

Media Guide: How We Talk about Forensics and a Glossary

All too often, when forensic analysts testify in court that they have found a perfect match, just like the actors on popular CSI and forensics shows. Those claims are exaggerations that gloss over the nuance and uncertainty inherent in much of the work that forensic examiners actually do. The language and the terms used to describe forensics are important. Lawyers, judges, scientists, and policymakers have increasingly focused on that language, and adopted reforms. It is more important than ever that the media also carefully consider how forensics are described in the press.

What is a Match?

For decades, both forensic examiners and media reports, would use the term “match” to describe how they linked forensic evidence to a suspect. The word “match” is vague and it is not commonly used today by well-trained forensics professionals. After all, “match” can imply a perfect match, a certain conclusion that a pattern in fact came from an object, or it can describe a loose association, like that two people wearing black t-shirts “match.” At the FBI, supervisors have instructed hair and fiber examiners not to use the word “match” ever since the high-profile O. J. Simpson trial, at which the judge barred an FBI examiner’s use of the word regarding hair evidence. Instead, fingerprint examiners now use terms like “source identification” with quite detailed accompanying definitions.

For a really good discussion of the issue, [Discover Magazine](#) put it this way:

Trained examiners judge whether two pieces of evidence look similar enough to call them a match — say, a fingerprint from a crime scene and a suspect. But such a nebulous threshold, *similar enough*, means two experts can reach different conclusions, given the same evidence.

The term “match” should not be used. Instead, more precise language should be used that actually explains how reliable the conclusion was. For many forensic disciplines, as described, all that can be said is that an examiner was able to compare evidence and observed similarities. It cannot be said whether a “match” was made or how probable it is that the evidence came from a particular source.

Unfortunately, one still sees uses of the term “match” in the media and by law enforcement. For example, a U.S. Department of Justice [press release](#), described the evidence in a prosecution that resulted in a guilty plea, stating that:

A match was generated from the test fire of the seized Glock handgun through the National Integrated Ballistic Information Network (NIBIN).

Or the Kansas City, Missouri Police Department [profile](#) of the head of the firearms section of their crime lab, explained that the unit can: “confirm conclusively, for example, if a specific gun fired all the casings at a crime scene. As a result, members are often testifying in court.” They added:

One significant tool the firearms section uses is the National Integrated Ballistic Information Network (NIBIN). Lalli’s team will test-fire a gun to retrieve cartridge cases that they enter into NIBIN. The program can compare and match cartridges from jurisdictions around the country.

Is there such a thing as an identification?

One also often sees the claim that forensic methods can identify individuals or that an examiner made an “identification.” This term raises many of the same concerns as the term “match,” except it may imply even more certainty about a conclusion that the evidence in fact came from a person or source.

One still sees government and media accounts describing these types of overstated conclusions. One lab, for example, explains on its website that: “[t]he Latent Evidence Section develops and identifies latent fingerprints, palm prints, and sometimes even foot prints.” They add, “[w]hen these tiny details are constant in both prints without any unexplainable differences, then the prints can conclusively be said to have a common origin or, in other words, to have been made by the same person.”

In cases of innocent people, a range of experts have offered similarly categorical conclusions, using a variety of terms such as “identification,” “individualized,” or “match.” This type of overstatement was, years later, singled out by the FBI as a type of error, in which the expert inappropriately claims that evidence can be associated with a specific individual to the exclusion of all others.

A range of scientific groups as well as labs, and the U.S. Department of Justice, have provided guidance regarding these types of identification-based conclusions. In a series of guides regarding forensic reporting and testimony, the Department of Justice provides standards that limit what an examiner can appropriately say. For example, regarding fingerprint work:

An examiner shall not assert that two friction ridge impressions originated from the same source to the exclusion of all other sources or use the terms 'individualize' or 'individualization.'

