statistical Society, 2012) paras 7.1 – 7.3.

[3] Roberto Puch-Solis and others, 'Assessing the Probative Value of DNA Evidence: Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses' (Royal Statistical Society, 2012) para 7.4.

[4] *Doheny* (n 1).

[5] ibid 4.

strength of evidence, however, in compliance with *Doheny*,[6] these sections remained marked for removal if the statement was to be used at trial.

> Int4: The match probability statement does… within small variation, tends to be quite straightforward and everyone tends to say pretty much the same thing. I think just historically it is just accepted by the courts, why vary from it.

The simple explanation that presented itself as to why there has been no 'practical drift' from the *Doheny*[7] standard statement, was given by the interviewees as due to the fact that simple DNA matches were rarely, if ever, challenged:

> Int19: … there are four basic questions in a criminal trial, whose DNA is it, what biological material did it come from, how did it get there and when did it get there. The first two now seem to have almost disappeared in terms of contested issues at a trial.
>
> Int4: I don't know of many… defence that will try and argue (that) a full profile isn't from that person, … I can't think of an example.

In the case of DNA mixtures and partial profiles, it is not possible to state a random match probability using the *Doheny* direction, however interviewees stated that the generally accepted interpretation of *Doheny*[8] was that where a random match probability could be calculated, then this was all that could be presented in court, without additional explanation of the meaning of the figures (compared with other forms of forensic evidence in which a sliding scale of adjectival descriptions was used to indicate strength of evidential support for a proposition). They might have given an opinion on other related matters (for example, an opinion as to the meaning of a blood spatter pattern from which the DNA sample was extracted, or opinion concerning an activity), but were prohibited by the *Doheny* direction from expressly or implicitly giving their opinion as to whether the defendant left the crime stain.

This was generally perceived as being a problem, as interviewees expressed concern that juries might be unable to understand the meaning of a random match probability in relation to DNA mixtures. This was especially

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[6] ibid.

[7] ibid.

[8] ibid.

so because the statistical figures for mixtures fell far short of the standard one in a billion quoted for straightforward matches.

> Int9: … if it is a poor partial then you may have statistics down to… the thousands, tens of thousands… . Yeah, it is difficult, and I do feel for the jury because it is a difficult concept… .

> Int7: If that result is critical, if you haven't got any other DNA in the case, and that result is critical, then that will become an area of contention and debate and you will see that in the courtroom. The poor jury must… well, you feel for them sometimes. … then it is very dangerous to leave it in the court's hands to try and assess what that means.

Another concern expressed regarding the *Doheny* direction was that interviewees felt that it was sometimes misapplied. For example, one interviewee stated that they had been prevented from evaluating unrelated, but in their belief, probative, evidence on that basis:

> Int10: So one of the pieces of evidence there, I was trying to do a verbal evaluation, but the prosecuting counsel wouldn't let it be presented because he said it contravened the *Doheny*… ruling.

(It should be noted that this is not true on the simple stated facts. Although the expert may not verbally evaluate the DNA match probability, they may do so for other aspects of the evidence. In *R v Reed*, for example, a verbal evaluation of the likelihood of DNA transfer was admitted[9]).

It was suggested also that forensic experts erred on the side of caution in not verbally evaluating evidence on the basis that it might be disallowed:

> Int7: … the Doheny… ruling said that the scientist isn't allowed to give an opinion of where the DNA comes from… and so for that reason scientists generally would not verbally evaluate a result because it was felt that it would be thrown out, so where is the value in doing that?

Interviewees generally reflected the well-rehearsed arguments that the *Doheny* direction was flawed, a number stating that in many ways DNA experts have been in a limbo ever since:

> Int4: Well, *Doheny* I think has actually… locked us in for years. So in the past people wouldn't use you know 'support for the assertion' when it came to DNA evidence because of

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[9] *R v Reed* [2009] EWCA Crim 2698, [2010] 1 Cr App R 23.

> *Doheny*, *Doheny* said you should do match probability and nothing else.

Interviewees reported that they were increasingly asked to testify as to more complex DNA analyses:

> Int7: It is when you are dealing with mixtures, it's when you are dealing with low level, low template stuff, you do a lot of enhancement techniques, low copy number techniques… attribution of a mixture to an individual, and then the subsequent… there is layers, so you have your DNA profile, you then have your attribution of a DNA profile, for body fluid, you then have your interpretation of the DNA profile as to how… the DNA or that body fluid could have got there. And it is as you get further down the tiers, that is when (there is) less understanding.

Interviewees unanimously expressed concern regarding how they should express such increasingly complex DNA evidence. In particular, they expressed concern at recent cases, culminating in *R v Dlugosz*, in which the court had accepted subjective evidence regarding the DNA match itself.[10]

> Int2: And you know there is a certain clash of cultures between science and the law I think which is understandable you know. … But I think the confusion isn't being helped by what I think are some illogical decisions… .

The current view of commentators, and of all interviewees regarding the meaning of the precedent in *Dlugosz*,[11] was that, where a statistic could not be calculated, the expert may be permitted to give their subjective opinion on the meaning of the evidence based on their experience and not based on a scientific database. One interviewee referred to such evidence as a 'Dlugosz statement', and it may be surprising if this terminology does not gain wider acceptance.

The decision in *Dlugosz*[12] was highly significant, both in practice and in principle: the advent of DNA profiling was hailed as a 'new paradigm' in that, for the first time, scientific evidence could be presented in a statistically significant, quantitative form. *Dlugosz*[13] appeared to erode that principle.

It has been argued that, the key danger concerning this, is that such subjective opinion may be prejudicial in favour of the prosecution. One

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[10] *R v Dlugosz* [2013] EWCA Crim 2, [2013] 1 Cr App R 32.

[11] ibid.

[12] ibid.

[13] ibid.

interviewee with a special interest in this area underlined the dangers of relying on subjective experience in the absence of a database:

> Int13: … where scientists are starting to report complex mixtures where no statistic can be produced but they are giving some sort of subjective view, not based on data… but based on their experience. … That to me is we are getting into very, very dangerous territory.
>
> Int4: … but not all scientists have that much experience (of complex DNA samples). If you are asking someone that has been reporting for two years their opinion on, you know, the likelihood of something, they may have seen lots and lots of DNA profiles but 95% of them might be clean, full profiles. How many of these really difficult complex mixtures have they actually seen?

Many interviewees expressed concerns, in general, as to precedent controlling their reporting of DNA evidence, particularly regarding these recent developments. These concerns may be summarised as, firstly, the limitations placed upon the expert by *Doheny* in evaluating more complex DNA evidence in court (which experts believed meant that the jury did not have sufficient information), and, secondly, uncertainty regarding implications of new precedent set down in recent cases, which allowed expert witnesses to testify beyond the simple match probability statement specified in *Doheny*. It will be recalled that in *R v Weller*, opinion evidence was admitted regarding DNA transfer, in *R v Broughton*,[14], evidence was admitted regarding Low Template DNA evidence despite the fact it was below the 'stochastic' level below which it had been legally accepted as reliable,[15] and in *Dlugosz*,[16] for the first time, opinion as to whether there was a DNA match was admitted, despite the lack of a statistical calculation.

That the challenge could only get greater was without doubt according to interviewees, due to advancing technology. As an example they pointed out that new seventeen-marker tests, because they target more DNA loci, are more sensitive and theoretically allow greater individualisation. The practical result, however, will not be that in practice more individuals could be eliminated from a match (because already in practice if an individual matches at one in a billion, they usually do not argue that the DNA is not theirs), but instead will mean that more samples will be determined as

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[14] *R v Broughton* [2010] EWCA Crim 549.

[15] *Reed* (n 9).

[16] *Dlugosz* (n 10).

mixtures, rather than simple DNA matches. This means that more analyses will be based on statistics revolving around partial profiles, mixtures, and inevitably lower amounts of DNA. Thus ‘Dlugosz statements’ are more and more likely to become commonplace.

A question voiced by interviewees was as to *when* the court may override *Doheny*[17] and allow a ‘*Dlugosz* statement’. In *Reed*,[18] the court determined an absolute level (the ‘stochastic’ threshold) below which the quantity of DNA present meant that a statistic could not be determined. Interviewees were uniformly critical regarding this, pointing out that this level was arbitrary, and that it was possible to have a high quality sample below this level, and a low quality sample above it. Their concern was therefore that high quality DNA evidence that was capable of statistical analysis could potentially be presented as a qualitative opinion, and that, conversely, low quality evidence could be presented in the form of an unreliable random match probability.

Of concern, three interviewees mentioned situations in which a statistical calculation was potentially possible, but was not carried out. The expert was thus able to give a qualitative, subjective opinion. These examples will be discussed below. They are significant because, whether deliberately or not, these point to potential pathways by which the rigorous statistical requirement of DNA might be bypassed, and subjective evidence, arguably prejudicial in favour of the prosecution, may be introduced.

The first example was where an interviewee stated that sometimes a statistical calculation might not be commissioned:

> Int22: If no calculation is possible, or one is not commissioned, then the scientist is now allowed to provide a qualitative opinion.

On being asked for clarification as to why a calculation might not be commissioned, Int22 pointed out that although a calculation was routine for standard samples, where a specialist calculation was necessary, this would not be commissioned by the Forensic Service Provider, but would have to be separately commissioned by the Police. They would not do this for financial reasons, and because they did not have to, given that a subjective opinion was now allowed. The question arose as to where the incentive would be to commission an additional analysis, when the one they had was more

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[17] *Doheny* (n 1).

[18] *Reed* (n 9).

favourable to the prosecution. Int22 stated also that there could be two reports:

> Int22: Sometimes two reports are served, one with a specialist calculation and another from the original scientist with a qualitative opinion under *Dlugosz*. The CPS commission the second report for use in the event that the specialist calculation is not admitted, either because of legal argument or because of the late submission of evidence.
>
> … So it is possible that a result would be too complex for the standard procedure but that no specialist calculation is requested and only a qualitative *Dlugosz* report is produced. I'm not sure whether this would be in an attempt to avoid the implications of the *Doheny* ruling though… .

When asked to elucidate, Int22 stated that prosecution and defence counsel in this case had agreed not to present the statistical evidence on the basis that it was too complex and difficult to lead or cross-examine, but instead rely on *Dlugosz*[19] to present a subjective opinion. *Prima facie* this appeared to run counter to the *Doheny* direction. Whether *Dlugosz*[20] did indeed supersede the *Doheny* direction (notably Int22 stated that some lawyers told her that it did), it is still to be determined under what distinction it could do this.

The second example is where the defence expert could see no technical reason why a statistic could not have been produced by the prosecution expert:

> Int13: … just recently in this court … (the expert did not) produce a statistic, which she (could) have quite easily, and I am really still not sure why she didn't… . But for whatever reason, whether it was a confidence with stats or mixtures or whatever she didn't feel able to do a statistic, well what that meant was that you can forget about *Doheny*… because there wasn't a statistic, and all this more recent case law… seemed to allow her to… give… some sort of (subjective) description about what the profile was and it has kind of opened the door… to us talking in a very dangerous way about profiles that are not of a great quality and potentially talking them up in a way that is misleading.

It may be noted that these interviewees did not suggest underhand reasons why statistics might not have been produced. This may not have been

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[19] *Dlugosz* (n 10).

[20] ibid.

deliberate in these cases, however with the increasing complexity of DNA evidence the potential to deliberately avoid the *Doheny* direction by imagining difficulties with analysing the evidence must not be overlooked.

Int4 reflected a general sentiment that could be described as the doors being opened, but experts not knowing quite what to make of the outside world:

> Int4: So people just didn't (go outside *Doheny*) and I think that is why now to a certain extent we are so uncomfortable about moving from that safe zone, because we have always said you can't because of *Doheny*. And now it has almost opened up a world to us and people go oh we don't know what to do about that.

A significant qualification applies to the foregoing discussion regarding recent case law. It might have appeared that interviewees were expressing concern regarding the principles behind recent precedents. This was, indeed, true for some interviewees, particularly those with a special interest in the area. However, the underlying concern for the majority of interviewees was not principle, but rather concern as to how exactly they were supposed to present complex DNA evidence.

