MISCARRIAGE BY EXPERT

Justice Susan Glazebrook*

This article examines the role expert evidence plays in court and some of the risks surrounding such evidence. Through the examination of several tragic cases of miscarriage of justice, this article warns of the dangers of relying unquestionably on expert evidence and calls for a careful consideration of the evidence as each case comes before the courts. The value of good forensic evidence in the investigation and prosecution of crime is nevertheless recognised.

I LIES, DAMNED LIES, AND STATISTICS[1]

I would like to start by telling a story. The story is about Sally Clark, a British solicitor, married to Stephen, also a lawyer. The couple's first son, Christopher, died suddenly in December 1996. He was just under three months old. A post-mortem by a Home Office pathologist, Dr Alan Williams, concluded that Christopher had died of natural causes, probably of what is colloquially known as cot death but is more technically called sudden infant death syndrome or "SIDS".

Sally gave birth to her second son, Harry, in November 1997. In January 1998 Harry was also found dead. He was just under eight weeks old. A post-mortem was conducted by Dr Williams, the same Home Office pathologist as for Christopher's death. Harry's death led him to reconsider his conclusions about Christopher. His new view was that both Christopher and Harry had died as a result of child abuse.

Sally had been home alone with both boys when they died. A month later she was arrested and charged with their murders. At her trial a number of highly qualified medical experts gave evidence. The medical evidence was complex but, in essence, the experts called by the prosecution considered that both deaths were caused deliberately, either by shaking or smothering the babies. The experts

* Judge of the Supreme Court of New Zealand. The views expressed in this article are my own and not necessarily those of the Supreme Court. An earlier version of this article was presented at the Commonwealth Magistrates' and Judges' Association Triennial Conference on 17 September 2015 in Wellington, New Zealand. Thanks to my clerk, Andrew Row, for his invaluable assistance with that paper. Thanks are also due to my current clerk, Josie Beverwijk, for her assistance with updating the paper. All the case studies mentioned in this article have occurred outside New Zealand. I am not to be seen as suggesting that there have been are no miscarriages of justice in New Zealand. Overseas cases have been chosen to avoid discussion of New Zealand cases that could eventually come before the Supreme Court.

1 The phrase is of uncertain origin but was popularised, at least in the United States, by Mark Twain.

called by the defence said that the evidence was not conclusive and that the causes of the deaths were simply unclear. There was evidence of trauma in both boys but that could have been related to the attempts to resuscitate them.

One of the witnesses for the prosecution was a well-regarded paediatrician, Professor Sir Roy Meadow. He was, at the time of the trial, writing a preface to the report of a panel appointed to investigate the causes of SIDS in the United Kingdom. Based on figures he took from that report, Professor Meadow's evidence was that the chance of two children from an affluent non-smoking family like the Clarks dying of SIDS was one in 73 million. In his evidence he apparently likened the probability to the chances of backing an 80 to one outsider in the Grand National four years running and winning each time.[2]

Sally was convicted of the murder of both boys and went to prison. Her first appeal against conviction was unsuccessful.[3] While some issue was taken in that first appeal with the accuracy of Professor Meadow's statistical evidence given at trial, the Court dismissed these errors as incapable of affecting the safety of the convictions.[4] The Court stated that "the trial was not about statistics" and that out of a 170 page summing up, only two or three pages dealt with the statistics.[5] As a result, even if there had been a statistical error at the trial, there was an "overwhelming case against the appellant" and "in the context of the trial as a whole, the point on statistics was of minimal significance".[6] The Court concluded that "there is no possibility of the jury having been misled so as to reach verdicts that they might not otherwise have reached".[7]

After the first appeal it came to light that microbiological tests had revealed that Sally's second son, Harry, had a colonisation of staphylococcus aureus bacteria at the time of his death. That had been known by Dr Williams, the Home Office Pathologist, since February 1998 but had not been disclosed to the defence or to any of the other medical witnesses. It had come to light only through the efforts of a lawyer who had not been satisfied with the verdict and who was acting pro bono for Sally.

---

2 See *R v Clark* [2003] EWCA Crim 1020 [*R v Clark* (second appeal)] at [99].

3 *R v Clark* (2000) WL 1421196 (CA) [*R v Clark* (first appeal)].

4 Vincent Scheurer, in an article "Convicted on Statistics?" (available at Understanding Uncertainty <www.understandinguncertainty.org>), says that, to the outside observer, the medical evidence in Sally Clark's trial was extremely complicated. There were a number of different medical issues debated by some nine specialists who reached different and contradictory conclusions. He suggests that what is striking about the case is that "within this sea of complexity, the staggering figure of 1 in 73 million stands out like a beacon of simplicity. Unfortunately for Sally Clark, far from being a lighthouse to the truth, this figure managed the feat of being both irrelevant and wrong."

