

Title: Is Forensic Document Examination a Science?
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The 1993 United States Supreme Court case, *Daubert v. Merrell Dow Pharmaceuticals* (92-102), 509 U.S. 579 (1993) changed the federal court requirements for expert testimony in Rule 702 of the Federal Rules of Evidence.

Many states have adopted the Daubert approach, which makes the judge the gatekeeper who decides whether an expert may testify. The intent is to keep “junk science” out of the courtroom.

Daubert set forth a reliability standard to establish the validity of the methodology used. The following considerations are included:

- Can the methodology be empirically tested? The theory or technique must be falsifiable, refutable, and testable.
- Has the methodology been subjected to peer review and publication?
- Is there a known or potential error rate for the methodology used?
- Are standards and controls maintained concerning operating the methodology?
- To what degree are the theory and technique generally accepted by a relevant scientific community?

The Daubert Court cited Karl Popper. Popper proposed that the ability to falsify a premise is the basis of science, meaning that an examiner must attempt to demonstrate a hypothesis is false to avoid bias. From this perspective, forensic handwriting analysis is, in fact, scientific.

Case History Subsequent to Daubert

In 1995, in *United States v. Starzecpyzel*, 93 Cr 553 (LMM), 880 Fed.Sup. 1027 (S Dist N.Y. 1995), the court determined forensic document examiners (FDEs) are “skilled experts” rather than scientists. The Daubert standard was not applied to forensic document examiners.

In that case, the government’s FDE, Mary Kelly, was unable to articulate any standard or quantitative method by which a questioned document could be distinguished from an individual’s writing. She was unable to cite a scientific study supporting quantitative evidence for the validity of FDE’s opinions.

The Court wrote, “The government ... produced no evidence of mainstream scientific support for forensic document examination.”

In 1997, in *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999), the United States Supreme Court applied the Daubert standard to all expert testimony, not just testimony from scientists. Therefore, the Court stated that Daubert tests do apply to forensic document examiners. This changed the opinion put forth by the *Starzecpyzel* Court.

California's Science-Based Standard

In 1923, *Frye v. United States*, 54 App. D.C. 46, 47, 293 F. 1013, 1014 (1923) developed law regarding the admissibility of expert testimony. California follows the Frye standard.

The Frye case establishes that experts must use generally accepted practices in the industry when performing scientific examinations. The Frye Court wrote, "...while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs."

Application of the scientific method to forensic handwriting analysis

A forensic document examiner performs a comparative analysis between the known handwriting and the writing in question. The document examiner starts with the hypothesis that a person wrote the questioned document or did not write the questioned document.

Whichever hypothesis is assumed, a competent document examiner seeks to falsify that hypothesis. If instead he or she attempts to confirm the premise, this can lead to confirmation bias where evidence that contradicts the hypothesis is ignored. Falsifying a hypothesis applies the scientific method.

The basis of handwriting identification

In theory, handwriting is unique to a specific person. This theory is not provable. Limiting the focus to potential suspects rather than all people improves the chances that the handwriting being considered is unique.

Although no two writings by the same person are identical, unique traits can be found among various known writings by a specific person. The FDE analyzes a person's known writing to determine whether unique traits found in the questioned writing are also found in the known writings.

Quantitative measurements can be used to obtain a statistical analysis of the handwriting. Published research shows that ratios such as the relative height of letters is consistent among a person's writings. This is one example of many attributes to study.

A good simulation or tracing of a person's writing will show similar statistical results as authentic writing. The FDE must also test for this occurrence as well as all other attributes of the writing.

The examiner does not anticipate finding all unique traits of the questioned writing in each known writing. In the same way, the unique traits in one known writing exemplar may not be found in all writings of the same person.

When all the traits of the writing in question are found across the known writings, the document examiner opines in the direction of identifying the writer of the known writing as the writer of the questioned writing. When unique traits found in the questioned writing are not found in the

known writings, the document examiner opines in the direction of eliminating the writer of the known writings as the writer of the questioned writing.

In no circumstances has a document examiner proven a person either wrote or did not write the document. Additional evidence can cause the examiner to modify their original opinion if new evidence falsifies the original opinion. This is why the document examiner should be presented with as many known handwriting samples as possible.

Study results of document examination

Starzecpyzel produced a substantial body of research to determine the validity of forensic handwriting analysis. Controlled university studies comparing the skill of trained document examiners have been performed.

Independent researchers also have conducted studies to determine whether trained document examiners are better at identifying whether someone wrote a document or signature.

Each study has shown statistically significant differences between trained examiners and lay people. Many of these studies have been published in peer reviewed journals.

Application of scientific techniques to altered documents

Forensic document examiners often are asked to determine a document's authenticity. Documents may be altered using computer software such as Photoshop. A signature may be authentic, yet it was copied from another document. Photocopiers are so good that it is often visually difficult to determine whether a signature was produced with ink or is a photocopy.

A document examiner uses a microscope to view the signature to see how it was constructed. A hypothesis that the signature is authentic can be falsified by evidence of photocopying. Applying the scientific method, the document examiner attempts to falsify the hypothesis that the image is authentic.

A common method of altering documents is to use a similarly colored pen to change a number such as a 1 into a 4, 7, or 9. Although the change cannot be visually discerned, infrared light can be used to differentiate the inks.

Ultraviolet light may be used to identify alterations such as erasures or different paper used for different pages of a document such as a contract or a will.

In one case, I identified an inserted page in a trust by magnifying the way the toner was laid down on the various pages. The page in question was different from the other 14 pages of the trust. It had a printer-induced defect.

My initial hypothesis was that all pages would show the same printing if all were printed with the same printer. If this were true, this particular defect would have appeared on every page or every third or fourth, depending on the source of the defect. However, the defect appeared on only the page in question. Thus, the hypothesis was falsified. I opined the page in question was printed either at a different time or a different printer than the remainder of the trust.

Summary

Forensic document examiners are “skilled experts” who apply the scientific method to their discipline. Although forensic document examination is not an exacting science such as mathematics, a science-based approach is required to support the opinion expressed in a case accurately.

Not all FDEs apply a science-based approach to their methodology. Ask your document examiner what methods they use to apply the scientific approach.

About the author

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