Indeed, the strongest view regarding precedent, held by many, was simply that someone (the Forensic Science Regulator was commonly suggested) needed to take control and tell forensic experts what they should do, perhaps issuing guidance in the form of a standard. (After the current study, the Forensic Science Regulator produced an 'Information' on legal guidance for forensic practitioners, however this still constitutes only a summary of legal rulings, and not a mandatory, or even advisory approach).[21]

A significant number of interviewees also referred positively to the potential application of existing mathematical algorithms to complex DNA data:

> Int7: … (with) service providers… we will have different statistical models being presented in court, which will then mean there is lots of statistical arguments at court which is just far too complex for a jury to understand. There should be established ways before it gets to court of… how we should be presenting it.

> Int7: … what we really need is a package where… it doesn't matter what you are putting in there it will give you statistics.

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[21] Forensic Science Regulator, 'Legal Obligations' (FSR-I-400, Issue 3, 2015).

> The mathematics works… that is possible, it is just having somebody take control of that and standardising it.

That is to say, the view was that there was always a scientific calculation that could be done, albeit highly complex, and this should not be compromised by the judiciary.

> Int13: … potentially I suppose if we can get the Regulator to issue some sort of edict, a quality statement about some sort of standard that ought to be presented and that might be helpful… I am thinking particularly about DNA evidence and particularly about when you can't produce a statistic. You know because when you can't, I think we are entering dangerous territory… '

Many experts did not believe that, other than for simple matches, DNA evidence was well understood:

> Int25: … it will just be a small but very crucial element of either your wording or something or about how it is situated in the context of the case, and they don't quite understand that overall meaning… because they do admit or agree so much evidence beforehand to make sure that what is being heard in court is only the parts that in contest, that sometimes small errors are made.

> Int2: … when you speak to some of the lawyers… you know you start talking about data and they think they've grasped it and then their eyes glaze and they just sort of switch off you know.

> Int14: … another scientist… would completely understand it. But to try and get that across to a lay person or a jury or a barrister can be really difficult… .

In summary, perhaps surprisingly, the *Doheny* direction regarding the presentation of DNA evidence, was still applied for simple DNA matches and the general opinion was that the situation was satisfactory on the basis that, although the expert could not go further in their explanation than the match statistic, at least there was a clear instruction as to how they should report and testify.

Regarding the reporting of more complex cases, however, interviewees expressed concern, less about scientific principle, but more that they had no clear guidelines on how they should report or present evidence. These complex cases included complex DNA samples, but also cases in which the hypothesis level was unclear. In the light of these factors, and as reported in

Chapter Six, there was great concern that DNA evidence was not properly understood.

7.3 Rationalising Conflicts between Science and Law in the Court Room

The previous chapter discussed how forensic experts attempted to resolve perceived conflicts between science and adversarial process in the court room. It will be recalled, that interviewees reported that there were limits to the degree that they believed that this was successful. This section investigates the ways in which interviewees rationalised their contact with the judicial system in situations in which they felt that they had been unable to resolve particular conflicts.

In practice, conflicts were described principally by prosecution witnesses. It will be recalled that prosecution witnesses described their involvement in the case as being rather 'peripheral' with little explanation to them (other than in high profile cases) as to the details of the case:

> Int4: … you are probably sent a warning from witness care that says turn up on this day and then you turn up… Someone might come and have a chat with you, they might not… you tend to go give your evidence then go home… literally sometimes just before you are about to go in they might say so if I ask you this what are you going to say … and then you go in and they ask you and then that is done.
>
> Int13: But often what happens is you turn up, you don't speak to anybody, they call you up and they ask you a few questions and you go home.

The fact that defence experts did not report conflicts may be because they tended to be much more involved in the development of the defence case, and would be involved in the case, often sitting behind counsel to give advice.

The conflicts described by prosecution experts could be described as ranging from simple to complex, and were generally explicable within the context of the adversarial system. However, as described below, interviewees' rationalisations of such conflicts were somewhat surprising. A simple example of such a conflict was where the expert did not understand the significance of the evidence that they were being asked to give, or were asked questions on part of the evidence that they did not feel was important. Many interviewees rationalised that their part of the evidence was almost

always a small part of the overall evidence in the case, so that the evidence they were giving must have meant something to the jurors in the context of evidence that was not privy to the interviewees:

> Int22: … the thing is as a scientist you only ever know your little bit of the case. You know what seems important to you scientifically, you have no idea what has been going on in the background, what has been agreed, what the points that are important to the prosecution and the defence are. So yes, sometimes they focus on something that you think I didn't think that was the important bit, but clearly it is because they know what the background is.

On the same basis, they rationalised that counsel might lead them in a direction, whose rationale might not be apparent to them:

> Int6: I think it is also, remember, quite a small part of a big case, so whilst what we have looked at has been everything to us, that is actually quite tiny, and in some ways you do have to be led and guided by the court because we are just a small part of the whole picture.
>
> Int22: … the prosecution they know the background, you know scientifically, but they know legally what points they are trying to make.

Such a rationalisation seemed reasonable, as the expert had indeed not been involved in the wider case. However, interviewees also reported situations in which they felt that their evidence had been misrepresented. The previous chapter discussed the behaviours that experts reported in order to try to correct such misrepresentations, however, where they felt that they had been unable to correct a misrepresentation, they reported various methods of rationalising that. Some interviewees stated that in such a situation, they felt that their responsibility was discharged by passing their concerns to (their) counsel (emphases added):

> Int4: … if there is something that I think needs to go before that jury **I will tell the barristers**, and I will say I think you should ask me about this and this is what I am going to say to make sure it gets out.
>
> Int22: … Yes, I suppose it is difficult to know why didn't they ask me that when maybe there is a good reason to. Yeah **if you have pointed out to them that it is something they could ask, then it is up to them**.
>
> Int13: It is not in your hands you see, what I would do is once outside of court is to say **look we need to talk about this** and hopefully they will have time to spend five minutes

> with you… **You are a little bit powerless if the barrister isn't really interested in talking to you then there is not a lot you can do really**… But usually you just respond to the questions that you're asked. But yeah, you are really just at the mercy of what you are asked and **somebody else is in control of it all**, the barristers and the judge really.

The expert clearly has a duty under legal privilege not to disclose 'their' party's strategy to the opposing party, or indeed the court.[22] However, if the expert felt that an important point had not been made, for example an exculpatory explanation for evidence that that expert had presented, then it is hard to see, at least, how the expert could believe that this discharged their 'over-riding' obligation to act in the service of the court, over their obligation to party by whom they are paid .[23] Despite the fact that counsel is foremost a 'minister of justice' with primary responsibility to the court, they also have the responsibility of presenting their client's case as effectively as possible,[24] and may not see it as their duty or to their advantage to present evidence that weakens their own case. The failure to inform the court of a possible exculpatory explanation for the evidence presumably does not infringe the rule that counsel must not 'knowingly or recklessly mislead or attempt to mislead the court'.[25]

On the other hand, it is hard to see what other action they could take. As one interviewee stated, in response to this dilemma:

> Int25: I guess we could write a letter to the judge.

In summary, forensic experts, particularly for the prosecution, sometimes felt concern that the DNA evidence had not been properly understood. As described in the previous chapter, they reported specific behaviours on their part to try to ensure that their evidence was properly understood. However, the findings above describe two methods by which interviewees reported that they rationalised situations in which they were not clear that their evidence had been presented or used properly.

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[22] Derby Magistrates' Court, ex parte B [1996] 1 AC 487, HL.

[23] Criminal Procedure Rules 2015, pt 19.2.

[24] The Bar Standards Board, 'Handbook' 2nd edn, April 2015, 6.

[25] ibid.

7.4 Experience versus Experiment or Prosecution versus Defence?

Although DNA may be regarded as the ‘gold standard’ of forensic identification techniques, this does not mean that its forensic use may be regarded as purely objective. Interpretation of scientific results, such as a DNA match, can only take place within a framework of circumstances. The expert’s typical role in court has been described as assisting the court with an evaluative opinion on the usefulness of scientific observations.[26] Int16 gave an example of a case in which a suspect’s DNA was found on a drug wrap, and this evidence was presented in court. On the simple facts the DNA evidence had little or no probative value as the wrap was found in the defendant’s pocket, however, counsel did not seek to mention this. This may not have needed expert opinion to understand, however complex issues, such as DNA transfer, certainly need expert evaluative opinion. As an example, the question arose in *R v Weller* as to whether the alleged victim’s DNA, found underneath the accused’s fingernails, could have been transferred there by digital penetration.[27] This is where the challenge arose: in the absence of research, and appropriate resulting data, the expert had nothing to base their opinion on except ‘experience’. As will be seen below, the law had no problem with such subjective evidence, however disagreements existed between forensic experts as to the value of such expert ‘experience’. Surprisingly, these disagreements appeared to be polarised between prosecution and defence.

It is worth expanding briefly on the distinction between ‘experiment’ and ‘experience’, by recounting an example given by one interviewee: if one had turned on an electric light switch, then one’s experience was that the light came on. This was experience, but it could almost certainly be proved experimentally, (that is, scientifically, within a statistically significant number of trial turnings on). Equally, if one pressed the crossing button at a Pelican crossing, experience may suggest that this caused the crossing light to turn to green. Scientifically this may not have been true, however, as many crossing lights (perhaps surprisingly) are not engaged directly with the pedestrian button, and respond at certain times of day solely to a timed

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[26] Charles EH Berger and others, ‘Evidence Evaluation: A Response to the Court of Appeal Judgment in R v T’ (2011) 51.2 Science & Justice 43, 44.
[27] *R v Weller* [2010] EWCA Crim 1085.

cycle. ‘Experience’ does not live up to the rigour of scientific method, in other words.

It has been suggested that courts may be unable to tell the difference between ‘expert opinion’ and ‘scientific evidence’, even that anything stated by a scientific expert is logically ‘scientific’. However, scientific evidence requires experimentation to prove a hypothesis. In its absence ‘then the ‘evidence’ is speculation’.[28]

This does not eliminate the value of evaluative opinion, but requires that the expert is clear about the assumptions associated with their opinion. This study, however, showed a surprising result, in that prosecution experts were confident in the value of their ‘experience’, whereas defence experts expressed a strong confidence in scientific method over that experience, doubting the value of opinion based purely on experience. It is worth pointing out that the Court of Appeal has endorsed the evidential superiority of ‘day-to-day’ ‘practical experience in DNA over ‘scholarship’ and ‘academic activity’.[29]

Perhaps surprisingly, most prosecution interviewees expressed similar views regarding the value of experience versus experiment. Whilst accepting that in any specific case no scientific experiment could prove that, for example transfer of DNA, could have occurred in a certain way, all believed that their experience, and familiarity with the subject area, was sufficient basis for their opinion on the likelihood of such transfer, especially when backed up with discussion with colleagues:

> Int19: … it is going to be a little bit subjective because it is going to be based on your previous casework experience, and the more casework experience you have I guess the broader view you have, but you are still never going to have seen everything. … And there is no getting around the fact that people’s experience will vary, different experts’ experiences will vary, but what I think is really important is have some discussions with your colleagues about it, this is what certainly I do when I am interpreting and what my colleagues do. And certainly when I am doing work at <<private institution>> there are lots of casework discussions go on … So rather than deciding in isolation

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[28] Peter Gill, *Misleading DNA Evidence: Reasons for Miscarriages of Justice* (Elsevier, 2014) para 1.4.1.

[29] *Weller* (n 27) [26 – 27].

> what your opinion is, of course you are going to ask your colleagues what do they think… .

Critics may suggest that apparently informal discussion with colleagues did not equate with the scientific concept of 'peer review':

> Int4: …but it has been peer reviewed by someone that comes from the same lab and has often had the same training …; whereas if you get scientists from somewhere completely different you are more likely to get a different opinion. It is also meant to be based on the experience of the scientist, which is fine… .

Interestingly, even interviewees, such as Int4, who had explained the concerns regarding the reliability of the data upon which such opinions were based, still maintained that experience to be useful to the court, and indeed superior to academic counter argument.

Additionally, and somewhat paradoxically, given the rigorously scientific basis of DNA evidence, several interviewees were positive (or believed others were) about the new found permission of the Court of Appeal for the expert witness to offer opinion under *Dlugosz*:[30]

> Int25: I think… the evaluative opinion, I think a lot of people were very happy when that ruling came out and thought of it as a great opportunity, but I think people are going be reined back in.

> Int1: … it is going to be a little bit subjective because it is going to be based on your previous casework experience… And I think that is fine if you are absolutely transparent in your statement and you explain how you have come to that conclusion … .