5 *R v Clark* (first appeal), above n 3, at [183].

6 At [272].

7 At [272].

This new evidence led to a review by the Criminal Cases Review Commission and a second appeal. That second appeal in 2003 was successful. The Court of Appeal said that, since there was evidence that was not before the jury that might have caused the jury to reach a different verdict on the count in respect of Harry, that verdict was unsafe and had to be quashed.[8] As a result, the Court said that no safe conclusion could be reached that Christopher was killed unnaturally.[9] Sally was freed from prison, after an incarceration of over three years.

Her experience had, however, left Sally with major psychological and alcohol problems,[10] and she died on 16 March 2007 of accidental acute alcohol poisoning, aged 42. Her third son was then aged only eight. Sally's case prompted a review of a number of other cases by the Attorney-General which resulted in other convictions being overturned.[11]

It is probably true to say that, although the existence of the bacteria was the main reason for allowing the appeal, it is the statistical evidence given by Professor Meadow that became the focus of concern about this case.[12] It is therefore worth looking at how Professor Meadow calculated his odds. He started with the proposition that, for a family like the Clarks,[13] the probability of a single SIDS death was one in 8,543. He calculated the probability of two SIDS deaths in the same family as around one in 73 million, that being 8,543 multiplied by 8,543.

So why was he in error? The first mistake was that Professor Meadow's probability calculation methodology would only have been valid on the assumption that two SIDS deaths in the same family are independent of each other.[14] There are very strong reasons for supposing that assumption

---

8 *R v Clark* (second appeal), above n 2, at [134].

9 At [135].

10 Sally had had post-natal depression and alcohol issues after Christopher's death but she had been in recovery by the time Harry was born: see "Obituary of Sally Clark" *The Telegraph* (online ed, London, 19 March 2007). It appears that evidence of Sally's issues with alcohol and depression was put before the jury: see *R v Clark* (first appeal), above n 3, at [156].

11 For more information see Mark Townsend "Shaken baby convictions will stand" *The Guardian* (online ed, London, 12 February 2006).

12 In 2001, the Royal Statistical Society issued a statement relating to the issues in the Sally Clark case: Royal Statistical Society "Royal Statistical Society concerned by issues raised in Sally Clark case" (press release, 23 October 2001). See also Ray Hill "Multiple sudden infant deaths – coincidence or beyond coincidence?" (2004) 18 Paediatric and Perinatal Epidemiology 320. The Royal Statistical Society now has a Statistics and the Law Working Group, which produced four practitioner guides between 2010 and 2014 to assist practitioners in communicating and interpreting statistical evidence in the administration of criminal justice. They are available at <www.rss.org.uk>.

13 A non-smoking household, with at least one waged income in the household, and the mother 27 years or older.

14 Hill, above n 12, at 325.

is false. There may well be unknown genetic or environmental factors that predispose families to SIDS so that a second case within a family that has already suffered a SIDS death is much more likely than would be the case in another apparently similar family.[15]

Second, there is a real danger that the jury committed a statistical error known as the "prosecutor's fallacy". This fallacy consists of first showing that the "innocent" explanation for certain facts is highly improbable and then deducing guilt from that.[16] That is the wrong approach. The relevant question is whether it is more likely that the deaths were natural than that they were deliberate.

Professor Meadow should have assessed the probability of the alternative explanations – that the boys were victims of SIDS or that the deaths were caused by rare but natural causes missed by the pathologist performing the autopsies – and compared these explanations with the probability that a mother like Sally had murdered her first two children. Double murders by natural parents are very unusual and, indeed, one may think, likely to be rarer than double SIDS.[17] If all this is taken into account, the probability of Sally's innocence was in fact quite high.

In any event (and the third error), the probability of a child dying from SIDS from a family like the Clarks was in fact one in 1,300 and not one in 8,543.[18] Professor Meadow had ignored a major risk factor for SIDS: the fact that both of the Clark babies were boys.

In the meantime, what are the lessons we can take from this tragic saga? The first is that Professor Meadow was not a statistician. Nevertheless, he was allowed to give statistical evidence in front of the jury. His evidence was not seriously challenged by defence counsel at trial and no contrary evidence was called from a defence statistician.[19] Further, the first appeal was unsuccessful, despite the statistical errors being brought to the Court's attention. So can Professor Meadow really carry all the blame?[20] Or should the criminal justice system itself shoulder a large part of it?

