



## TALKING POINTS

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**Talking points** are succinct statements designed to persuasively support one side taken on an issue. Such statements can either be free standing or created as retorts to the opposition's talking points and are frequently used, areas heavy in debate.

The following Talking Points in Forensic Document Examination are not exhaustive or all-inclusive of every detail, and were compiled from various sources to serve as an overview and general summary that forensic document examiners should be familiar with.

For further information, any interested forensic document examiner is encouraged to perform additional research on these or any other relevant topics of debate in forensic document examination and/or forensic sciences. Additions to the summaries listed here are always welcome.

Talking Points in this section include

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## Talking Points for Daubert Questions:

### Overview:

The U.S. Supreme Court decision reached in the case of *Daubert v. Merrill Dow Pharmaceuticals, Inc.* in 1993 gave rise to many challenges in determining reliability of expertise, including forensic document examination.

The court provided certain criteria that must be met. These are now known as the 5 Daubert factors. To determine whether or not the criteria were met, judges were assigned the role of “gatekeeper” and this word provides a helpful acronym to help remember the 5 Daubert factors:

- GA:** General Acceptance
- T:** Whether the theory or technique used has been Tested
- E:** The Existence and maintenance of Standards controlling the technique’s operation
- KE:** The Known or potential Error rate
- PR:** Whether the technique has been subject to Peer Review and publication

### How does forensic document examination, specifically handwriting examination and comparison, meet the 5 prongs of Daubert?

**General Acceptance:** This term refers to the acceptance of a technique or methodology by the relevant scientific community. Forensic document examination has been accepted in the U.S. for over 100 years. The Supreme Court has already accepted handwriting evidence in the case of *U.S. v. Schmerber*. Forensic document examination is an expertise provided by all major law enforcement agencies. In addition there is a Questioned Document Section in the following forensic organizations:

The American Academy of Forensic Sciences (AAFS)  
The International Association of Identification (IAI)  
Mid-Atlantic Association of Forensic Sciences (MAAFS)  
Mid-Western Association of Forensic Sciences (MAFS)  
The Northeastern Association of Forensic Sciences (NEAFS)  
The Canadian Society of Forensic Sciences  
The Australian Forensic Science Society  
The New Zealand Forensic Science Society  
The British Academy of Forensic Sciences  
The International Association of Forensic Sciences

The following universities offer courses in forensic document examination as part of their forensic science programs:

George Washington University  
Michigan State University  
John Jay College of Criminal Justice

National University  
University of Alabama at Birmingham  
University of New Haven  
University of Central Oklahoma  
University of Illinois at Chicago  
Oklahoma State University

The FBI offers a course in Fundamentals of Forensic Document Examination.

ASCLAD-LAB (The American Society of Crime Laboratory Directors – Laboratory Accreditation Board) evaluates the discipline of Questioned Documents along with other disciplines to determine if it meets specific standards.

**Testability:** Testability addresses the question of whether the method or technique has been or can be tested; a critical evaluation process that supports or refutes a hypothesis. The basic premise of forensic handwriting examination and comparison is that no two writers share the same combination of handwriting characteristics and a writer cannot exactly write the same way twice (each writer’s writing has variation.) The following tests support these hypotheses.

In the **US Secret Service’s FISH** (Forensic Information System for Handwriting) database, which as of 2006, contained writing from over 10,000 different individuals, and its German counterpart database, which contained writing samples from over 100,000 individuals, no two writers have been found to have the same combination of handwriting characteristics.

The **Center of Excellence for Document Analysis and Recognition (CEDAR)** at the State University of New York in Buffalo conducted a study lead by Dr. Sargur Srihari in which samples of handwriting were collected from over 1500 in the U.S. Computer software known as CEDAR-FOX was used to measure selected handwriting features. Based on a combination of measurements taken, the computer system was able to identify a writer with a confidence level of 95%.