> Int9: … (N)ow there are some forensic scientists out there, but I think the tide is turning, that used to think well you can't statistically evaluate it therefore it means nothing. Well, I don't agree with that, and the latest judgment assists us with that… .

Int7 suggested that juries may not be capable of understanding the evidence without such opinion:

> Int7: DNA profiling is so sensitive now, the opportunities for transfer are greatly increased, and so unless you have experience of understanding of what those transfers can be,

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[30] *Dlugosz* (n 10).

> what they mean, then it is very dangerous to leave it in the court's hands to try and assess what that means.

Defence interviewees were unanimously doubtful about the reliability of such opinion based on experience:

> Int17: I find that even within one firm, like within one company, one forensic provider, Crown provider, you can have a very similar case and a certain argument put by the Crown expert that is supported, and then on another case, like you have one case like that, and then very closely sort of back to back a completely separate expert but from the same company and they are almost arguing exactly the opposite, you know from a point of view of transfer and all this. That is the trouble, it is very personal, you know to say well I have seen these cases and that is my opinion. It is very hard to sort of standardise someone's opinion… .

Defence experts robustly defended scientific method over experience:

> Int12: … the reason people are doing forensic science is because they have seen it on the telly, because they want to solve crime. I don't want to solve crime, I want to do good science… it is actually very tedious and the work is done in your head, not at the bench and that is another thing you know the Crown keep trying to go on 'so you don't actually do this every (day)?'… no I don't… what would I learn from pipetting liquids from one tube to another?
>
> You know when I am challenged with this kind of 'but you are not an expert in that area' I come back with well I am not an astrologer but I feel quite competent to tackle the lack of any backing for astrology.
>
> Int2: … a cynical view (is that) those at the top don't want the boat to be rocked in any way even though the science is saying it should be rocked. Or alternatively it can just be you know they don't really understand how science can be used and how science works.

On one level, such comments could be argued to support the notion of a 'rational' defence expert and an 'irrational' prosecution expert, however, such a polarised view was less surprising when viewed from the point of view of presenting the most persuasive prosecution and defence cases (although it remains hard to reconcile with the notion of the 'unbiased expert'): most cases hinge on how the DNA came to be at the crime scene, rather than whose DNA it is, and the only evidence that can support this is expert 'experience'. However, viewed from the defence point of view, attacking the scientific basis of the prosecution case is a logical approach:

defence experts can generally show defects in science beyond simple DNA matches, especially given the lack of scientific data existing on, for example DNA transfer.

Illuminatingly, the experience versus experiment argument has shown itself to be more than academic in practice, with prosecution and defence experts taking generally strongly polarised views on the subject. In the earlier chapter on the relative roles of prosecution and defence experts, examples were demonstrated of apparent close identification of experts with their instructing 'side'. It may be recalled, too, that, particularly for the prosecution, experts sometimes expressed strong feelings about the 'other side'. The question of (prosecution) experience over (defence) experiment, provided further striking examples of this, with prosecution experts, again, conflating discussion of the validity of forensic laboratory experience over scientific principle with doubts about the competence and motives of defence experts:

> Int15: And it may be that one has just been doing this day in and day out for years and is thoroughly up to date with the literature, and knows their stuff and so on. And (for the defence expert) it is a bit of an academic hobby.

> Int16: It is almost not even scientific in a lot of situations, you know, they reel off qualifications that actually when you drill down into it mean diddly squat and will say whatever they think is a means to an end to muddy the waters, and are very defence biased.

Meanwhile defence experts did not attack prosecution experts on a similar level, however expressed frustration at attacks on their competence:

> Int2: And then other cross-examinations have been very persistent on you know my expertise or the way I do things or have done things as a way of trying to… they may not have had the opportunity to question my science but if they can undermine my credibility… .

> … the way they justified things was totally wrong but you know they didn't say I was an idiot but they just said that you know the other guy he's been at it for years.

The defence did not largely criticise the scientific capability of prosecution experts, however they did suggest that they were highly susceptible to conformation bias, and inflexibly aligned with the prosecution case.

These findings were curious. On the one hand, prosecution scientists demonstrated respect for the scientific approach, and acknowledged the lack of solid scientific data, on, for example DNA transfer, but, on the other, they

strongly supported the court's decision that forensic experience should take precedence over scientific expertise in the trial. Curious, too, were the personal attacks on the competence and motives of defence experts, particularly those who had not come from the 'prosecution school' of experts.

In summary, experts took highly partisan stances in regard to recent developments in case law, in which the precedence of forensic laboratory experience was established over scientific principle. Although a minority of prosecution experts expressed reservations over the value of 'lab-bench experience', the vast majority were confident in its superiority over purely scientific arguments. In this regard, however, prosecution experts conflated such lack of experience with strongly voiced suspicion of the competence and motives of the defence experts themselves, especially those who had come from the 'non-prosecution-school'. For their part, defence experts, despite expressing frustration that they believed the courts to have admitted unreliable evidence, did not hold such strong views regarding prosecution experts. They regarded them as 'institutional', inflexible, and over-strongly aligned with the single prosecution case, but did not impugn their professionalism.

7.5 Engagement of the Forensic Expert and the Court

In the previous chapter a 'trial pathology' or 'dysfunction' was reported in the form of a lack of contact between forensic expert witness and instructing counsel, and between opposing parties. This could be described simply as a 'communication' problem, however, in addition to this, interviewees expressed a lack of involvement, indeed 'engagement' with the judicial process as a whole.

Most of the following discussion refers specifically to prosecution witnesses. Defence witnesses were (where they had been called) much more closely involved with the case, often having provided advisory support for defence counsel. Having said that, and as detailed below, certain aspects of their behaviour still indicated a surprising detachment from the case.

Quite apart from mystification on the interviewees' part as to why they are sometimes not called to court even though they believe their evidence to be both important and complex, when cases did go to trial, many interviewees expressed frustration with the judicial 'machinery'. In many cases there was poor communication, short notice, excessive waiting time with little information, and generally a feeling of remaining uninformed:

> Int1: So we would ring up witness care or whoever it was to try and establish which day we would be required … it is usually day two or day three depending on the size of the trial … So there is lots of ringing up the day before to make sure it is the next day that you are required, usually it is get there at ten o'clock. Sometimes they then move that so they'll ring you that day we don't need you tomorrow, could you come the day after… .

The majority of interviewees stated that, very frequently they had no contact with counsel before arriving at the court, and might even have had no contact before appearing in the witness box.

> Int25: 99% of the time there is little or no communication until the day you are at court and they ask for you to get there an hour before…most of the time (I meet them for the first time) on the day and sometimes you might not even (have spoken) to them beforehand at all, when you first walk in and start answering questions for them. Yeah, it can be really limited actually… .

> Int19: … half the cases I go to you meet them on the morning that you are going to do and that is even in serious cases…I did a murder trial and … the first time I met the barrister you know I had five minutes with him and he said I am going to call you in and ask you these questions and that's it. You know be prepared to explain to the jury a little bit about DNA profiling blah blah blah… .

> Int7: Other times it is not a very nice experience, it's like a factory line you just go in, give your evidence, leave.

Interestingly, and somewhat surprisingly, several interviewees went further, reporting that they felt sometimes deliberately belittled by the legal system, or, at least, not accorded the expected respect:

> Int24: I think… pathologists are seen in a much higher regard … I have been sat outside court for two days, you will be next on, pathologist turns up: oh yes come in Dr so and so.

> Int5: … an expert is for the most part quite a big deal really in a Magistrates' Court. … in a Crown Court … you are kind of like oh he is another expert, in fact you are kind of a figure of derision probably.

Although, as reported in the previous chapter, experts attempted to apply certain strategies in court, and, as reported above, rationalised their experiences where they felt that they had not been successful, beyond this point many interviewees' views manifested a certain dis-engagement from

the judicial process. Put simply, this presented itself in the form of an acceptance that the legal system behaved in its own way and that was not the experts' concern, however illogical scientifically:

> Int2: … I hadn't even had the opportunity to debate the meaning of the science because (it was dismissed on a technicality)… (but)…you know scientists shouldn't tell lawyers and judges how things should be done because it is a legal process… .
>
> Int3: … you can't say a thing although you are listening to these howlers in court. You know that is the system.

Very interesting was a comment from an interviewee with many years' experience and court appearances, in response to a question regarding why a witness had been called in a certain circumstance:

> Int25: I don't know if this is just how Counsel prefer to proceed with evidence in court… or if it is more a matter of correct protocol.

The significance of this was that, *prima facie*, one might have expected that the expert, if not familiar with, was at least curious as to why a certain procedure had been followed in court. Arguably the lack of that knowledge or curiosity signals that the expert saw that beyond a certain line 'another country' existed which did not concern them.

Vivid examples of 'bafflement' were given by several interviewees who described circumstances in which facts agreed by the court were at odds with scientific or common sense reality.

In one example of this, defence's argument of self-defence was dependent on the identification of an individual. Despite the defence expert's insistence that the court had confused different people with similar names, the case proceeded on the basis of mistaken identity agreed by both prosecution and defence:

> Int25: But they totally misread the name, it was actually someone, a totally different witness that the DNA belonged to. It was about three or four times I said in the box I think you have got the wrong person, and they said no, no, we have agreed this. I think you have made a mistake, I really think you are wrong. And it wasn't until after I'd finished, and I even raised it with defence as well because they were making the play for self-defence, and no, it was actually another witness and a totally different guy who that DNA belonged to, and he was in prison at the time of the actual offence, so it couldn't have been.

Int25 explained that neither counsel was interested: the misunderstanding had been accepted by both parties as fact, and both were seeking to build their cases upon this false, but agreed, basis.

Int7 described a similar example in which a shoe provided scientific evidence for a blood spatter and DNA match, however counsel demonstrated the wrong trainer:

> Int7: So even when I came out and explained to him you have got the wrong trainer… it was just like you're a scientist, I am not interested. And that leaves you feeling like you haven't done your job properly, but it is frustrating because it is not your job to stand in the witness box and tell somebody how to do their job. It is just your job to answer questions and to put the information across, and you tell them at every opportunity what you can do, and that can get a little frustrating sometimes.

In another case, the interviewees expressed frustration that prosecution and defence had agreed the DNA evidence, but on a misconception, so that the expert was not asked to give any further opinion:

> Int25: … we have sort of told them that evidence can't be construed in that way. And then they have gone ahead and had that agreed with defence counsel, so why defence counsel allowed to be agreed and admissible, and that is it we don't get to comment any further on it. I guess we could write a letter to the judge. I have had though where they have sort of agreed evidence between the prosecution and defence and I don't think they have quite got the point of the evidence.

Given that the experts were only present for a part of each of these cases, they might not have been aware of relevant background context. However, it is not hard to understand these interviewees' puzzlement at such misrepresentation of their evidence, especially given that the misrepresentation is clearly (to them) nonsensical. Significant, also, is their observation that when they have had the opportunity to properly explain to counsel the true position, then counsel have not been interested. The experts' figurative 'shrug of the shoulders' at the legal system was, therefore, altogether understandable. More concerning, though, was interviewees' feelings that such confusions may have applied equally to the DNA evidence itself, which they were concerned was sometimes accepted and agreed on a basis which was not scientifically true. Despite the fact that Int3 (above) reported that on hearing similar misrepresentations they could do nothing,

interviewees pointed out that their key concern was how such misrepresentations might be argued when they were not in the court room.

As a clear indication of the degree to which interviewees ultimately disengaged themselves from the judicial process, the majority of interviewees reported that they did not usually even know what the outcome of cases were, in which they had been involved:

> Int25: No, it will be read about it in the paper sometimes. The good officers do… let you know, but I would say that is a fraction of the time, maybe like 25% of the time that you hear…, but definitely for the borough type cases you don't tend to hear. And the murder cases you tend to hear more often than not, so maybe 50% of the time, so no, never hear. You will literally hear about it in the paper or a colleague will come in and say oh did you know that… read it in the Metro this morning.
>
> Int1: I don't know what the outcome was of that case, we often don't find out what the outcome is.
>
> Int24: No, despite saying to the officers and things let me know, oh yeah we'll let you know, blah, I get the impression we are a small part of a lot of cases.

