

Discussion paper:

Reaction to Hamer and Thompson in LPR

Charles E.H. Berger^{a,b}, Marjan J. Sjerps^{a,c}

^a*Netherlands Forensic Institute, The Hague*

^c*Leiden University*

^b*University of Amsterdam*

The Hamer contribution reveals a lot of the common misperceptions surrounding the issues in *R v T*. While the paper risks adding to the confusion of the uninformed reader, we will use it to list and address such misperceptions in this reaction. We acknowledge that the author will in some cases have described misconceptions held by others rather than his own, although this is not always clear.

- The author consistently refers to ‘Bayesians’ and ‘non-Bayesians’. In fact, many authors use the term ‘Bayesian approach’ to refer to the framework based on Bayes’ rule for interpreting evidence. It should be noted, however, that there is nothing exclusively Bayesian about the use of Bayes’ rule. Similarly, there is discussion about whether the appropriate term is ‘likelihood ratio’, or ‘Bayes Factor’. In this reaction, we will use the term ‘likelihood ratio approach’.
- The paper suggests that some view forensic examination as ‘a purely physical exercise’ and some might view the likelihood ratio approach as a ‘a pure exercise in the logic of inference’. In reality, this is not a matter of differing views or emphasis. A forensic examination is without value if its results are not interpreted in a logically correct way. It is not an academic exercise but a *conditio sine qua non* for any forensic examination. In an increasing number of

countries, forensic science is developing and putting the likelihood ratio approach into practice.

- The author emphasises the importance of the differences between the legal traditions for the requirements of logical inference and evaluation of evidence. However, the subsequent text does not provide clear arguments why this should be the case, and indeed we don't see why it would be.
- There is no real difference of opinion on the issue of transparency between Hamer and ourselves. The author is not able to draw a line between 'absolute transparency would be an illusory goal' and the rather gratuitous 'the expert should explain his or her reasoning fully' either. The fact that in the end it is the court that decides what is worth reporting does little to help the expert decide what he should write in his report, while he is writing it. Our contribution was aimed at providing criteria for the choice that the expert necessarily has to make, even if the court will have the final word.
- We agree that 'expert evidence should be confined to the area of the witness's expertise', but much like the court in *R v T*, the author fails to see that only the likelihood ratio approach succeeds in this confinement. This is clear from the forensic literature of the past decades, yet Hamer says: 'Arguments against evidence in the form $P(PS|FE)$ have been presented but they are not very persuasive' and 'yet I find it difficult to dismiss the traditional non-Bayesian approach to forensic evidence as wholly illogical.' We simply note that the author provides no arguments for his intuitions, which go against established science.
- Hamer notes that the requirement that the examiner be provided with the specific details of the competing cases presents two difficulties. The first is that the defense might not be willing to come up with an alternative proposition.

In practice, if the propositions are unavailable to the expert, he chooses them based on his limited knowledge of the case. For instance, in DNA comparisons the propositions can be 'the DNA is from John' versus 'the DNA is from another man unrelated to John'. Later in court it may turn out that this is not the most relevant alternative proposition, if the defence argues that the DNA is from John's brother. This would explicitly require the examiner to evaluate the evidence for the new proposition. Any approach where the evaluation of the evidence does not depend on

the relevant issues is either based on a fallacy or on some unknown implicit alternative proposition.

The second difficulty Hamer sees assumes that either the propositions themselves contain biasing information, or that you need to be exposed to biasing information in order to find the relevant propositions. The propositions themselves only contain the very issues that the evidence is supposed to shed light on. They are the essence of the question put to the examiner, and as such they are not biasing. But in looking for the relevant propositions an expert might be exposed to biasing case details. In such a situation he would be wise to pass on the propositions to a colleague who can then examine the evidential material without exposure to the potentially biasing information.