---

15 At 321–323.

16 At 325.

17 At 321–323.

18 At 324–325.

19 *R v Clark* (first appeal), above n 3, at [120]. The Court of Appeal noted there had been no assistance from a medical statistician for either side.

20 Professor Meadow in fact was struck off the Medical Register by the General Medical Council in 2005 for serious misconduct in relation to Sally's case but reinstated in 2006 after he appealed. In *General Medical Council v Meadow* [2006] EWCA Civ 1390 at [205], Auld LJ commented that, when assessing the culpability of an expert witness accused of misconduct, all the circumstances must be considered including the emotional strain of testifying: "Not least … should be an appreciation of the isolation of an expert witness, however seasoned in that role, in the alien confines of the witness box in an adversarial contest

It seems to me that it is up to us as judges to ensure that expert witnesses stick to their areas of expertise. Statistical evidence should only be presented by those qualified to do so. This will not only be statisticians of course as many scientists (and especially forensic scientists) will be familiar with the particular statistical techniques and probabilistic assessments in their field of expertise.

The second lesson is to ensure that we as judges have a basic understanding of probability and statistics and their uses and limitations.[21] And that we encourage the counsel who appear in our courts to do the same.[22]

The third is to ensure that, when statistical evidence is presented to a jury (or indeed to a judge in a judge alone trial), it is presented in as simple a manner as possible and that it is properly explained, including the assumptions on which it is based and any qualifications to the evidence.[23]

---

over which the judge and the lawyers hold sway". Dr Alan Williams, the Home Office Pathologist who conducted the post-mortem examinations on both the Clark babies, also suffered consequences. He was banned from Home Office pathology work and coroner's cases for three years. The decision was upheld by the High Court. Those consequences to the doctors involved are obviously nothing like the trauma that Sally Clark and her family suffered by her being wrongfully sent to prison or to the subsequent tragedy of her death but their professional (and probably personal) lives must have been adversely affected.

21 As Chief Justice French of the Australian High Court has said, scientific literacy is central to modern decision making and, as a result, courts must have the capacity to assess scientific evidence. He suggests ongoing education for judges in relation to areas of science and technology relevant to their decisions: Robert French "Measure not on the Scale of Perfection" (speech given at the 5th International Conference on Evidence Law and Forensic Science, Adelaide, 22 July 2015) at 7. See also England and Wales Law Commission *Expert Evidence in Criminal Proceedings in England and Wales* (LC 325, 2011) at 10 for comments on mandatory training for both counsel and the judiciary. The Commission made recommendations for statutory regimes regarding the admissibility of expert evidence in criminal proceedings: at 48–58. The Government did not enact these recommendations but instead introduced amendments to the Criminal Procedure Rules. For discussion on the impact of these amendments, see Gemma Davies and Emma Piasecki "No More Laissez Faire? Expert Evidence, Rule Changes and Reliability: Can More Effective Training for the Bar and Judiciary Prevent Miscarriages of Justice?" (2016) 80 The Journal of Criminal Law 327; and Michael Stockdale and Adam Jackson "Expert Evidence in Criminal Proceedings: Current Challenges and Opportunities" (2016) 80 The Journal of Criminal Law 344.

22 The Royal Statistical Society's Practitioner Guides, described above at n 12, are a useful tool in this regard. Also in the United Kingdom, the Lord Chief Justice of England and Wales, the Royal Society and the Royal Society of Edinburgh recently launched a project to create a series of "primers" relating to the most popular areas of forensic science. These are to be presented in an accessible, plain English format and are designed to assist the judiciary, legal teams and juries when handling scientific evidence in the courtroom: The Royal Society "National academies and the law collaborate to provide better understanding of science to the courts" (11 April 2016) <www.royalsociety.org>.

23 As required by the New Zealand Code of Conduct for Expert Witnesses, High Court Rules 2016, sch 4. This code applies in civil proceedings only, although many of the principles have been set out in case law as applying in the criminal context: see *R v Carter* (2005) 22 CRNZ 476 (CA) at [47], approved in the postscript of *R v Hutton* [2008] NZCA 126.

As judges, we need to make sure that vague phrases such as "consistent with", "cannot be excluded" and "could have come from" are explained. "Consistent with", for example, usually seems to mean "not inconsistent with" and this concept is often useless unless the alternative explanations are also considered.[24] As the Sally Clark story illustrates, even if an outcome is unlikely assuming innocence, it could conceivably be even more unlikely assuming guilt.