Interestingly, this dis-engagement was not necessarily unconscious:

> Int22: No, I find it very easy to detach myself from the case, hard to detach myself from the science but easy to detach myself from the case because I don't know the rest of it… .
>
> … Now I have no problem in thinking that that went well, the questions were reasonable, I think I answered them well, then that is a success and the verdict is irrelevant to that.

On the one hand, it may perhaps be understood that where scientific analyses had been rather routine, then report of that evidence may be seen as equally routine. On the other hand, however, experts may have been closely involved with the investigation and progression of a case, and in any case it might be supposed that the very reason why experts were called to court would have been where the evidence was more complex.

In view of this argument, this strikingly consistent reported dis-engagement from the judicial aspects of the trial was rather surprising. Even from the point of view of defence experts, who were brought in late in the process (that is, after the investigation and prosecution) to assess any weaknesses in the prosecution case, similar dis-engagement was demonstrated:

> Int23: Sometimes with these cases you don't know how they are going to go, often I send off my report and never hear another (thing), don't know what has happened in the case, nothing. Even when they send their payment they don't tell you what has happened in the case.

In Chapter Five it was reported that, particularly for prosecution experts, there was often strong association their side's case. This being the case, it might be seen as paradoxical that experts now seemingly displayed a disinterest in the outcome of trials in which they had been involved.

Two final comments by interviewees were illuminating. The first simply defines forensic science, but, crucially, differentiates it from other sciences:

> Int14: … being a forensic scientist is a bit weird, because you are master of lots of different sciences, but you are not a pure academic scientist, (in that you are not) … producing data.

The second commented on the decision in the courts to admit subjective opinion on DNA matches in certain circumstances:

> Int19: … now I thought they would make a special case for DNA … In actual fact they followed the other line… which say(s) basically well you're an expert, so even though you haven't got a statistical underpinning to this we are going to allow you to give your expert judgement as to the weight that this finding attracts, which is very antithetical to the whole DNA (principle). I thought they would go now you have always set your stall out to say you are going to do this statistically and now you are saying you can't so therefore we don't receive this and I thought they would take that and make DNA a special case. That would have driven forward the statistical working up the new methodology for statistical analysis of mixtures but they haven't, they have gone, alright well we will accept a softer approach.

Taken together, these comments are significant. Firstly, forensic science was clearly described as a purely 'reactive' science. The second comment, however, seemed to express not only a seemingly passing interest in a significant development regarding the use of DNA evidence, but also an implication that this was nothing to do with the forensic expert. This, perhaps, summarised the findings described above, that is, experts not only appeared to accept that judicial machinery used scientific evidence in ways that were apparently unscientific, but that forensic experts were happy to let them do that. In addition, they appeared to show little interest in the machinations of 'that other country'. Put rather bluntly, given that the only purpose of forensic science (within this context) is the investigation and

judicial disposal of crime, ensuring that the guilty are convicted and the innocent exonerated, forensic experts displayed startlingly little interest in ensuring that this was done.

In summary, any basic knowledge of the reality of the English legal system should have led one to the conclusion that the pivotal role of the forensic scientist portrayed within popular media (for example, the drama 'CSI'), did not reflect reality. Strikingly, this study showed that the involvement and engagement of forensics experts was less than might be even realistically supposed. This study uses the word 'disengagement' to describe the 'withdrawal' and 'detachment' that experts appeared to exhibit towards the judicial system. The term disengagement also implies 'apathy' and it would not be unrealistic to describe some interviewees' views as apathetic. It is important to add that this was not to forensic science, however, but to the court and judicial process.

7.6 Conclusions

There has been much academic comment regarding the relationship between science and the law. Walsh, in addressing the limited engagement of forensic specialists with legal aspects of forensic evidence suggested that forensic experts may have disassociated themselves because the law was more properly the domain of legal and social specialists.[31] Edmond suggested, however, that the relationship between law and science had failed, primarily because of a failure on the part of judges and lawyers to deal with expert evidence, and, that the forensic community, by 'look(ing) to courts (or law) for guidance, leadership, credibility or legitimacy'[32] there had been 'serious and endemic problems with many forensic sciences'.[33]

This study aimed to investigate experts' experience of the practical manifestations of the relationship between science and the law, and to determine the degree to which such academic criticisms might be supported. The findings gave some cause for concern.

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[31] Simon J Walsh, 'Legal Perceptions of Forensic DNA Profiling: Part I: A Review of the Legal Literature' (2005) 155 Issue 1 Forensic Science International 51.

[32] Gary Edmond, Mehera San Roque, 'Actual Innocents? Legal Limitations and their Implications for Forensic Science and Medicine' (2011) 43 Issue 2-3 Australian Journal of Forensic Sciences 177, 178.

[33] ibid 177.

Interviewees expressed concern regarding the *Doheny* direction, not for the ideological reasons given by its critics, but because it did not allow them to offer additional evidence to the court where they felt it necessary. On the other hand, interviewees stated that *Doheny* offered a practical solution, in that its requirements were relatively clear-cut.

Prosecution experts expressed concern regarding case law developments culminating in *Dlugosz*,[34] arguably allowing erosion of the 'gold-standard' nature of DNA identification. Yet, again, albeit with some exceptions, this was not for ideological reasons, but rather because of a lack of clarity regarding the way that complex DNA evidence should be reported in court.

Prosecution experts expressed concern regarding case law that allowed expert experience even to take precedence over scientific argument. Paradoxically, despite admitting that there were significant scientific limitations to subjective evidence of this sort, they suggested, almost unanimously, that their opinion should take indeed take precedence over scientific counter-argument.

On this matter, prosecution and defence experts adopted strongly polarised views, indeed, from a prosecution view expressing a sometimes strongly disparaging view, not only of the defence argument, but the motivation and even honesty of the witness themselves.

Prosecution experts had stated repeatedly that they often had little or no information prior to the case, for example details of the defence case, or issues at dispute, and were often confused as to the purpose of questions they were asked during examination.

Edmond suggested that the forensic community was passive in the face of judicial requirements. The current study, to the degree above, supports that assertion. An external observer could be forgiven for questioning why the forensic community did not actively seek information regarding cases in which they were involved, push back against the widely accepted limitations of the *Doheny* direction, and take a lead in determining how DNA evidence should be presented in the face of increasing complexity of evidence, and the forensic need to answer more complex questions.

If the evidence is that the forensic expert has taken a passive role in the trial process, then the question arose as to how the forensic expert rationalised this situation in practice. In this study, interviewees rationalised simple

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[34] *R v Dlugosz* (n 10).

conflicts (for example, why they had been examined on apparently irrelevant DNA evidence) as being because there were, presumably, parts of the case to which they were not privy. This seemed reasonable, however, it should be recalled, from the previous chapter, that whilst in the witness box, interviewees reported attempting to 'rectify the balance', where they were not sure that a point had been made. Viewed in this light, the rationalisation that 'they were not aware of the whole case' would seem to reflect simply a reaction where they did not feel that they been able to 'rectify' a perceived inaccuracy.

Echoing findings reported in the previous chapter, that interviewees found themselves to be poorly communicated with, they reported also a lack of engagement with them by the legal apparatus bordering, in some interviews, on disrespect. Whether or not the judicial process disengaged the forensic expert, or vice versa, this study showed, not only that the involvement and engagement of forensics experts was less than might be even realistically supposed, but, in many respects, showed an active and conscious dis-engagement.

It will be recalled from the last chapter that one expert stated that they found it easy to detach themselves from the case, but not from the science, stating that 'impartiality', to them, simply represented good science, and 'answering questions correctly'. Perhaps this rationalisation of the meaning of 'impartiality' solved a number of challenges. That is, finding themselves in a confusing environment under examination, this was one method of endeavouring to remain unbiased.

Of interest, too, was the striking 'disengagement' from the case itself, with most experts, even if they attended court, not knowing the outcome of their cases. Indeed, it was striking that interviewees expressed little or no curiosity in cases where they had *not* been called to court. They rationalised these cases in terms of an assumed guilty plea, or other resolution, or, simply, factors unknown to them. This seemed a weak justification, given that many had witnessed misuse of forensic evidence in court. As mentioned above, one interpretation of this disengagement was that experts were displaying perhaps, a praiseworthy, lack of bias. On one level, this may have been true, and on that basis it may have been considered paradoxical that the findings reported in Chapter Five described strong apparent association by experts with instructing parties. This is not incompatible with the proposal made in the preceding paragraph, however, that true impartiality might have been an impossible objective, given the exigencies of the adversarial

process, with experts' roles essentially thrust upon them. On that basis, again, the objective of delivering objective science may have been considered a practical aim in its stead.

Chapter 8
Concluding Remarks

8.1 Introduction

The aim of this study was to examine the presentation and examination of DNA evidence in the English Crown Court, from the perspective of the forensic experts who provide it. The central objective was to deepen understanding of the forensic expert's role and experience during the course of the adversarial criminal trial.

By using DNA evidence as its focus, this study aimed to focus on the interface between the forensic expert, offering scientifically rigorous proof, and the court, requiring legal proof of certainty. DNA evidence is the only forensic identification test to demonstrate rigorous scientific proof.[1] It does not offer legally rigorous proof of an offence because all evidence is contextual. Previous empirical studies including non-DNA forensic evidence have suffered a challenge in that the scientific validity of the evidence itself has been potentially at issue, thereby obscuring the true nature of the science – law interface.

Despite the significant intellectual effort devoted to expert scientific evidence, the perspective of the forensic expert has been largely ignored. This study set out to demonstrate, not only a new perspective upon the debate, but also one which was uniquely valuable in that it is required, by law, to be unbiased.[2] The methodology involved qualitative analysis of the perceptions and opinions of forensic experts, with data generated by semi-structured interview.

This study was defined by the adversarial nature of the English criminal trial, indeed, criticisms of expert evidence in the English courts have commonly been described as having their origins in detrimental effects of the

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[1] National Research Council of the National Academies, *Strengthening Forensic Science in the United States: A Path Forward* (National Academies Press, 2009) (NRC Report) 7.

[2] Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325 (2011)) (Law Commission Report) para 2.9; Criminal Procedure Rules 2015, pt 19.1.

adversarial trial system.[3] These effects have been summarised as being, first, claims of bias on the part of the expert witness, and, second, the result of various 'trial pathologies', that is, 'systems failures' in the presentation and examination of DNA evidence.[4] Strong arguments have been made, however, that many perceived pathologies may be equally viewed as strengths of the adversarial system (for example selective presentation of evidence).[5] On this basis, any *actual* pathology might be understood as a dysfunction in the correct working of the adversarial system, rather than the nature of the system itself.[6]

With this in mind, the current study sought to examine the role of DNA evidence within the adversarial system, rather than the established nature of the adversarial system itself.

A number of lines of investigation were suggested by the claimed detrimental effects mentioned above. First, the study investigated the degree to which the environment of the adversarial trial, and the assumedly partisan opposing parties, impacted upon the presumed intention of the expert witness to remain unbiased. The study also aimed to identify what forensic experts understood by their responsibility to remain unbiased; it aimed to answer the question of how 'prosecution' and 'defence' experts perceived their duty of giving objective and unbiased opinion to the court, the challenges they faced in discharging this duty, and how successfully they believed they were in doing this.

Secondly, the study investigated the forensic experts' experience and perception of the trial itself, specifically looking at individual 'trial pathologies'. This term refers specifically to a model, defined by Nelken, which attempts to classify philosophies regarding the inter-relationship between law and science.[7] The 'trial pathology' model suggests that challenges of scientific evidence within the legal system may be resolved to

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[3] Mike Redmayne, *Expert Evidence and Criminal Justice* (Oxford University Press, 2001) 198-205; Oriola Sallavaci, *The Impact of Scientific Evidence on the Criminal Trial: The Case of DNA Evidence* (Routledge 2014) 33.

[4] ibid.

[5] Paul Roberts, 'Paradigms of Forensic Science and Legal Process: a Critical Diagnosis' (2015) 370 Philosophical Transactions of the Royal Society B 1 (Paradigms).

[6] ibid.

[7] David Nelken, 'A Just Measure of Science' in Michael Freeman, Helen Reece (eds), *Science In Court* (Ashgate, 1998) 14-18.

simple and discrete systems failures. Although Nelken suggested that such failures might simply represent symptoms, rather than causes, this second line of investigation probed practical manifestations of challenges with DNA evidence from the expert's perspective.

