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Article Title: Certainty, Individualisation and the Subjective Nature of Expert Fingerprint Evidence

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Author: S. Cole and A. Roberts

Article's Subject Matter:

The authors give an overview of various aspects of fingerprint comparison that they feel need to be addressed. They discuss things like the science behind friction ridge comparison, the methodology and ACE-V, and sources of bias.

Key Points in Article

- Historically, fingerprint evidence was not challenged in court. Uniqueness has been accepted as a “fact”, but that does not necessarily address sufficiency for reaching a conclusion.
- In the US, through things like Daubert challenges and the NAS Report, the infallibility of fingerprint comparisons are being questioned. Claims that accuracy is at 100% lack credibility.
- The NIST/NIJ human factors report called for reform in areas of documentation, reporting, quality control, training, and research. The McKie report also did an extensive examination of fingerprint comparison.
- Scientific Basis: What supports the claim that a friction ridge impressions recovered at a scene can be attributed to a single source? Looking for “consistencies” (How many?) or “inconsistencies” is subjective when you have to decide what is consistent and what is inconsistent. Finding consistencies is not enough unless you address the rarity of the area that is being observed. Saying rarity is 1 or 100% says fingerprints are unique, but does not address the rarity of the specific area of friction ridge found at the crime scene. It can be accepted that fingerprints are unique, but how unique is the portion recovered at the crime scene? One way to look at this problem is with statistical approaches like likelihood ratios. So far, these are not yet good enough for acceptance in court. The second approach is the use of “black box” studies to demonstrate how well fingerprint examiners reach their conclusions, and to estimate false positive and false negative rates. The authors think a combination of both approaches is required. The question of uniqueness of friction ridge detail is not important. The important question is what support exists for the conclusions being reached.
- Methodology: This section gives an overview of ACE-V. In the Comparison phase, the examiner has to decide if any inconsistencies indicate a different source, or if it is within “tolerance”. But how is tolerance defined? In Evaluation, a decision has to be made



about sufficiency. Sufficiency is subjectively determined with the examiner giving varying weight to features based on a subjective idea of the rarity of certain features in combination. Some people claim that “A” and “C” are objective, but the authors argue that all three aspects of ACE are subjective. The authors believe that documentation (bench notes) is lacking, so it is difficult to see how a positive ident was arrived at, or more importantly, how a false ident occurred. The authors also take exception with the idea of doing AC more than once. They think “A” should be done once only, followed by “C” without ever looking back at the latent, since this will bias a second “A”. They also advocate for blind verification, without knowing what the conclusion was or who did the comparison. Some of the examinations of the fingerprint comparison process call for more documentation or special processes (consultation?) for complex prints, but there is no standard definition for what constitutes a complex print. The whole idea of relying so heavily on an examiner’s discretion seems troublesome to the authors.

- Bias: Bias can be introduced if too much unnecessary information is given to the examiner. Some of this section described some of the experiments that were carried out by Dror. More research may be required to determine what affects our perceptions of things, and how biasing factors can be addressed. Another form of bias is the positioning of fingerprint bureaux in the police agency.
- Presentation of conclusions: Conclusions of “inconclusive” or “identification” are seen by the authors as rounding down a partial correspondence to zero, and rounding up a close association to 1. The Nuffield Report has suggested using “opinion” in conclusions so that there was less problem with disagreement between examiners, and less problem with not matching the ground truth all the time. While this may make it easier to explain discrepancies or disagreements, it may also make the weight of evidence weaker. However, the past reputation of fingerprint conclusions may make it easy for triers of fact to still give great weight to these “weaker” conclusions.

Fallacies and or Issues

- The authors raise a number of relevant points, but many have been addressed. Many of the points raised have been mentioned previously (or later) in other publications.
- The uniqueness of fingerprints can be accepted, but the scientific support for a conclusion is not there yet (and may never be explained adequately). How do you decide what is consistent or inconsistent, and how do you decide if the latent has been identified? Black box or white box studies can validate the process, but cannot tell you in a specific case if the conclusion is correct.
- The criticism of ACE allowing for the repeated examination of the latent and the known may seem like a logical way to prevent bias, but would seem to be unrealistic in real life.
- The use of ACE as a shorthand description for how the comparison is done should not be studied too closely for its “scientific” merit.
- The use of bench notes should answer some questions about documentation and make it easier to review the process that was used for correct and incorrect conclusions.
- Bias is being recognized, and conscious efforts must be made to try to prevent it from affecting an examination. Examiners, although housed in law enforcement agencies, have to resist hearing too much about the case at hand. Some information must be shared, but care must be



taken to ensure that only the required information is communicated and biasing comments are not presented. Blind verification of some kind will help prevent some confirmation bias.

- Perhaps the most contentious point concerns conclusions. Using only inconclusive (0%) and identification (100%) seems a bit artificial and hard to defend. Calling conclusions “opinions” allows the examiner more latitude in expressing a more nuanced opinion as to the similarity of the latent mark to the known print. Trying to introduce something like probability conclusions will be one of the hardest pills for the current examiners to swallow.