None of this is to suggest that statistical and probability evidence is not good evidence. Of course good statistical and probability evidence is very often the best evidence. Indeed, such evidence is becoming more and more important in our courts, DNA evidence being the most prominent example of this. Statistics can also provide real assistance for other types of evidence, such as shoeprint and glass fragment evidence by comparing, in statistical and probability terms, the likelihood of a guilty and innocent explanation for possible matches (often referred to as the "likelihood ratio").[25] This type of evidence can be much more meaningful and fairer than assertions by experts of matches.

It is not just in trials that statistics can provide assistance. For example, risk assessment tools have been shown to provide better (although not perfect) predictions of the risk of recidivism than unstructured clinical judgement.[26] Statistics can thus play a role in sentencing and of course we must never forget the DNA exonerations that have occurred in recent years.

II MURDER OF DOROTHY WOOD

To my next case study, which occurred in May 1996. Mrs Dorothy Wood, a frail, arthritic and totally deaf 94-year-old woman, was asleep at her home in Huddersfield, England. In the early hours of the morning, an intruder, by means of a jemmy or screwdriver, forced open a small transom

---

24 See Colin Aitken, Paul Roberts and Graham Jackson "Practitioner Guide No 1: Fundamentals of Probability and Statistical Evidence in Criminal Proceedings – *Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses*" (Royal Statistical Society, 2010) at 60–62. As an example, the American Board of Forensic Odontology developed a set of terms that they expected their members to use in stating their conclusions. One study asked a group of laypeople to assess the terms on a 100-point scale as to how certain the expert was that the evidence originated from the suspect. The highest scoring term (and therefore indicating the strongest perceived association between the evidence and the proposed source) was "match" (86 out of 100). The term "match" was intended by the forensic dentists to represent the weakest linkage, the official definition being: "some concordance, some similarity, but no expression of specificity intended; generally similar but true for large percentage of population". The strongest connection term used by the dentists out of the four was ranked third in the survey, at 70.7: Dawn McQuiston-Surrett and Michael J Saks "Communicating Opinion Evidence in the Forensic Identification Sciences: Accuracy and Impact" (2008) 59 Hastings LJ 1159 at 1161–1162.

25 Aitken, Roberts and Jackson, above n 24, at 59. See also Graham Jackson, Colin Aitken and Paul Roberts "Practitioner Guide No 4: Case Assessment and Interpretation of Expert Evidence – *Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses*" (Royal Statistical Society, 2015) at 38–39.

26 See generally Susan Glazebrook "Risky business: Predicting recidivism" (2010) 17 Psychiatry, Psychology and Law 88.

window above her bed, scrambled through it and suffocated Mrs Wood with her pillow. Suspicion fell on Mark Dallagher. Mr Dallagher was, as one of my colleagues is wont to say, a rather unsatisfactory chap. In addition to living close to Mrs Wood, Mr Dallagher was a serial burglar and he frequently effected entry through a transom window.

The police found ear prints on the glass immediately below the transom window during the course of their scene examination. These were examined by two experts and compared with control prints provided by Mr Dallagher and others. They reported a match with Mr Dallagher's ear prints and he was duly arrested, tried and found guilty of murder in 1998.[27] It is fair to say that the main evidence relied on by the prosecution at trial was the ear print evidence and it appears from newspaper reports that this was the first time ear print identification had been used successfully in evidence in England.[28]

The first ear print expert at trial was a Dutch police officer who had specialised in ear print identification for some 10 years but without formal qualifications or training. The second expert was a forensic science professor. Both experts agreed at trial that the technique was in its infancy and that it would be useful if further research was done. But this did not stop them proffering their opinions. The Dutch police officer testified that he was "absolutely convinced" that the ear print was Mr Dallagher's.[29] The professor said it was highly likely to be Mr Dallagher's ear print, although he could not be 100 per cent satisfied. No challenge to the admissibility of the evidence was made by the defence at trial.

In 2002, four years after being convicted, Mr Dallagher successfully appealed on the basis that ear print evidence, in the current state of knowledge, could not safely be used to identify a suspect.[30] In 2004, DNA obtained from the ear print excluded Mr Dallagher as the source.[31] The Crown then abandoned the prosecution.

---

27 There was other evidence at trial: Mr Dallagher's history of burglaries was admitted as similar fact or propensity evidence and there was a jailhouse confession. According to the informant, Mr Dallagher revealed information about the killing, and in particular, about the use of the pillow; information which was not known to the general public: *R v Dallagher* [2002] EWCA Crim 1903, [2003] 1 CrAppR 12 at [3].