Numerous published articles that support the individuality of handwriting include:

**Twins Studies:** Studies of the handwriting of identical twins performed in 1960 involving 50 sets of twins, and in 1980 involving 58 sets of twins came to the same conclusion that with a sufficient amount of writing it was always possible to distinguish the handwriting of identical twins. (See Beacom, Mary S., “A Study of Handwritings by Twins and Other Persons of Multiple Births” published in the Journal of Forensic Sciences, Vol. 5, No. 1 1950, and Gamble, D. “The Handwriting of Identical Twins” published in the Canadian Society of Forensic Science Journal, Vol. 13, No. 1980).

**Existence and Maintenance of Standards that control the operation of techniques or methods.**

This prong of Daubert requires the establishment and maintenance of operations guidelines/protocols for conducting analytical testing, and monitoring quality assurance and controls.

ASTM (American Society for Testing and Materials) has been in existence since 1898 and is one of the largest voluntary standards development organizations in the world. ASTM provides a forum for the development and publication of voluntary consensus standards for materials, products, systems, and services, including forensic science. Guidelines published by ASTM provide objective documentation of standards of examination methodology. As of 2011 the following ASTM standards pertaining to forensic document examination have been published: It should be kept in mind that all standards are works in progress. They are periodically updated and revised, and additional new standards may be issued.

E444 Standard Guide for Scope of Work for Forensic Document Examiners

E678 Standard Practice for Evaluation of Scientific or Technical Data

E860 Standard Practice for Examining and Preparing Items that are or may become Involved in Criminal or Civil Litigation

E1422 Standard Guide for Test Methods for Forensic Writing Ink Comparison

E1658 Standard Terminology for Expressing Conclusions of Forensic Document Examiners

E1732 Standard Terminology Relating to Forensic Science

E1789 Standard Guide for Writing Ink Identification

E2195 Standard Terminology Relating to the Examination of Questioned Documents

E2285 Standard Guide for Examination of Mechanical Checkwriter Impressions

E2286 Standard Guide for Examination of Dry Seal Impressions

E2287 Standard Guide for Examination of Fracture Patterns and Paper Fiber Impressions on Single-Strike Film Ribbons and Typed Text

E2288 Standard Guide for Physical Match of Paper Cuts, Tears, and Perforations in Forensic Document Examinations

E2289 Standard Guide for Examination of Rubber Stamp Impressions

E2290 Standard Guide for Handwritten Items

E2291 Standard Guide for Indentation Examinations

E2325 Standard Guide for Non-destructive Examination of Paper

E2331 Standard Guide for Examination of Altered Documents

E2388 Standard Guide for Minimum Training Requirements for Forensic Document Examiners

E2389 Standard Guide for Examination of Documents Produced with Liquid Ink Jet Technology

E2390 Standard Guide for Examination of Documents Produced with Toner Technology

E2494 Standard Guide for Examination of Typewritten Items

In addition to the ASTM Standards, ASCLD-LAB requires written policies regarding examination techniques, case notes, and the handling of evidence. For laboratories accredited by ASCLD-LAB or ISO, this provides another avenue to satisfy the mandatory criteria of having established standards.

**Known or Potential Error Rate:** Although in Daubert, the court did not define error rate, it can be described as the frequency at which one deviates from a correct standard. Errors can occur from a number of sources, and may result in either:

False Positive Error: Identification of a writer when the questioned document was not executed by that writer, or:

False Negative Error: Elimination of a writer when the questioned document was executed by that writer.

It is very difficult to measure error rate of a particular examiner because it deals with a unique event that cannot be statistically duplicated. Forensic document experts are permitted to express opinions to a reasonable degree of scientific certainty, and to a reasonable degree of professional certainty. There have been studies, however, which compare the ability of forensic document examiners to laypersons and these studies have documented error rates as they apply to those specific studies.

Dr. Moshe Kam, a Professor at Drexel University, School of Engineering and Applied Sciences, conducted a series of proficiency tests that demonstrate that forensic document examiners consistently outperform layperson in tasks of handwriting comparisons. These include the following studies:

Writer Identification by Professional Document Examiners (JFS, 1994) Study involved handwriting and hand printing examined by 7 FDS and 10 laypersons. Results indicated that laypersons were 56 times more likely to associate handwriting than FDE's and were also 36 times more like to wrongly differentiate handwriting than the FDE group.