The third line of investigation was suggested by Nelken's alternative models of the relationship between science and law, specifically that science and law may represent 'competing institutions' or 'incompatible discourses'. The study investigated a number of aspects of the practical interface between science and law in the court room, and attempted to draw conclusions as to the question of whether, as has recently been suggested, that relationship has failed.[8]

The study also aimed to draw conclusions as to whether DNA evidence did indeed herald a new paradigm in forensic identification, as has been claimed.[9]

8.2 Importance and Originality of the Research

Despite the fact that criminal courts are ever more reliant on scientific expert evidence, and, particularly, DNA evidence, concerns regarding such evidence have been ever increasing. These concerns become manifest in significant academic activity,[10] governmental reports[11] and commissions,[12] chartered body publications,[13] proposed[14] and actual (if secondary)

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[8] Edmond, Gary and San Roque, Mehera, 'The Cool Crucible: Forensic Science and the Frailty of the Criminal Trial' (July 2012) 24 No. 1 Current Issues in Criminal Justice 51, 56 (Cool Crucible); Edmond and others, 'Admissibility Compared: The Reception of Incriminating Expert Evidence (i.e., Forensic Science) in Four Adversarial Jurisdictions' (2014) 3 University of Denver Criminal Law Review 31-109.

[9] MJ Saks and JJ Koehler, 'The Coming Paradigm Shift in Forensic Identification' Science (2005) 309 Science 892.

[10] For example, Edmond, Cool Crucible (n 8).

[11] For example, Science and Technology Committee, *Forensic Science on Trial* Seventh Report (HC 2004-2005) (HC Forensic Science on Trial).

[12] For example, HMSO, *Report of the Royal Commission on Criminal Justice* (Cm. 2263, 1993).

[13] For example, Royal Statistical Society, *Communicating and Interpreting Statistical Evidence in the Administration of Criminal Justice*: 1-4.

[14] Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325, 2011) Appendix A: Draft Criminal Evidence (Experts) Bill.

legislation,[15] developments in common law,[16] and, not least, media reports.[17] Paradoxically, concerns regarding DNA evidence have increased as its scientific rigour has increased. A particular concern has been that, despite the fact that the trial is adversarial, and that expert witnesses are instructed by either prosecution or defence to support their case, by common law the expert must remain unbiased, with a primary responsibility to the court.[18]

The issues are not purely academic. The Runciman Royal Commission on Criminal Justice, in investigating the causes of a number of miscarriages of justice,[19] identified many contributory factors, however, many had, at their heart, undisclosed, flawed or misrepresented forensic evidence.[20] More recently, the Law Commission Report into Expert Evidence of 2011,[21] took, as its start point, four cases in which the jury apparently relied on expert testimony which later turned out to be erroneous.[22]

On average, approximately 19,000 crimes are solved each year through matches on the National DNA database.[23] Despite the vast academic commentary upon the use of DNA evidence, there have been few empirical studies, and, of these, the majority have been of a limited nature (for example, mock jury reaction to presentation methods). No previous study has specifically canvassed the perceptions and opinions of the forensic experts who present, and are examined upon, DNA evidence. Despite the claimed ‘paradigmatic’ and ‘gold standard’ nature of forensic DNA evidence, it has shown itself capable of error and misuse.[24]

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[15] For example, Criminal Procedure Rules 2015, pt 19.

[16] For example, *R v Dlugosz* [2013] EWCA Crim 2, [2013] 1 Cr App R 32.

[17] For example, Claudia Himmelreich, ‘Germany's Phantom Serial Killer: A DNA Blunder’ (March 27, 2009) Time Magazine.

[18] Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325, 2011) para 2.8 (Law Commission Expert Evidence Report).

[19] HMSO, *Report of the Royal Commission on Criminal Justice* (Cm. 2263, 1993) (Runciman Report).

[20] Carole McCartney, *Forensic Identification and Criminal Justice: Forensic Science, Justice and Risk* (Willan Publishing, 2006), xix.

[21] Law Commission Expert Evidence Report (n 18).

[22] ibid paras 2.12 – 2.23.

[23] Home Office, ‘National DNA Database Strategy Board: Annual Report 2012-13’ para 2.3.

[24] For example, Forensic Science Regulator, ‘Report into the Circumstances of a Complaint received from the Greater Manchester Police on 7th March

DNA technology has advanced significantly since its first forensic use, and commentators have suggested that, with such technical advances (both biological and statistical), the scope for misuse of DNA evidence can only increase.[25] Significantly, that misuse does not only include technical aspects, such as contamination, but also judicial aspects, such as the realisation that juries, as well as other court 'players' may be unable to process the true meaning of complex evidence correctly in the context of the case.

Scientifically, it is undisputed that DNA identification evidence heralds a new paradigm. However, the law regarding the presentation of simple DNA evidence has not changed since its earliest days, despite being widely regarded as flawed. Additionally, there has been widespread controversy about the implications of new precedents regarding more complex evidence in which subjective evidence has been admitted and relied upon (it will be recalled that the paradigmatic claims regarding DNA evidence revolve around the fact that DNA evidence is presented in the form of an objective probability statement, and not a subjective opinion subject to expert disagreement).

It has been suggested that a crossroads has been reached in which the new paradigm intersects with established adversarial practice.[26] The examination of the use of DNA evidence in court has never been more important.

Although this study is small, it is unique in that it specifically addresses forensic experts testifying as to DNA evidence. The scope of the study only included experience of experts whilst in court, and in the cases in which they were called to court. It should be remembered, however, that trial itself has been described as simply the 'presentational surface' of the entire underlying criminal investigation and prosecution, it being described as a 'sociological truism' that the evidence presented, and the verdict reached, is heavily dependent on myriad contingencies in the pre-trial process,[27] both existing

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2012 regarding DNA Evidence provided by LGC Forensics' (2012) (FSR–R-618).

[25] Peter Gill, *Misleading DNA Evidence: Reasons for Miscarriages of Justice* (Elsevier, 2014).

[26] Roberts, Paradigms (n 5) 2.

[27] Paul Roberts, 'Introduction', in Paul Roberts (ed), *Expert Evidence and Scientific Proof in Criminal Trials* (Ashgate, 2014) xiv.

within the context of each other.[28] On that basis, although the data generated within the study cannot be generalised directly to the wider use of DNA evidence without further qualification, it might be assumed that valid conclusions can still be drawn. This study reported a wide range of experience from which these conclusions can be made.

8.3 The Unbiased Expert

The statement within the Criminal Procedure Rules that the '… expert must help the court… by giving opinion which is objective and unbiased… '[29] might appear disarmingly simple to understand. The observation has been made in the current study, however, that, both in academic commentary, and official reports and guidelines, not only have the terms 'unbiased' and 'impartial' been used synonymously, but they have also been used variously in conjunction with the terms 'independent', 'objective', 'neutral',[30] and, in common law, '(acting) in the cause of justice'.[31]

The current study would argue that the distinction between these terms is important. For example, to be 'unbiased' (not improperly influenced) is not exactly the same as 'impartial' (not favouring one party). Most commentary, mentioned above, appears to conflagrate the different terms into a general, but unclearly defined, responsibility on the part of the experts. The interviewees in this study similarly appeared to have an unclear and abstract general idea of what this responsibility meant. Significantly, however, this study also showed that different interviewees had different opinions as to what this meant in practice and how they applied it.

A naïve interpretation of the 'unbiased' responsibilities of the expert in court might have implied that, to an external observer of court proceedings, the expert witness for the prosecution would have been indistinguishable from the expert witness for the defence. That naïve observer may have gone on

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[28] Antony Duff and others, 'Introduction: Towards a Normative Theory of the Criminal Trial' in Antony Duff and others (eds), *The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 10.

[29] Criminal Procedure Rules 2015, pt 19.2 (1).

[30] For example, Gary Edmond, 'Is Reliability Sufficient? The Law Commission and Expert Evidence' (2012) 16 The International Journal of Evidence & Proof 30; Law Commission, *Expert Evidence in Criminal Proceedings in England and Wales* (Law Com No.325, 2011); Forensic Science Regulator, 'Legal Obligations' (FSR-I-400, Issue 3, 2015).

[31] *R v Ward* [1993] 1 WLR 619 [53] – [54].

to assume that experts were drawn from a central pool of experts, who would have been equally willing and competent to testify whether called by prosecution or defence counsel.

This study has shown these assumptions would be far from true, for the study demonstrated that prosecution and defence experts are not 'prosecution' and 'defence' simply because of which side instructs them, but, rather because of the very different organisational origins of each side. For the prosecution these origins were institutional, and the forensic expert may have been closely associated with the investigation and prosecution team from the earliest stages. This very much reflected the comment made by a defence barrister in testifying to the House of Commons Science and Technology Committee when he stated that:

> 'I will not use an FSS expert when I am defending because I believe—whether I am right or not is not the point— there is a corporate spirit that will mean an expert from the FSS will not go against the party line.[32]

The origins of the defence were diverse, with experts not necessarily coming have come from the forensic laboratory. Prosecution an defence roles were further distinguished by the fact that the prosecution had to show guilt beyond reasonable doubt, whereas the defence simply had to cast reasonable doubt upon that. From a forensic evidence point of view these required very different approaches to the evidence.

In this study, interviews with prosecution experts indicated that they understood their responsibility to be unbiased, took the responsibility seriously, and claimed to achieve it. Interviewees argued that they simply 'appeared to be biased' because of the questions that they were asked, and, specifically because they could only provide evidence regarding the single case being argued by the prosecution. They could not qualify their evidence beyond that.

This study provided strong evidence that, to all intents and purpose, true 'impartiality', that is, 'not favouring one party' was not achievable in practice, simply by the role that the expert was required to play. The prosecution expert testifies as to evidence supporting a single case, which the prosecution counsel aims to prove beyond reasonable doubt. However the defence expert testifies in support of other, innocent, explanations for the

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[32] HC Forensic Science on Trial (n 11) para 155.

same evidence. The aim is not to disprove the prosecution case, but simply to show reasonable doubt.

It is important to note however, that it may be argued that such ‘partiality’ may be better understood not in terms of partiality towards the state, or to the defendant as an individual, but rather to the prosecution and defence cases.

It would not be expected, as one interviewee stated, that the prosecution witness would feed possible exculpatory explanations of the evidence to the defence party, or that the defence expert would concede that their evidence did not demonstrate reasonable doubt.

In a similar demonstration of the very different roles of prosecution and defence experts, a small but significant number of defence experts indicated that they would testify in favour of a defendant that they believed to be guilty. As one stated, it was sufficient to discredit the DNA evidence, and ‘… there was always something… ’ (for example, the possibility of contamination) to challenge. It might be argued that this would not be counter to the expert’s duty of service to the court: the defence expert does not need to believe that their client is ‘innocent’, but rather that there is reasonable doubt upon their guilt. In this way, the viewpoints of prosecution and defence, and the objectives for the evidence supporting their cases, does not form a mirror image.

Of course the expert is bound by legal privilege not to disclose their party’s strategy regarding the use of evidence, and, of course, cannot volunteer information in court, however this further underpins the contention that experts cannot remain ‘impartial’, in its technical meaning.

From an adversarial point of view, prosecution experts were clear that they felt pressured by their adversarial role, a situation not helped by the fact that they were closely associated with the investigators prior to any detection or prosecution of crime. For example, prosecution experts indicated that they were cautious about volunteering information of use to the defence at any stage (for example during pre-trial disclosure of evidence).

Defence experts took a very different role. Where they were instructed, they gave objective opinion on the evidence, often agreeing with the prosecution’s case. It did not surprise them that, in these cases they were not asked to testify.

If all experts declared that they remained professionally unbiased, then the question arose as to how they defined this responsibility. Interestingly,

although this varied between individuals, it did not apparently vary between prosecution and defence. Most indicated that, in practice, they saw their responsibility as achieving ‘good, objective science’, and it was up to the court to decide what they did with that. Interestingly, one interviewee stated that they found it easy to detach themselves from the trial itself, but not the science. Although experts did not define their responsibilities in ‘dictionary terms’, it was apparent that they also saw their role as remaining ‘honest’, perhaps better defined as ‘not misleading’, although, and as particularly described in Chapter Six, they felt concern that their evidence was sometimes used in a misleading way.

If the expert offers an objective, unbiased opinion, the question arises as to whether it is important that the expert is ‘impartial’. After all, and as described above, the way in which experts are involved in the case arguably necessitates alignment with one side, and need not be detrimental to objective science.