28 "Ear print catches murderer" (15 December 1998) BBC <www.news.bbc.co.uk>.

29 *R v Dallagher*, above n 27, at [9].

30 *R v Dallagher*, above n 27. It has been shown, for example, that ears change shape depending on the temperature or how hard they are pressed on a surface. There was also a paucity of research into the technique which was in its infancy at the time of trial: David Bamber "Prisoners to appeal as unique 'earprint' evidence is discredited" *The Telegraph* (online ed, London, 2 December 2011). See further C Champod, IW Evett and B Kuchler "Earmarks as evidence: A critical review" (2001) 46 Journal of Forensic Sciences 1275.

31 Bob Woffinden "Earprint landed innocent man in jail for murder" *The Guardian* (online ed, London, 23 January 2004). See, however, Vicki Martin "DNA Profiling of earprints" (Abstract, 2004) available at <www.le.ac.uk>, which suggests that DNA evidence obtained from ear prints is too inconsistent to be

So what lessons do we take from this case? The first is that, even if there is not a challenge to the admissibility of evidence, the courts should take care, in cases of novel science in particular, to ensure that it has a sufficient scientific base to be admitted as expert evidence. Cooperation is required between the judiciary and forensic science to keep what is commonly termed "junk science"[32] out of the courtroom.[33]

The second is that the witnesses should not have given evidence in such definite terms in what was at the least a technique in its very early days. Scientific method generally does not deal in certainties and witnesses should not suggest otherwise (or be pushed into it by counsel).

The third is that witnesses should be properly qualified. The Dutch police officer seems to have been working largely alone without peer review, validation, formal qualifications or training.

The fourth (and somewhat contradictory point) is that, just because a form of evidence is not accepted by the establishment, does not mean it is invalid – it may be at the cutting edge and set to overtake old thinking.[34]

III BRANDON MAYFIELD

This leads onto my next point. We do have to be wary of accepting what has always been accepted as necessarily reliable. Mr Brandon Mayfield was an American lawyer from Oregon and his fingerprints, which were held on an electronic database, came up in a search when the FBI was assisting with investigations into the train bombings in Madrid in March 2004.[35]

---

utilised reliably. However, I have not been able to source the underlying study and it is possible that the DNA from the ear print in this case may still have been sufficient to exclude Mr Dallagher as the source of the ear print.

32 Junk science is forensic science that is invalid in the "straightforward sense that it does not 'work': tests do not measure what they purport to measure, and results do not show what they purport to show": Paul Roberts "Paradigms of forensic science and legal process: a critical diagnosis" (2015) Phil Trans R Soc B 370 at 370.

33 The courts, however, perform the ultimate role of gatekeeper as to what evidence is admitted. In New Zealand, expert opinion evidence must meet the substantial helpfulness threshold set out by s 25 of the Evidence Act 2006. Principles of admissibility for novel scientific evidence to guide the application of the Evidence Act were discussed by the Ellen France P in her dissent in *Lundy v R* [2014] NZCA 576 at [42]–[48] (Harrison and French JJ agreeing on the analysis of these principles at [71]).

34 On this point, see for example Andre A Moenssens "Novel Scientific Evidence in Criminal Cases: Some Words of Caution" (1993) 84 J Crim L & Criminology 1; Karen Belt "Novel Scientific Evidence and Judicial Gatekeeping: *R v Calder* and *Daubert v Marrell Dow Pharmaceuticals* Compared" (1998) 28 VUWLR 399; and John DeWitt, James Richardson and Lyle Warner "Novel scientific evidence and controversial cases: a social psychological examination" (1997) 21 Law & Psych Rev 1.

35 Brandon Mayfield was a recent convert to Islam.

Three senior FBI fingerprint examiners concluded that Mr Mayfield's fingerprints were a 100 per cent match with those found at the site of the bombings. Thus, in May 2005, Mr Mayfield was arrested, despite protesting that he had never been to Spain. Approximately two weeks after Mr Mayfield was arrested, the Spanish National Police informed the FBI that it had identified an Algerian national as the source of the fingerprints. After the FBI undertook its own examination of the fingerprints of the Algerian, it withdrew its identification of Mr Mayfield's prints and he was released from custody.[36]

So is the Mayfield case an isolated incident? Well no. Indeed in 2009 the United States National Academy of Sciences (NAS) in a report on forensic evidence in court, concluded that for many of the common types of forensic science (including firearms, handwriting and fingerprint identification), there was simply not sufficient scientific basis for the so-called experts' conclusions.[37] The only exceptions were nuclear DNA analysis, toxicology and drug analysis.[38]