A leading scientific organization, the AAAS, in a 2017 report regarding fingerprint evidence, explained that more caution is needed for such disciplines:

Because there is no scientific basis for estimating the number of people who might be the source of a particular friction ridge print, we recommend that latent print examiners stop using the terms “identification” and “individualization.” These terms clearly imply that latent print examiners have the ability to single out the source of a print—to link it to a particular individual to the exclusion of any others.

The term identification, proposed or not, implies an ability to limit the source of a friction ridge print to a single individual. That is an ability that latent print examiners cannot justifiably claim to have.

Raising similar concerns, the White House PCAST report suggested forensic scientists use the term “**proposed identification**” in order to “appropriately convey the examiner’s conclusion, along with the possibility that it might be wrong” (PCAST 2016, p. 45).

Some judges have also limited the types of language that forensic examiners can use. For example, in the area of firearms comparisons, a series of judges have ruled that examiners cannot use terms like identification, but can only describe a reasonable certainty, or that they cannot exclude a particular firearm.

Does experience matter?

Experts have sometimes told jurors that they have examined tens of thousands of samples in their careers, and never have been wrong. It is understandable that people would assume that a more experienced examiner might become more reliable over time. However, those experts are often not actually having their work routinely tested. We do now know how often they were right or wrong in their

casework. This type of language is highly misleading. As a result, the FBI has similarly called these experience-based claims errors. The Department of Justice forbids them. The DOJ has explained:

An examiner shall not cite the number of latent print comparisons performed in his or her career as a measure for the accuracy of a conclusion offered in the instant case.

What is Reasonable Scientific Certainty?

Another type of phrase that some forensic professionals have used is “reasonable scientific certainty.” That term has no particular meaning. Indeed, one reason that some forensic experts started to use those terms is that courts, which were concerned with overstated language like “match” or “identification,” thought that a “reasonable” degree of certainty would be somewhat more cautious. The problem is that it is vague and does not refer to any actual degree of certainty that can be measured. As a result, some agencies, including the U.S. Department of Justice in its standards, forbid such statements. For example, regarding fingerprint work, the Department of Justice states:

An examiner shall not use the expressions 'reasonable degree of scientific certainty,' 'reasonable scientific certainty,' or similar assertions of reasonable certainty as a description of the confidence held in his or her conclusion in either reports or testimony unless required to do so by a judge or applicable law.

Experts must offer real probabilities, and so should journalists

Forensic experts have exaggerated conclusions by making up statistics. In Timothy Durham’s case, an analyst at the Tulsa Police Laboratory testified that the particular reddish-yellow hue of his hair and the crime scene hair were only found in “about 5 percent of the population.” That number was pulled out of the air. When an expert presents a DNA test result to the jury, well-grounded statistics can be used, because DNA is based on population data. However, in a range of cases involving hair comparisons, like Durham’s, the forensic analysts similarly made up probabilities, saying that it was “very likely” from the same source or that the features were “rare.” The science does not permit an expert to say whether ten, a hundred, or a million other people might have the same hair characteristics. The FBI would later call this type of overstatement an error. Nevertheless, it is still common to see media reports regarding “rare” probabilities that forensics could have come from anyone else.

There is excellent guidance from the American Statistical Association (ASA) on how to report and discuss statistical statements regarding forensic evidence. The ASA explains:

Statistical statements should rely on: (1) a defined relevant database describing characteristics, images, observed data, or experimental results; (2) a statistical model that describes the process that gives rise to the data; and (3) information on variability and errors in measurements or in statistics or inferences derived from measurements. This information permits a valid statistical statement regarding the probative value of comparisons or computations (e.g., how rare is an observed positive association when two items arise from the same source and when they arise from different sources?).

A comprehensive report by the forensic scientist should report the limitations and uncertainty associated with measurements, and the inferences that could be drawn from them. This report might include a range of possible values for an estimated quantity, a separate statement regarding errors and uncertainties associated with the analysis of the evidence and resulting opinions, or empirical performance data associated with a chosen statistical model. If the forensic science

practitioner has no information on sources of error in measurements and inferences, or has no validation data, the ASA recommends that this fact be stated.