This study concludes that, in principle, there seems little problem with this view. However there was evidence in this study that a simple ‘alignment’ or ‘partisanship’ with the instructing party sometimes extended to bias (that is, undue influence) towards that side. Theoretically this could be manifest as exaggeration of evidence or misleading use of evidence. Whilst there was no evidence of this in the current study, some interviewees did show a partisanship towards their instructing party that appeared to go beyond simple alignment, to a desire to win. Comments such, ‘… what you don’t want is a case falling apart once you are in court’, ‘I have definitely had cases where the wheel has wobbled.’ and ‘whichever side you are batting for… .’ clearly, at least, indicate a desire to win for their side.

Perhaps of concern, some experts indicated that they saw their responsibility as ensuring that their client has a fair trial. Of course, a ‘fair trial’ is a worthy objective of itself, however a number of interviewees indicated that they would actively seek to ‘balance the playing field’ where, for example, they felt that counsel had not elicited from them evidence that would support the counter case. It might be argued that this was not only illegitimate in that the expert is not allowed to act as advocate, but also would have been of doubtful effectiveness.

This study identified different cultures and values separating prosecution and defence, with distinct institutional origins. Notable were the disparaging comments from prosecution experts regarding some defence experts. These not only impugned the defence science, but also the qualifications,

motivation, and, indeed, honesty of the expert themselves. The recent demise of the FSS has meant that a number of ‘prosecution’ experts now work within defence consultancies. It was clear, though, that some of these individual experts found discomfort in ‘going against the prosecution’, one expert opining that they ‘would do their best for the defendant’, no matter how serious the crime they were accused of.

It is worth considering the degree to which, in agreement with established thinking and law, just how important it is that experts themselves are not ‘adversarial’. On the one hand, Redmayne suggested that criticisms of adversarial expertise might be better seen as criticisms of adversarialism in general,[33] and that, whilst adversarial expertise ‘is bound to’ produce biased experts, there are reasons why this may not be a significant problem.[34] On the other hand, strong arguments have been made that, not only is the position of the expert itself anomalous, but that this leads to serious difficulties.[35] Specifically, the criticism has been that if both experts testify as to opposing partisan opinion, then the jury has no way of knowing which is right. In fact, they now fail in the essential contribution supposed to be provided by the expert, which is assistance to the jury in matters beyond their everyday knowledge. In this way, the expert has become useless to the trial.[36]

In summary, these findings support Redmayne’s proposition that adversarial expertise is bound to produce, at least, experts partial to the prosecution or defence cases, based on the role dictated for prosecution and defence experts by the adversarial process.

The contention of this study is that the concept of the role of experts as ‘unbiased servants of the court’, although generally accepted, in fact conflagrates a number of abstract concepts. These include lack of bias, impartiality, neutrality, objectivity, independence, and ‘acting in the cause of justice’. This study has also shown that because experts have differing views of exactly what their responsibility in this regard is, there is the danger of bias. If left unchecked, such bias might lead to exaggeration or other distortion of evidence. These are plainly not in the interests of justice.

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[33] Redmayne (n 3) 201.

[34] Redmayne (n 3) 203.

[35] Learned Hand, 'Historical and Practical Considerations Regarding Expert Testimony' (1901) 15 No. 1 Harvard Law Review 40, 50.

[36] ibid.

Despite the significant academic and legislative effort that has been expended on the subject of expert evidence, little or no effort has been expended on what exactly is meant by the responsibility to remain 'unbiased' and how this relates to impartiality, neutrality, objectivity and independence. Critics might argue that, within the constraints of the adversarial system, all that experts have ever been able to do is to is to offer objective testimony regarding sound science. However, the law itself states that the responsibility extends beyond that. In this a conflict evidently applies. This study recommends that examination is made of the desired policy objectives of the expert responsibility to remain unbiased. Whilst historical in origin, it is not clear that continuing examination has been made of the reasons for this, and, assuming for the moment that unbiased expertise is desirable, exactly what the nature of that is. From a practical point of view, it might then be possible to develop clear guidelines as to how experts can achieve policy aims in practice.

8.4 Experience in Court

The second line of investigation in this study concerned 'trial pathologies'. As discussed in Chapter Two, strong arguments have been made that many perceived trial 'pathologies' may be more accurately described as features of the adversarial system, and that where true dysfunction occurs, this may be because of a fault in the way in which the adversarial system is applied, as opposed to a fault of the system itself.[37]

Previous studies on witnesses in court, both lay and expert, have been consistent in describing lack of communication as a trial pathology. Despite many reforms aimed at streamlining communication, such as disclosure requirements, streamlined reporting and pre-trial meetings between experts, all aimed at early identification of issues and early disposal of cases,[38] the current study gave cold comfort to those who would claim that these provisions have so far been effective.

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[37] Roberts, Paradigms (n 5).

[38] Criminal Procedure Rules 2015 ibid pt 19.6; T Ward, 'Expert Evidence and the Law Commission: Implementation Without Legislation' (2013) Criminal Law Review 561; Science and Technology Committee, *Forensic Science*, Second Report Volume 1 (HC 610, 2013–14) Ev 31, Q172 response by Karen Squibb-Williams (HC Forensic Science Report Evidence).

Great institutional emphasis, for example, has been placed upon the Criminal Procedure Rules provisions for expert witnesses,[39] and reforms contained within the Criminal Practice Directions.[40] Particular stress has been put upon the provision for pre-trial discussion between experts. In this study, not only had few interviewees attended pre-trial discussions with the opposing expert, but many were not even familiar with the intention or the legal provision for them. Indeed, a small, but significant number of interviewees indicated that they believed such meetings would be illegitimate, in the absence of counsel control, and with a report to counsel. A few interviewees described meetings that they had attended, at which counsel were present, but vanishingly few stated that they had attended a pre-trial discussion conforming with the provisions of the Criminal Procedure Rules. It will be recalled that such a meeting should be court-ordered, between experts alone, the output being an agreed statement and no more.[41] It appeared, from this study, that counsel remained very much in control regarding pre-trial contact between experts.

In common with reports in previous studies, this study showed that communication problems extended to lack of contact with the counsel. Prosecution experts had little information about the defence case, and had little, or no, contact with counsel before appearing in the witness box. They stated that they sometimes remained confused under examination as to why questions were being asked, or how they should answer. They reported that although they could clarify their immediate evidence, they witnessed misuse of DNA evidence whilst outside of the witness box, and, in those cases, were powerless to correct misunderstandings.

As discussed in detail below, DNA evidence is uniquely complex. On the one hand, in the adversarial arena, each party is free to adduce only the evidence that they choose, and experts may only answer the questions that they are asked. However, the working of the adversarial trial must assume that both parties (that is, counsel), understand the evidence, and are able to examine and cross-examine that evidence effectively. The findings reported in the current study indicate that experts believe that, in many cases, they are not effectively examined or cross-examined, and, for that reason they do not believe that DNA evidence is adequately understood by the jury. Even in

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[39] Criminal Procedure Rules 2015 pt 19.

[40] Criminal Practice Directions 2015 pt 19.

[41] ibid.

cases where they believe the DNA evidence to be clearly presented, experts have clear concerns regarding the jury's ability to understand the probabilistic evidence presented to them.

Previous studies suggested that some experts, with experience, were able to 'play the system', however, in the current study, many forensic experts described feelings of powerlessness, and being unable to explain the evidence in the way they believed would be most effective.

Certainly, in the current study, interviewees described strategies to try to overcome perceived shortcomings in the way in which their evidence was examined, however these strategies did not appear generally effective. For example, for many defence experts, counsel simply did not call them to the stand, for fear that they would testify that their evidence supported the prosecution case. In these cases all they could do is witness proceedings, with their contribution restricted to passing notes to counsel. In other cases in which interviewees stated that they felt that their evidence had been misrepresented, all they could do was inform counsel of that.

The findings in this study support observations that many apparent failings are caused by a failure to apply existing processes, many aimed at streamlining existing processes, with the objective of improving communication and early identification of contested issues in the case. Commentators have pointed out, however, that justice in the adversarial process also involves effective examination and cross-examination, and adequate resourcing for the defence. This study certainly supports observations in previous studies that examination and cross-examination is not always effective. Compounding this, experts reported compensatory behaviour, aimed at remedying perceived shortcomings in the evidence that they presented. Whilst perhaps a worthy objective, it is a distortion of the adversarial system for the expert to take the role of advocate.

This study also, however, makes the proposition that DNA evidence is qualitatively different from older forensic identification techniques. It has been suggested that one of the major reasons for the use of scientific evidence in criminal trials is its assumed ability to determine truth, or at least to contribute towards accurate fact finding.[42] As Jackson suggested, '… there is an attraction in the verdict being based on hard evidence and models of formal reasoning rather than on frailties of common sense

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[42] Sallavaci (n 3) 113.

reasoning.'[43] However, Sallavaci has suggested that, to a certain degree, forensic scientists have 'nurtured' that view, for example by declaring a fingerprint match.[44] Indeed, Sallavaci also pointed out that, in cases resting upon the single issue of identity, experts have effectively been able to rule upon the ultimate issue, even usurp the role of the jury.[45]

Paradoxically, DNA evidence is different because it *cannot* prove identity. It can only provide evidence in probabilistic form. In this way, DNA is different because the expert is forced to present their evidence in a scientifically rigorous fashion. This point is worthy of emphasis: the expert must present the evidence in the form of a random match probability, that is, the probability of the DNA match if the sample did not belong to the defendant (not, what the probability of this being the defendant's DNA is). Additionally the expert must be careful to address this evidence to the correct level according to the hierarchy of propositions (that is, ensure that they are addressing the question that is being asked).

The point is that, not only is the science difficult to understand (demonstrably in the cases of judge, jury, counsel and experts themselves), and difficult to process (the 'number-blindness noted as a pathology of scientific evidence), but DNA evidence is unique in that it forces experts' evidence to be rigorously scientific. (It might be noted that DNA is not the only evidence that is probabilistic in nature, however DNA is the only evidence that, by law, must be presented in the form of a random match probability alone. This is, arguably, simply because of the undisputed database underlying DNA evidence, and the very low random match probabilities presented in court).

8.5 Science and Law

Serious concerns have been raised concerning the engagement of forensic science with the law, indeed, it has been suggested that the forensic-law relationship has failed. Edmond argued that judges were partly to blame, a historically 'cosy' relationship with the forensic community having led to 'lax

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[43] John D Jackson, 'Managing Uncertainty and Finality: The Function of the Criminal Trial in Legal Inquiry' in Antony Duff and others (eds*), The Trial on Trial Volume 1: Truth and Due Process* (Hart Publishing, 2004) 27, 145.

[44] Sallavaci (n 3) 113-114.

[45] ibid 126-127.

admissibility standards for incriminating expert opinion, … (and a diversion of) attention from research and interest in the reliability of evidence'.[46]

However, his criticism was aimed predominantly at the forensic science profession, who, he suggested:

> … should not appeal to the law or the courts for social or epistemic legitimacy… (and) should be appealing to techniques that have been studied and validated rather than whether a technically incompetent (legal) profession finds their opinions useful in the disposition of busy dockets.[47]

That is, as other commentators have suggested:

> … they should move (back) to adopt the characteristics of a profession, rather than attempt to simply demonstrate independence in a system, compromised by the need to provide the judicial system with what it asks for.[48]

These are serious accusations: the implications of these statements are that forensic science has been passive in the face of the judicial determinations regarding scientific evidence. As Edmonds states:

> 'While courts may confer social legitimacy, prior experience in trials and appeals and success with previous prosecutions, do not constitute forms of validation or credible support for the reliability of techniques and opinions'.[49]

On the other hand, Roberts suggested that, although there were failures in the interface between forensic science and the law, these were largely through forensic practitioners' lack of understanding of adversarial culture.[50]

Whilst the commentators, above referred to the forensic profession as a whole, this study aimed to identify evidence in support or rejection of these arguments by investigating individuals' experiences of the practical manifestations of this engagement between science and law. It also aimed to draw conclusions as to whether DNA evidence provided a special case.

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[46] Gary Edmond, Mehera San Roque, 'Actual Innocents? Legal Limitations and their Implications for Forensic Science and Medicine' (2011) 43 Issue 2-3 Australian Journal of Forensic Sciences 177, 178 (Actual Innocents).