Taking fingerprints as an example, the NAS said that there had been assumptions made without proper testing, such as the idea that fingerprints are unique and do not change over time. It also said that the matching process was so subjective that it could not be called scientific. Further, there was inadequate training and validation of individual results. Since the report there has been more research conducted and better training and validation processes instituted in the United States.[39]

---

36 See Office of the Inspector General "A Review of the FBI's Handling of the Brandon Mayfield Case" (2006) available at <www.oig.justice.gov>. See also Alex Kozinski "Criminal Law 2.0" (2015) 44 Geo LJ Ann Rev Crim Proc iii at iv (preface) for a brief discussion of the Mayfield case. In that article, Justice Kozinski, Judge of the United States Court of Appeals for the Ninth Circuit, highlights numerous myths in the criminal justice system such as the myth that "fingerprint evidence is foolproof".

37 Nancy Gertner "National Academy of Sciences Report: A Challenge to the Courts" (2012) 27(1) Criminal Justice 8. See National Academy of Sciences *Strengthening Forensic Science in the United States: A Path Forward* (National Academies Press, Washington DC, 2009) [NAS Report]. The conclusions were simply not supported by their methodology or their training and there was not an adequate basis for individualisation, for linking crime scene evidence to a particular defendant, and much less for conclusions that were announced to an exceptional degree of certainty. For a discussion of the admissibility of fingerprint evidence in New Zealand, see *R v Carter*, above n 23.

38 In summary, the NAS stated that, in terms of scientific basis, the analytically based disciplines (for example, nuclear and mitochondrial DNA analysis, toxicology and drug analysis) generally hold a notable edge over disciplines based on expert interpretation (for example, fingerprints, writing samples, tool marks, bite marks, and specimens such as hair): NAS Report, above n 37, at 7. The NAS was highly critical of the competence of judges, lawyers and jurors, calling the courts "utterly ineffective" in apprehending and excluding poor expert evidence: at 53.

39 In the United States, there is a judicial reference manual on scientific evidence developed by the National Research Council and others: see *Reference Manual on Scientific Evidence* (3rd ed, National Academies Press, Washington DC, 2011).

More recently, the President's Council of Advisors on Science and Technology report was released.[40] This report effectively dismissed bite-mark analysis as a forensic science and highlighted issues with firearm analysis, footwear analysis, hair analysis, fingerprint analysis and DNA from complex-mixture samples. While the report recommended that bite mark evidence, firearms identification, footwear analysis and hair analysis not be admitted into evidence, the then-United States Attorney-General Loretta Lynch released a statement saying that the United States Justice Department would not adopt the recommendations of the report.[41] So I am not suggesting (at least yet) that courts should be abandoning fingerprint evidence, but we do need to remember that it is not infallible.

The Mayfield case had a fascinating aftermath, which illustrates another point I want to make. An experiment was carried out in which a group of five international fingerprint examiners were each given a pair of prints they were told were from the Mayfield case.[42] However, that was not the case. The two prints were from fingerprint sets that each examiner had in unrelated cases previously testified (under oath) were a conclusive match. Three out of the five examiners, thinking they were re-examining the flawed Mayfield prints, said that the prints did not match; one said he could not decide; and only one of the five said that the prints were a match.

This experiment illustrates the dangers of an expert's judgement being influenced by prior expectations, the idea being that people see what they expect to see. Given fingerprint examiners will know they are comparing crime scene prints with those of a suspect and may know why the person is a suspect, they may be highly susceptible to the effects of confirmation bias. There will also be "adversarial bias" arising from an expert's involvement in the adversarial system.[43] Some commentators have said that it is almost an "inevitable" consequence of the appointment of experts by partisans.[44] This adversarial bias may be present due to a number of factors[45] and lead to an

---

40 President's Council of Advisors on Science and Technology *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods* (September 2016).

41 Gary Fields "White House Advisory Council Report is Critical of Forensics Used in Criminal Trials" *Wall Street Journal* (online ed, New York, 20 September 2016).

42 Itiel E Dror, David Charlton and Alisa E Peron "Contextual Information Renders Experts Vulnerable to Making Erroneous Identifications" (2006) 156 Forensic Sci Int 74. See further Saul M Kassin, Itiel E Dror, Jeff Kukucka "The forensic confirmation bias: Problems, perspectives, and proposed solutions" (2013) 2 Journal of Applied Research in Memory and Cognition 42.