- <https://www.amstat.org/asa/files/pdfs/POL-ForensicScience.pdf>

Forensic Toolkit Glossary Terms:

- Accreditation
 - The process of assuring that a forensic laboratory follows procedures and protocols as set forth by a professional organization such as ISO (International Organization for Standardization) or ASCLD/LAB (American Society of Crime Laboratory Directors). Gaining accreditation involves examinations of policies, procedures, staff education and training, and general laboratory operations. This review is undertaken by the organization that would grant the accreditation status and usually involves a site visit. Accredited laboratories may be audited by the accrediting body to check compliance.
(<https://www.oxfordreference.com/view/10.1093/acref/9780199594009.001.0001/acref-9780199594009-e-0011?rskey=9YIobj&result=11>)
- Black box study
 - “Researchers use black box studies to assess the reliability of methods that rely on human judgment”
(<https://www.nist.gov/news-events/news/2020/06/nist-digital-forensics-experts-show-us-what-you-got>)
- Clerical errors
 - Clerical error is an error due to a minor mistake or inadvertence and not one that occurs from judicial reasoning or determination. It can be a mistake made in a letter, paper, or document that changes the meaning of the same. Typographical errors or the unintentional addition or omission of a word, phrase, or figure in writing or copying something on the record are all examples of clerical error
(<https://definitions.uslegal.com/c/clerical-error-scriveners-error-vitium-clerici/>)
- Cognitive bias
 - Cognitive bias refers to a systematic (that is, nonrandom and, thus, predictable) deviation from rationality in judgment or decision-making.
(https://link.springer.com/referenceworkentry/10.1007%2F978-3-319-47829-6_1244-1)
- Contributing factor
 - Something that helps cause a result
(<https://www.merriam-webster.com/dictionary/contributing%20factor>)
- Crime labs
 - A crime laboratory, also called forensic laboratory, facility where analyses are performed on evidence generated by crimes or, sometimes, civil infractions. Crime laboratories can investigate physical, chemical, biological, or digital evidence and often employ specialists in a variety of disciplines, including behavioral forensic science, forensic pathology, forensic anthropology, crime-scene investigation, and ballistics.
(<https://www.britannica.com/science/crime-laboratory>)

- CSI
 - Crime scene investigations refer to science used in determining facts during legal proceedings. The goals and objectives of a crime scene investigations unit are the collection, preservation, packaging, transportation, and documentation of physical evidence left at the crime scene.
(<https://definitions.uslegal.com/c/crime-scene-investigations/>)
- CSI effect
 - A term used to describe increased public awareness of forensic science as a result of the American television show *CSI* and its spin-offs still airing in many parts of the world. The increased awareness may have had impacts on expectation of forensic science by law enforcement agencies and justice systems and probably played a role in the increasing number of students pursuing forensic science degrees in the early to mid-2000s.
(<https://www.oxfordreference.com/view/10.1093/acref/9780199594009.001.0001/acref-9780199594009-e-0284?rskey=bPmVfS&result=280>)
- Error rates
 - The frequency with which errors are made. Examples include the proportion of an experimenter's data recordings that are wrong or the number of Type I errors that occur during significance testing (<https://dictionary.apa.org/error-rate>)
- Indigent person
 - Impoverished, or unable to afford the necessities of life. A defendant who is indigent has a constitutional right to court-appointed representation
(<https://www.law.cornell.edu/wex/indigent>)
- Proficiency testing
 - The testing of laboratory analysts as part of obtaining or maintaining a certification from a professional association. For example, to obtain certification from the American Board of Criminalistics (ABC), a person must complete written tests as well as laboratory proficiency testing in their area of specialization.
(<https://www.oxfordreference.com/view/10.1093/acref/9780199594009.001.0001/acref-9780199594009-e-0999?rskey=cG2FCT&result=981>)
- Source identification
- Spot-checking
 - A quick examination of a few members of a group instead of the whole group
(<https://dictionary.cambridge.org/us/dictionary/english/spot-check>)