[47] ibid 196.

[48] Roberta Julian and Sally Kelty, 'Forensic Science and Justice: From Crime Scene to Court and Beyond' (July 2012) 24 No. 1 Current Issues In Criminal Justice 1, 131.

[49] Edmond, Actual Innocents (n 46) 196.

[50] Roberts, Paradigms (n 5) 6.

The forensic community has accepted a presentation method for DNA that has always been widely accepted as flawed. On the one hand, this could be described as a simple, and practical solution, however, on the other, interviewees stated that this had limited their evidence in an unhelpful (to the jury) fashion. Reflecting Edmond's statement above, and that of one commentator who stated that 'Doheny was a lost opportunity', it was surprising that interviewees did not express more concern regarding the continuing application of an approach to DNA presentation widely regarded as being out of date. This was especially so given that interviewees believed that the jury could not always properly understand the DNA evidence without further (inadmissible because of *Doheny*) explanation.

Interestingly, however, the rationale given by almost all interviewees for their continuing support for *Doheny* was that it provided certainty as to how their evidence should be presented.

Interviewees uniformly expressed concern regarding how more complex DNA should be presented. This included low template DNA, DNA mixtures, and partial profiles, often in combination. They also expressed concern regarding recent precedent on how evidence regarding transfer of DNA should be presented (for which there is no statistical database). Concern was also raised regarding the recent decision in *R v Dlugosz*,[51] in which opinion evidence regarding a DNA match was admitted.

Interestingly, however, interviewees were not concerned regarding the scientific validity of the decisions in these cases. Instead, they expressed concern simply on the basis that they had no clarity on how such evidence should be presented. It will be recalled that interviewees stated that simple DNA matches were rarely, if ever, in dispute. Effectively, therefore, they had no clear guidelines on how to present anything other than routine cases.

Strikingly, one interviewee with a special interest in the area expressed surprise at the decision that had been made in *Dlugosz*,[52] stating:

> I thought they would go: now you have always set your stall out to say you are going to do this statistically and now you are saying you can't … I thought they would … make DNA a special case. That would have driven forward the statistical working up the new methodology for statistical analysis of

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[51] *R v Dlugosz* [2013] EWCA Crim 2, [2013] 1 Cr App R 32.

[52] ibid.

> mixtures but they haven't, they have gone, alright well we will accept a softer approach.

On the one hand, it might be argued that the forensic community were best placed to make a judgment on the reliability (at least, scientific) of the DNA evidence in such cases, rather than remain passive in the face of a judicial determination, although strict proponents of adversarial examination might equally argue that the adversarial system should be capable of testing reliability for itself.

Having said this, one 'adversarial' split in forensic opinion was observed: regarding the recent decision in *Dlugosz* to admit subjective opinion as to a DNA match (when a standard match probability could not be calculated), whilst defence experts expressed uniform criticism of such an approach, a significant number of prosecution experts stated that they welcomed a relaxation in how they could present evidence. A similar split was observed regarding recent cases in which subjective opinion given by the prosecution expert was countered unsuccessfully by defence arguments that there was no validated science to support the opinions. Again, prosecution and defence experts differed on party lines regarding whether laboratory (subjective) experience should take precedence over experimental rigour. Interviewees' suggestions that discussions with colleagues regarding results constituted 'peer review', therefore validating their 'experience' as science seems a weak argument.

With reference to the conclusions within Chapter Five, it may not be found surprising that prosecution and defence experts each supported the view of the evidence (for example experience versus validated science) that best supported their party's case, however this 'polarisation' did suggest an 'adversarialism' beyond an objective view of the case.

A number of experts described paradoxical events within the trial, for example the acceptance by opposing parties of evidence known by both to be false. Their assumption that such events were explicable by factors of which they were unaware in the case seemed reasonable, however it was noteworthy that such rationalisation seemed to extent to a figurative 'shrug of the shoulders' at the workings of the legal system. This study has used the term 'disengagement' to describe such 'withdrawal' and 'detachment' that experts appeared to exhibit in such regard.

It should be noted that such disengagement seemed to go further for many, if not most, interviewees, in terms of the case itself. For example, it was striking that the majority of forensic experts did not know the outcome of

trials in which they had been involved. Additionally, it was striking that interviewees expressed only a passing curiosity in cases where they had not been called to court.

One interpretation of this disengagement was that experts were displaying, perhaps a praiseworthy, lack of bias in this regard. On the one hand it may be considered paradoxical that this study found strong apparent association by experts with instructing parties, and yet lack of interest in the case outcome. On the other hand however, it was suggested by this study, that any natural 'partiality' displayed by expert witnesses might be understood as being towards prosecution and defence cases, rather than to the state or the defendant individually.

8.6 Theoretical Implications

A major line of investigation in this study has concerned the overall relationship between science and law in the court room. Nelken's models described this relationship in terms of 'trial pathologies', 'competing institutions' or 'incompatible discourses'.[53]

Trial pathologies similar to those reported in previous studies have manifested themselves in this study in relation to DNA evidence. This study has generally supported Roberts's argument that many of these 'pathologies' might be better viewed, and are explicable as, features of a working adversarial system.[54] Roberts argued that where true 'pathology' occurred, this indicated not that the adversarial system was at fault, but that a process within it was not operating correctly.

This is reasonable, if it can be assumed that examination in chief and the adversarial safeguard of cross-examination are sufficient tests of the evidence.

This study suggests that DNA evidence provides a special case, and indeed signifies a 'crossroads' in the intersection of law and forensic science. The reasons undoubtedly include its complexity, in terms of the science itself, the way in which DNA is understood by judge, counsel, jury and expert, and the way in which probabilistic evidence many be combined with traditional evidence. The implication of this complexity is that relevant 'pathologies' become magnified. If we consider the recognised pathologies of lawyer

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[53] Nelken (n 7).

[54] Roberts, Paradigms (n 5) 2-3.

ignorance, deliberate manipulation, communication failures, testimonial silencing, adversarial deficit, and number-blindness,[55] the potential for distortion of the evidence is significant.

It might be argued that such complexities might arise in respect of any scientific evidence, however, this is not the case. As detailed in this chapter, unlike older and more established identification techniques such as fingerprinting, DNA profiling is unique in that it is *forced* to be scientific. The very fact that it cannot individualise identification, but instead provide simply the 'strength of the evidence' brings it firmly down to rigorous scientific principles.

Strong proponents of the adversarial system might argue that the adversarial process itself is sufficient to test the evidence, however this has left the courts to rule on the validity of scientific argument. As Edmond suggested, courts have 'privileged the wrong type of heuristics in their attempts to engage with scientific… knowledge'.[56]

Regarding the proposal that science and law are 'competing institutions', whilst this is might be true in a greater philosophical sense, it seems true to say, not only that forensic science is science for the law, but also that it may be most clearly described as a legal process. On this basis, it has been argued that forensic scientists should serve the adversarial process through 'self-understandings of adversarial culture and their commitment to its routine reproduction through conscientious performance of their… roles and duties'.[57] Presumably, however, Edmond would disagree and not accept that forensic scientists should be driven by 'whether a technically incompetent (legal) profession finds their opinions useful in the disposition of busy dockets.'[58]

Roberts asks the ('doubtless impertinent') question of whether the forensic profession have received and understood the message regarding their ethical duties and delegated procedural instruments.[59] The answer suggested in the current study is that they have received the message that they serve the judicial system, but messages regarding the details of their

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[55] ibid.

[56] Edmond G, 'Legal Versus Non-Legal Approaches to Forensic Science Evidence' (2016) 20.1 International Journal of Evidence and Proof 3, 3-5.

[57] Roberts, Paradigms (n 5) 6.

[58] Edmond, Actual Innocents (n 46) 196.

[59] Roberts, Paradigms (n 5) 6.

ethical and procedural duties have only been partially received. Meanwhile the generally passive forensic experts are waiting for clarification and instructions. They indeed appear to be 'satisfy(ing) technically incompetent legal professionals in their disposition of busy dockets'.[60] Certainly, within this study, the almost unanimous viewpoint was that the scientist should provide what the law has asked for, if only the law would be clear about what they want.

This study supports the position that, whilst adversarialism is a highly efficient and effective tool in narrowing down the issues in factual disputes, it is not an effective tool in determining *scientific* issues. It seems self evident that issues of scientific complexity such as those involved in DNA profiling can only be determined by scientific experts. It is also clear from this study that, whilst there has been much academic commentary, this has not extended so far to practical activity within the judicial system.

Importantly, too, this study has described a cultural gap between prosecution and defence experts, with institutionally different origins. It determined that experts were inevitable thrust into roles which naturally aligned them with prosecution and defence cases, however this did not mean that they could not offer 'unbiased' advice within the constraints of their role. It was noted, however, that some experts aligned very closely with their instructing party, with a clear interest in winning their case. The most plausible definition of expert responsibility derived within this study was that experts were able to offer objective, unbiased opinion, but that they were not truly impartial in that they were aligned with 'their' side. This partiality, however, could best be understood as alignment with the 'prosecution case' and 'defence case' rather than with the state and the individual defendant.

8.7 Policy Implications and Future Direction

Nothing in this study suggests that the adversarial system does not remain the most efficient system to narrow down issues in factual disputes.

It should be remembered, too, that many 'trite' proposals to correct perceived trial pathologies often have the side effect of circumventing the adversarial system to some degree.[61]

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[60] Edmond, Actual Innocents (n 46) 196.

[61] Sallavaci (n 3) 33-34.

However, that is not to say that this study does suggest significant policy implications.

Regarding the duty of the expert to offer objective and unbiased opinion, this study has suggested that the very nature of the adversarial system does not allow the expert to be truly neutral. However, in the absence of clarity regarding the experts' neutral responsibility, there are varying interpretations and applications of this in practice. This study recommends that there is debate regarding the policy considerations regarding this responsibility, and clear practical guidance regarding how the responsibility should be discharged. Given that the objective of prosecution and defence expert evidence are not mirror images, there is not necessarily a need for such responsibilities to be identical.

It is undoubted that all the interviewees in this study attempted to discharge this duty conscientiously, however there was clear evidence that some experts had an interest in 'winning'. A clear definition of responsibility would assist all experts in aligning their duties according to standards both ethical and in line with policy.

Regarding trial pathologies reported in the study, this study takes little exception from the previous recommendations in this area that there should be continuing incremental implementation of existing reforms: much intellectual effort has been expended on the improvement of expert evidence, on both its admissibility and its evaluation in court, and there is much empirical work on the way in which complex evidence should be presented. Reforms have included consolidation of common law in the form of additional provisions within the Criminal Procedure Rules,[62] and additions to the Criminal Practice Directions,[63] as well as the 'active encouragement' of judges to take a more 'activist role' as gatekeepers.[64] There have been many other recommendations, including, by the Law Commission, training for judges and counsel, however it has been observed that the required training, would be substantial.[65]

These developments and reforms have been described as the start of a cultural shift, however there must be significant concerns. Firstly, few, if any,

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[62] Criminal Procedure Rules 2015.

[63] Criminal Practice Directions 2015.

[64] Ian Dennis, 'Tightening the law on expert evidence' (2015) Criminal Law Review 1,1-2.

[65] ibid

of the reforms are mandatory, and the judiciary has a long tradition of resistance to perceived change. Secondly such cultural changes need commitment from not only the judiciary itself, but also counsel, the government and the forensic community. For the adversarial system to work properly, it is insufficient simply to bring in rules regarding admissibility of expert evidence. It is necessary for counsel to be sufficiently able to examine and cross-examine complex evidence such as DNA, and to do so requires some training, but also sufficient communication with the experts that can support them. For the government's part, in supplying the resource to ensure operation of the adversarial system in cases involving complex evidence, sufficient resources must be made available to the defence to mount a fair defence.

A second 'plank' of policy considerations suggested by this study concerns the nature of DNA evidence itself. This study has made a strong argument that DNA evidence is qualitatively different from older forms of forensic identification evidence. Indeed, this study supports the contention that not only does DNA represent a new paradigm in forensic identification, but that it must inevitably force existing tensions between the law and scientific evidence into the open. It is surely unacceptable that future cases will depend on assessments of scientific reliability determined and dictated by legal precedent. Not least of the concerns must be that the paradigmatic nature of DNA evidence may become diluted if it is not subject to scientific rigour. In this respect, a clear recommendation of this study is that the forensic science community engage with the judicial system in cooperation, so that questions of scientific reliability are determined by scientific experts, and questions of law, by judicial experts. Although the adversarial system must dictate its requirements for scientific evidence, it seems self-evident that questions of pure science should be addressed by scientific experts and not in an adversarial environment.