43 Emily Henderson and Fred Seymour "Expert Witnesses under Examination in the New Zealand Criminal and Family Courts" (Research Report, University of Auckland, 2013) at 27.

44 Geoffrey L Davies "Current Issues – Expert Evidence: Court-Appointed Experts" (2004) 23 CJQ 367 at 368.

45 See Henderson and Seymour, above n 43, at 28.

expert moulding his or her evidence to fit appointing counsel's case.[46] This may be an unconscious bias through being part of a "team" and only getting one side of the story. In addition to being part of a side, cross-examination could lead an expert to become defensive and to take more extreme positions than they would otherwise adopt.[47]

Another more general bias, known as "forensic confirmation bias", refers to the "class of effects through which an individual's pre-existing beliefs, expectations, motives, and situational context influence the collection, perception, and interpretation of evidence during the course of a criminal case".[48] All involved in the justice system need to remain aware of this.

In an attempt to stem any bias, many jurisdictions have promulgated codes of conduct for expert witnesses.[49] Clauses 1 and 2 of the New Zealand Code of Conduct for example emphasise that the expert has an "overriding duty to assist the court impartially" and is "not an advocate for the party who engages the witness". This obviously serves as a reminder but is not a total solution to what can be unconscious and natural bias.[50] Nor are other solutions, such as court-appointed experts or pre-trial consultation, necessarily without issues.

We all use prior knowledge, experiences and contextual clues in order to interpret and understand the events that occur in our everyday lives. But we are unaware of the processes that we rely on and that carries the risk of bias.[51] While we have over time become aware of the dangers of

---

46 See for example the comment by the United States Supreme Court in the case of *Melendez-Diaz v Massachusetts* 557 US 305 (2009) where it said "[b]ecause forensic scientists are driven in their work by a need to answer a particular question related to the issues of a particular case, they sometimes face pressure to sacrifice appropriate methodology for the sake of expediency. … A forensic analyst responding to a request from a law enforcement official may feel pressure – or have an incentive – to alter the evidence in a manner favourable to the prosecution."

47 As one commentator has suggested, "[p]ermitting cross-examination on these opposing views is as likely to polarise them further as it is to eliminate or reduce areas of difference": Davies, above n 44, at 377.

48 Kassin, Dror and Kukucka, above n 42, at 45.

49 In New Zealand, sch 4 of the High Court Rules provides a "Code of conduct for expert witnesses". In addition to the code of conduct, expert witnesses with professional memberships may already be covered by some internal code of conduct or ethical standards.

50 Whether such codes are enough to dispel more subtle and subconscious biases is another question. As some commentators have stated, while these types of codes "are impeccable normative ideals, experts who have been exposed to the direct and more subtle pressures of adversarial criminal proceedings might be forgiven for experiencing, if not total bewilderment, at least mild cognitive dissonance": Paul Roberts and Adrian Zuckerman *Criminal Evidence* (2nd ed, Oxford University Press, Oxford, 2010) at 509.

51 Gary Edmonds 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 at 2–4.

physical contamination of evidence, more needs to be done to address the risks of "cognitive contamination".[52]

IV EQUALITY OF ARMS

So to my final case study. In 1985, Anthony Ray Hinton was convicted of two separate killings of restaurant workers in Alabama. There were no eyewitnesses linking him to the crimes charged, no fingerprints linking him to the scene, and no other physical evidence except for a supposed link between the bullets found at the crime scenes and a gun found at Mr Hinton's home. There was identification evidence from a later restaurant robbery but he was not charged with that offence.[53] The identification evidence from that later robbery was given in court despite the fact that Mr Hinton had been working in a locked warehouse over 25 kilometres away at the time of the later robbery.[54]

Mr Hinton's appointed lawyer for the murder trial mistakenly thought he would not be allocated sufficient funds to hire a qualified firearms examiner. Instead, he retained a visually-impaired (blind in one eye) civil engineer with no expertise in firearms identification and who admitted in court that he could not operate the microscope properly to examine the evidence. In the closing argument, the prosecutor said, when comparing the defence firearms witness and the expert called for the prosecution: "There is no comparison. One man just doesn't have it and the other does it day in and day out, month in and month out, year in and year out, and is recognized across the state as an expert."[55] Mr Hinton was convicted and sentenced to death. He was to spend nearly 30 years on death row before being released in April 2015.