- We agree with Hamer where he notes that ‘one would not want to declare logical methods counterproductive or inconsistent with the law too frequently’. The laws of the country can be put above the laws of logic, but doing so leads to arbitrariness and injustice. In an analogous manner, those that do not accept the law of gravity will only enjoy weightlessness until they hit the ground. Logic is not bound by legal tradition or geographical location, and abandoning it will inevitably reduce the chances of justice being done. That is not a matter of opinion, but a matter of fact.
- Where the author attempts to explore probability theory we think the reader is best referred to the appropriate literature. Note e.g. that the author first (incorrectly) argues that $P(PS|FE)$ can be derived solely from considering the forensic evidence, whereas a few pages later he shows that ‘this will be biased by the base rate he or she happened to encounter’.
- By the time the author claims that ‘it is doubtful whether an expert is prohibited from expressing a view on the ultimate issue’ (section ‘transposing the conditional’), he must have forgotten the starting point of his discussion that ‘expert evidence should be confined to the area of the witness’s expertise’ (section ‘the common law jury trial’). We think the author is inconsistent when claiming both. Considering ‘the question of whether the shoe made the mark’ is not necessarily the same as considering the ultimate issue, but the answer to such a question invariably depends on factors that have nothing to do with shoes or marks, and which are outside the witness’s expertise.

The Thompson contribution is one that we largely agree with, and which echoes the criticism that many have expressed in the course of the past decades. We have just a few comments.

- Where Thompson notes that ‘The court was justifiably concerned about the absence of a sufficient database’, he might seem to buy into the false dichotomy of databases of insufficient size versus those of sufficient size. The main issue should be how representative a database is for the alternative proposition considered. The chosen database in this case was certainly more representative than the one suggested by the court, because it made more sense to consider burglars and the kind of shoes they are likely to wear, than the general population’s shoes (including stiletto heels, baby shoes, etc.). The size of the database plays a smaller role, since for a good estimation of frequencies of a very popular model shoe the database used would seem more than large enough. And any amount of representative data is better than no data at all (i.e. no database or not using it). No database will ever be ‘ideal’ in practice. For shoes, for instance, local fashion will vary with different groups of people and with time.
- Thompson is correct in that ‘different people may interpret words like “moderate” and “strong” in very different ways.’ It is worth noting that several institutes like the former Forensic Science Service (FSS) and the Swedish National Laboratory of Forensic Science (SKL) have defined these words explicitly, and that the standards of the Association of Forensic Science Providers (AFSP) require definition of those terms. Sure enough, that brings one back to (ranges of) numbers.
- On the issue of how readers of LR-based forensic conclusions interpret them, the author notes that ‘Empirical studies of this issue would be helpful, although, as far as I know, none have yet been conducted.’ At the Netherlands Forensic Institute (NFI) we implemented the likelihood ratio approach and report numerical as well as ‘verbal’ likelihood ratios. While we started large educational efforts among writers and readers of our reports, the NFI also commissioned a study into the level of spontaneous understanding of LR-based conclusions. The results confirmed our impression that readers do not

spontaneously understand the logic of evaluative forensic interpretation. In this study people were tested without any form of explanation or warning about the logic of the conclusion. Under those conditions, a majority will transpose the conditional regardless of conclusion phrasing or educational background of the reader. A factor that did make a clear positive difference was whether or not the reader previously received any education on the subject, how much of such education, and whether the person was applying this knowledge in practice (De Keijser *et al.*, 2009; De Keijser *et al.*, 2012).

- For features which are reduced to discrete classes, the concept of a ‘match’ is defined (as features being within the same class), and so is the random match probability. Thompson proposes to apply the same concept in ‘random match equivalents’, when features are not defined as classes and the concept of a ‘match’ is not defined either. While it can help convey evidential value to jurors, we hope that this artificial construct will not add to the confusion already surrounding the concept of a ‘match’ among examiners.

References

De Keijser, J.W., Elffers, H., Kok, R.M. & Sjerps, M.J. (2009). *Bijkans begrepen? Feitelijk en vermeend begrip van forensische deskundigenrapportages onder rechters, advocaten en deskundigen*. Boom Juridische uitgevers, Den Haag; ISBN 978-90-8974-225-4.

De Keijser, J.W., Elffers, H. (2012). Understanding of forensic expert reports by judges, defense lawyers and forensic professionals. *Psychology, Crime & Law*, 18, 191–207.