Naturally the questions arise as to who should be responsible for suggested reforms, and who will pay. That is to be determined, but there is little doubt that it is insufficient to place reliance on individual bodies acting unilaterally. Many entities have played a part in the effort to date, including The Law Commission, the CPS, the Forensic Science Regulator, the now defunct Forensic Science Service, ACPO and various academic bodies, including, notably, the Royal Statistical Society. Notably (but not entirely) absent from this list are the judiciary themselves, the forensic scientists, and representatives of the advocates. The Government must take a lead in co-

ordinating expert bodies towards an integrated approach to complex evidence such as DNA, in the inevitable case that future forensic technologies can only be more complex still.

8.8 Final Reflections

Whilst the law and science may be competing epistemologies on a philosophical level, within the judicial arena it is the judicial system that dictates the requirements in terms of evidence. However, this study gives support to the contention that DNA evidence is qualitatively different from older forms of forensic identification evidence, and offers a particular challenge to the judicial system.

Despite the claim that DNA evidence is ‘just like any other (scientific) evidence’ the findings in this study are that because of its explicitly probabilistic nature, DNA evidence, and particularly its new technological developments, are forcing tensions between scientific evidence and the judicial process to the surface. It is hoped that, duly on the surface, they may be resolved.

The stakes are high. On the one hand, the misuse of DNA evidence has not only been shown to be the direct cause in cases of miscarriage of justice, but, it has been suggested, could represent the tip of an iceberg. With rapidly increasing technological advances in DNA, and, no doubt, other, future technologies, it is essential that the challenges are addressed as a matter of urgency, and it is not left to a conservative judicial system that ‘knows better’.

On a practical level, it could easily be argued that these findings have not caused a practical problem, because the vast number of cases are decided out of court, usually as a result of a decision not to proceed, or a guilty verdict on the basis of a routine, admitted, DNA match. As Learned Hand stated, however:

> There can be, in my opinion, no legal anomaly which does not work evil, because, forming an illogical precedent, it becomes the mother of other anomalies and breeds chaos in theory and finally litigation.[66]

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[66] Learned Hand, 'Historical and Practical Considerations Regarding Expert Testimony' (1901) 15 No. 1 Harvard Law Review 40, 50.

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Appendix A
Information Sheet and Consent Form

School of Law

UNIVERSITY OF LEEDS

The Presentation and Examination of DNA Evidence Adduced During Adversarial Trials

You are being invited to take part in a research project. This information sheet is intended to inform you about why this project is being undertaken and what it involves. Please could you read this before deciding whether to take part. You can withdraw from the research at any time without giving a reason.

Purpose of Project

This is a PhD research project looking at the way in which DNA evidence is used in the construction of criminal cases and in the prosecution and defence of those cases. The approach taken is a qualitative assessment of the experience and opinion of expert witnesses involved in such cases, gathered through interviews.

It is expected that the thesis will be completed in early 2015. It is hoped that this research will contribute towards the improvement of the judicial process regarding the use of expert evidence, specifically involving DNA.

Format of Interviews

It is intended to interview approximately 30 experts such as yourself over the course of 6 months. Potential participants have been identified by peer recommendation. It is anticipated that each interviewee will be participate in a single interview lasting up to 1 hour. Most questions are of an open nature, allowing you to fully give your opinion within the focus areas.

To assist in the efficiency of the interview process and accuracy of analysis, we request your permission to record the interview. This is optional on your part. This recording will be used solely to ensure accuracy and completeness of analysis, and will not be used for any other purpose or made available to any other party. It would be appreciated also if we may contact you after the interview by e-mail to clarify any questions that arise as a result of later analysis.

Confidentiality and Anonymity

Your participation in this research will remain confidential and you will not be identified in the published results of this research. Opinions quoted in the published results will remain anonymous. All data, including written notes, recordings and computer data regarding your contribution will be stored securely according to the Data Protection Act 1998, the Human Rights Act and the University of Leeds Code of Practice on Data Protection.

Funding

The research is funded by the researcher as an individual PhD thesis.

Further Information

Please ask the researcher, or supervisor (listed below) if you have any questions or concerns, or would like further information.

Contact Details:

Researcher:

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Consent to take part in the PhD research project:
The Presentation and Examination of DNA Evidence Adduced During Adversarial Trials

	Add your initials next to the statements that you agree with
I confirm that I have read and understand the above information sheet dated 2nd January 2014 explaining the above research project and I have had the opportunity to ask questions about the project.	
I agree to take part in the above research project.	
I agree that an audio recording may be made of the interview.	
I agree that the data collected from me be analysed and used as part of the final research publication, as indicated on the attached information form.	

Name of participant	
Participant's signature*	
Date*	
Name of researcher	Rick Graham
Researcher's signature*	
Date*	

*To be signed and dated in the presence of both researcher and participant.

One signed and dated form to be retained securely by the research team and another to be provided to the participant.

Appendix B
Interview Schedule

General Introduction

Thank you for your time today. I'm researching how DNA evidence is presented and examined in Crown Court trials, specifically, assessing the experience of experts involved with DNA evidence and prosecutions. On this basis, I am interviewing experts such as yourself.

The scope of my research covers the time from the decision to prosecute, through to the close of the trial and thus, there are three broad areas that I'd like to discuss, as well as gathering some background information. The first area is events pre-trial during development of prosecution and defence cases; the second is your experience of DNA evidence during the trial itself; and the third, your opinions regarding possible improvements to the process.

Interviewee

1. I'd like to start by asking you about your background experience, if I may, and the types of cases involving DNA evidence with which you have been involved. Firstly, could you tell me about your background and qualifications, as well as your current job title and employer?

2. Could you tell me approximately how many DNA cases you've been involved in to date, and what criminal offences these cases have involved?

3. How recently have you been involved in DNA cases?

4. How many of these cases have involved a Crown Court appearance on your part?

5. What proportion of the time have you appeared for the defence, as opposed to the prosecution in Crown Court cases?

Pre-trial

I'd like to ask you now about your experiences of the pre-trial process. The scope of my research is the use of DNA evidence in Crown Court trials, however I want to understand how the cases presented by both prosecution and defence counsel have been developed, and the various flows of information that lead to this point.

6. When you appear for the prosecution, at what stage in the pre-trial process do you become involved, and how are you involved in the development of the prosecution case?

> **Prompts if necessary**
>
> Could you tell me about your involvement with other parties relevant to the development of the prosecution case?
>
> For example, Police, CPS

7. When you appear for the defence, at what stage in the pre-trial process do you become involved, and how are you involved in the development of the defence case?

Prompts if necessary

Could you tell me about your involvement with other parties relevant to the development of the defence case?

For example, Solicitor

8. Could you tell me how well DNA evidence, and its limitations, are understood by those involved in case development?

Prompts if necessary:

What about the police?

What about the solicitor?

What about the CPS?

9. I'd like to move on to ask you about disclosure of evidence between prosecution and defence. In your experience, are there any issues or concerns when disclosing DNA evidence?

10. I specifically want to ask you about pre-trial conferences. How often do these take place, and what is involved?

Prompts if necessary:

Who is involved and exactly what happens in the conference?

Can you recall any instances where a pre-trial conference would have been useful but did not take place and whether this had any detrimental consequences in your view?

11. How effective are pre-trial conferences, in your view?

12. I'd like to conclude consideration of the pre-trial stage, by asking for your opinion on potential improvements that could be made during the pre-trial phase, from the point of view of case development.

Prompts if necessary:

Which other parties should be involved?

Are you given sufficient information?

What additional flows of information should take place?

How could prosecution and defence case preparation be improved?

What improvements could be made to pre-trial conferences, and other communication between prosecution and defence?

Trial

I'd like to move on to look at the trial itself. I'd like to ask about the way in which DNA evidence is presented, and challenged, by both prosecution and defence, and the way in which DNA evidence is managed by the Judge.

13. As a preliminary question, could I ask you to describe how DNA evidence is presented to the court?

Prompts if necessary:

For example, is the Doheny direction used to present DNA evidence?

14. Are there exceptions in practice to the guidelines laid down in the Doheny direction?

Prompts if necessary:

Is the Doheny direction always used?

Are alternative presentations ever used?

Are additional presentations ever used?

What about LTDNA?

What about where the sample size is below the stochastic threshold?

What about partial/ mixed profiles?

What about where the expert is being asked to give an opinion beyond the source-or sub-source level hypothesis?

15. In the cases in which you've appeared, and to your knowledge, how central has DNA evidence been to the case?

16. In your opinion how well have cases been constructed in relation to this and the other evidence in the case?

17. Following on from my earlier question regarding understanding of DNA evidence, how well do counsel understand the DNA evidence?

18. Are you ever constrained in your testimony by the direction of your evidence in chief?

19. I'm interested in the prosecution's overall strategy in its presentation of DNA evidence, and its rebuttal of defence arguments? Could you describe how, in your experience, prosecuting counsel present DNA evidence to juries?

How do they manage their case?

20. In your opinion, could this be improved? If so, how?

21. I'd like to move on to consider defence handling of DNA evidence in Crown Court trials. How often and under what circumstances do defence counsel call their own expert witness?

22. What strategies do defence counsel use to challenge DNA evidence?

23. In your opinion could this be improved? If so, how?

24. I'd like to ask you about your experience of cross-examination of DNA evidence. How would you describe you own experience?

Prompts if necessary:

Have you ever found the process challenging or otherwise difficult? If so why?

Have you ever found the process intimidating?

25. How has your experience varied depending upon whether you were appearing for the prosecution or the defence? If so, how?

26. Thinking about the presentation of DNA evidence as a whole: are you always able to give the evidence you want to give or are you sometimes interrupted or otherwise prevented from doing so by counsel?

Prompts if necessary:

What about during evidence in chief?

What about during cross-examination?

Is there any difference between prosecution and defence counsel strategy in this area?

27. How do you respond in these circumstances? Would you turn to the trial judge for assistance, for example?

28. I'd like to ask some questions about the handling of the case by the judge in terms of DNA evidence. What is your experience of the trial judge's summing up in this regard?

Prompts if necessary:

What about accuracy?

Do trial judges correctly sum up DNA evidence according to legal rules (for example Doheny)?

What about limitations?

How well do judges explain how to combine DNA evidence with other evidence?

How well do judges appear to understand DNA evidence?

29. If DNA evidence has been misrepresented, either explicitly, implicitly, or by omission, is this always recognised, and if so, how is this handled by trial judges?

30. As far as you can ascertain, how well do the jury seem to understand the DNA evidence?

Improvements to Trial Process

31. I'd like to move on to ask about the ways in which the presentation and examination of DNA evidence as a whole could be improved. There have been many suggestions in this area, not least from the forensic science community. I'd like to ask you about your opinions regarding possible improvements to the process, both during the pre-trial stage and the trial itself. Firstly, I'd like to ask you about potential improvements of knowledge to the various parties involved regarding DNA evidence. In your opinion, should any parties involved receive additional training, and what form should this take?

Prompts if necessary:

Judges?

Prosecution counsel?

Defence counsel?

The jury?

The expert witness (for example regarding legal issues?

32. I'd like to ask you about your opinion regarding potential statutory or procedural changes that could improve the presentation and examination of DNA evidence in court. Could I first ask your opinion on whether there should be an enhanced admissibility test for novel forms of DNA evidence?

33. In your opinion, should "enhanced" statistical presentations be available to the court, such as likelihood ratios, Bayesian calculations, adjectival descriptions of evidence strength?

34. What could be done to improve the usefulness of the expert witness to the court in his or her presentation of DNA evidence in court?

Prompts if necessary:

Should the expert witness be able to testify beyond the source-level hypothesis where valid?

35. Finally in this area, what other improvements should be made, if any?

FSS Closure

There have been many claims regarding potential wide-reaching effects of the closure of the FSS. I'd be interested in your opinion regarding the effects of this.

36. In your opinion, will has the closure of the FSS affected the preparation of prosecution and defence cases during the pre-trial stage??

37. Has the closure of the FSS affected the trial process itself?

Close of Interview

Thank you very much for your time and valuable experience.