After 12 years of litigation, the United States Supreme Court finally reversed the lower courts and ordered a new trial. The new trial judge dismissed the charges after scientists at the Alabama Department of Forensic Sciences tested the evidence and confirmed that the bullets from the crime scene could not be matched to Mr Hinton's weapon.[56] In fact, the bullets from the murders could not be matched to a single gun. When Anthony Hinton was freed among his first words were "the sun does shine".[57]

---

52 At 2.

53 The manager from the more recent shooting (for which Mr Hinton was not charged) identified Mr Hinton from a photo line-up.

54 Equal Justice Initiative "Equal Justice Initiative Wins Release of Anthony Ray Hinton" (2015) <www.eji.org>.

55 *Hinton v Alabama* 571 US 693 (2014) at 268–269.

56 In 2002 attorneys for Mr Hinton had engaged three of the United States' top firearms examiners who testified that Mr Hinton's gun could not be matched to the crime scene evidence. Despite this, the prosecution had refused at that stage to re-examine the case or concede error.

57 Equal Justice Initiative, above n 54.

The Anthony Ray Hinton case is a stark example of the reality that there is often an inequality of resources between the prosecuting state and a defendant. This disparity is compounded when the defendant is indigent and relies on limited state funding and resources to present a defence.

In many countries expert evidence is largely provided by the prosecution. There are issues with this, apart from disparity of resources. First, the prosecution "owns" the crime scene, controlling its investigation and possession of any evidence taken from it. Secondly, many forensic scientists are employed by the state, leading to the sort of bias issues discussed earlier.[58] In addition, defence experts may not be available in a small jurisdiction and the Crown laboratories in these jurisdictions may be too small to be able to offer credible defence services, even if conflicts of interest could be managed.

V CONCLUDING THOUGHTS

This article has concentrated on miscarriages of justice arising, at least partly, from flawed expert testimony. The examples are not isolated ones. The Innocence Project reports that in more than 50 per cent of DNA exonerations cases, invalidated or improper forensic science contributed to the wrongful conviction.[59]

But we must not lose sight of the very great assistance that forensic techniques give, both in the investigation and successful prosecution of criminals. The message though is for courts to be vigilant in making sure proper standards are kept by experts giving evidence. Even with proper vigilance, however, the reality is that flawed evidence may still be given. This may be due to a particular expert's fallibility but may also be because scientific knowledge has moved on. This points to the need for robust post-conviction processes to address miscarriages of justice.

The fallible and ephemeral nature of science was encapsulated by a United States State Court, which said:[60]

---

58 Déirdre Dwyer "The Judicial Assessment of Expert Evidence" (Cambridge University Press, Cambridge (UK), 2008) at 32.

59 Innocence Project "Wrongful Convictions Involving Invalidated or Improper Forensic Science that Were Later overturned through DNA testing" <www.innocenceproject.org>. As the NAS report, above n 37, noted at 42, "even those [forensic scientists] who are critical of the conclusions of The Innocence Project acknowledge that faulty forensic science has, on occasion, contributed to the wrongful conviction of innocent persons".

60 *State v Behn* 868 A 2d 329 (NJ Super Ct App Div 2005) at 343. There are of course other challenges that the court faces in any attempt to find the "truth" such as reliability of eyewitnesses' perception or memory of events: see for example Elizabeth Loftus and James M Doyle *Eyewitness Testimony: Civil and Criminal* (Cluer Law Book, New York, 1987) at 38–39; and JJ Spigelman "Truth and the law" (2011) 85 ALJ 746. For more on memory issues see Matthew Gerrie, Maryanne Garry and Elizabeth Loftus "False Memories" in Neil Brewer and Kipling D Williams (eds) *Psychology and Law: An Empirical Perspective* (Guilford, New York, 2005) at 222–253. For discussion on issues surrounding identification evidence issues see Neil Brewer and Matthew A Palmer "Eyewitness Identification Tests" (2010) 15 Legal and Criminological

Science moves inexorably forward and hypotheses or methodologies once considered sacrosanct are modified or discarded. The judicial system, with its search for the closest approximation to the 'truth', must accommodate this ever-changing scientific landscape.

Psychology 77 at 90; Ian Fraser and others "The Police Line-up and Its Impact on the Justice System: A Legal-Psychological Review" (2009) 54 Crim LQ 332; and Margery Malkin Koosed "Reforming Eyewitness Identification Law and Practices to Protect the Innocent" (2009) 42 Creighton L Rev 595 at 597. Issues also arise relating to false confessions: see Saul Kassin "The Social Psychology of False Confessions" (2015) 9 Social Issues and Policy Review 25. For issues with assessing credibility of witnesses see Aldert Vrij *Detecting Lies and Deceit: Pitfalls and Opportunities* (2nd ed, John Wiley and Sons, England, 2008) at 115–141.