Proficiency of Forensic Document Examiners in Writer Identification (JFS, 1997)  
Expert FDE's erroneously matched samples 6.5% while laypersons erroneously matched 38.3%

Effects of Monetary Incentives on Performance of Non-professionals in Document Examination Proficiency Tests (JFS, 1998). This study was conducted in response to criticisms regarding motivation to do well on the tests. Various monetary incentives were offered to laypersons to determine whether this affected their performance. In testing a total of 132 laypersons, Dr. Kam found no statistical difference from the earlier studies.

Signature Authentication by Forensic Document Examiners (JFS 2001). In this study of genuine and simulated signatures, FDEs erroneously concluded that non-genuine signatures were genuine in .49% of the cases, while laypersons made these incorrect conclusions at a rate of 6.47%. FEDs erroneously concluded that genuine signatures were non-genuine 7.05% of the time compared to laypersons rate of error of 26.1%.

Writer identification using hand printed and non-hand printed questioned documents (JFS 2003). A total of 90 FDEs and 34 layperson were tested in the examination of hand printing and cursive writing (non-hand printing). Laypersons were 4 times more likely than the FDE group to identify the wrong writer to a set of hand printing. Laypersons were also 7 times more likely than FDEs to identify the writer in the set of non-hand printed documents.

The results from all of these studies support that FDEs do have special skill in perceiving similarities and differences when compared with the critical lack of skill in laypersons.

**Peer Review** Peer review ensures that the relevant scientific community has had an opportunity to review the research and theories of colleagues in order to detect any fallacies. There are two types of peer review: internal and external. At most laboratories, examiners are required to have their case reports reviewed by a second qualified examiner. This is an example of internal peer review. Peer review may also include the evaluation of an individual's technical proficiency by an external organization. For example, in order to become certified by the ABFDE, the candidate for certification is subjected to peer review of their submitted tests by a group of ABFDE certified forensic document examiners. Meetings of professional organizations and societies, research, training seminars, proficiency testing, research presentations, and publications in relevant scientific journals are all venues for peer review.

Even though many states are not considered "Daubert states", and the Supreme Court decision did not require the expert to meet all 5 factors, it is a good idea for the forensic document examiner to be aware of the criteria. Questions about the reliability of forensic document examination have been worked into cross examination questions in cases even when there is no formal Daubert hearing, and this line of questioning has been allowed before juries.

## Talking Points For NAS Questions:

### Overview:

The NAS Report of March 2009 raised a number of issues about the various disciplines in forensic science, particularly with regard to the comparative sciences.

### In the Report, the Committee put forth 13 specific recommendations:

1. "To promote the development of forensic science into a mature field of multidisciplinary research and practice, founded on the systematic collection and analysis of relevant data, Congress should establish and appropriate funds for an independent federal entity, the National Institute of Forensic Science (NIFS)" NIFS should focus on such things as: establishing standards for the mandatory accreditation of forensic science laboratories and the mandatory certification of forensic scientists. NIFS would also oversee research and technical development, educational programs, funding for state and local forensic science agencies, accreditation of forensic science programs in colleges and universities.
2. NIFS, "after reviewing established standards such as ISO 17025, and in consultation with its advisory board, should establish standard terminology to be used in reporting on and testifying about the results of forensic science investigations."
3. "Research is needed to address issues of accuracy, reliability, and validity in the forensic science disciplines." Areas of research should include studies establishing the scientific bases demonstrating the validity of forensic methods; establish the limits of reliability and accuracy that analytic methods can be expected to achieve development of quantifiable measures of uncertainty and automated techniques capable of enhancing forensic technologies.
4. "To improve the scientific basics of forensic sciences examinations and to maximize independence from or autonomy with the law enforcement community." Congress should authorize and appropriate incentive funds to the NIFS for allocation to state and local jurisdictions for the purpose of removing all public laboratories and facilities from the administrative control of law enforcement agencies or prosecutors' offices.
5. "The NIFS should encourage research programs on human observer bias and sources of human error in forensic examinations." Studies might include those that determine the effects of contextual bias and to what extent the result of forensic analyses are influenced by this bias. Based on the results of these studies, NIFS should develop standard operating procedures to minimize potential bias and sources of human error.
6. NIFS should have authorization and appropriate funds to work with NIFS, in conjunction with government labs, universities, and private labs and in consultation with Scientific Working Groups, to develop tools for advancing measurement, validation, reliability, information sharing, and proficiency testing

- in forensic science and to establish protocols for forensic examinations, methods, and practices.
7. "Laboratory accreditation and individual certification of forensic science professionals should be mandatory, and all forensic science professionals should have access to a certification process." "...No person (public or private) should be allowed to practice in a forensic science discipline or testify as a forensic science professional without certification." "...All laboratories and facilities (public or private) should be accredited, and all forensic science professions should be certified, when eligible, within a period established by NIFS."
  8. Forensic labs should establish routine quality assurance and quality control procedures to ensure the accuracy of forensic analyses and the work of forensic practitioners.
  9. "The NIFS, in consultation with its advisory board, should establish a national code of ethics for all forensic science disciplines and encourage individual societies to incorporate this national code as part of their professional code of ethics."
  10. NIFS should work with appropriate organizations and educational institutions to improve and develop graduate educational programs designed to cut across organizational, programmatic, and disciplinary boundaries. These programs must also include attractive scholarship and fellowship offerings. NIFS should also support law school administrators and judicial education organizations in establishing continuing legal education programs for law students, practitioners, and judges.
  11. To improve medicolegal death investigations, Congress should authorized and appropriate incentive funds to the NIFS for allocation to states and jurisdictions to establish medical examiner systems, with the goal of replacing and eventually eliminating existing coroner systems.
  12. To achieve nationwide fingerprint data interoperability. This, however, should not be seen as a latent print issue only. One section of this recommendation is that "baseline standards – to be used with computer algorithms—to map, record, and recognize features in fingerprint images, and a research agenda for the continued improvement, refinement, and characterization of the accuracy of these algorithms (including quantification or error rates)." This could and should be applied to handwriting recognition also.
  13. NIFS should prepare, in conjunction with the Centers for Disease Control and Prevention and the FBI, forensic scientists and crime scene investigators for their potential roles in managing and analyzing evidence from events that affect homeland security, so that maximum evidentiary value is preserved from these unusual circumstances and the safety of these personnel is guarded.

## **What exactly did the NAS Report have to say about forensic document examination?**

Four pages in the Report (pages 163-167) discuss and describe Questioned Document Examination. The Summary Assessment states:

“The scientific basis for handwriting comparisons needs to be strengthened. Recent studies have increased our understanding of the individuality and consistency of handwriting and computer studies and suggest that **there may be a scientific basis for handwriting comparison**, at least in the absence of intentional obfuscation or forger. Although there has been only limited research to quantify the reliability and replicability of the practices used by trained document examiners, **the committee agreed that there may be some value in handwriting analysis.**”

References cited here included:

- the Kam study published in the Journal of Forensic Sciences 42(5):778-786;
- ASTM Standard 1658,
- the study by Sita, Found and Rogers published in the Journal of Forensic Sciences 47:1117; and,
- Srihari’s study reported in the Journal of Forensic Sciences 47(4):1-17.

### **With regard to ink and paper analysis, the report had this to say:**

“Analysis of inks and paper, being based on well-understood chemistry, presumable rests on a firm scientific foundation. However, the committee did not receive input on these fairly specialized methods and cannot offer a definitive view regarding the soundness of these methods or of their execution in practice”.

For further information, or to read the report in its entirety, see “Strengthening Forensic Science in the United States: A Path Forward:”

[http://www.nap.edu/catalog.php?record\\_id=12589](http://www.nap.edu/catalog.php?record_id=12589)