

“In Paris they simply stared when I spoke to them in French; I never did succeed in making those idiots understand their language.”

Mark Twain

A Likely Misguided Attempt at
Changing the Way We Write
Associative Reports that Could
Have Far Reaching Impact on
How Our Message is
Misunderstood

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Example: Paint Association

- “The questioned paint (Item #1) could have originated from the same source as the known paint (Item #2).”
- “The questioned paint sample (Item #1) originated from the same source as the known paint (Item #2).”
- “The questioned paint (Item #1) cannot be eliminated as having originated from the same source as the known paint (Item #2).”

Associative Evidence

- Typically cannot give a statistical basis for our association
- Since we cant put a value to it, many have decided that there is little value in trace evidence.
- We must do a better job communicating for the discipline to survive and grow.

Associative Evidence

- We typically are taught to give short and simple conclusions that even a police officer can understand.
- We are then taught to “educate” the jury on the relative strength of an association.

Associative Evidence

- Houck “Statistics and Trace Evidence: The Tyranny of Numbers”:
 - “Each examiner's experience is the key to interpreting conclusions within the context of the crime scenario. And it is up to each examiner to relate this understanding to the trier of fact so that they may in turn comprehend its meaning and relevance”

NAS Report

For years in the forensic science community, the dominant argument against regulating experts was that every time a forensic scientist steps into a courtroom, his work is vigorously peer reviewed and scrutinized by opposing counsel. A forensic scientist might occasionally make an error in the crime laboratory, but the crucible of courtroom cross-examination would expose it at trial. This “crucible,” however, turned out to be utterly ineffective.

Why We Need to Change

- We tend to do a lousy job of conveying our conclusions in our reports.
 - NOBODY KNOWS OUR RULES BUT US! WE ARE FAILING TO TEACH THOSE IDIOTS TO SPEAK THEIR LANGUAGE.
- We have the tendency to get into court and ambush one side or the other because they don't know our rules.
 - WHATEVER OPINION WE ARE TO PROFER IN COURT NEEDS TO BE IN OUR REPORT.

My Misguided Suggestion

- “Tiers of Association”
- By giving the reader a scale of association types (context), the reader can get a better sense of the relative strength of an association

Type I Association

- Identification
- A positive identification; an association in which items share individual characteristics that show that the items were once from the same source.
- An example of this type of association would be two broken fragments of glass that physically fit together and were once one piece.

Type II Association

- Unusual association
- An association where the two items are consistent in all measured physical properties and chemical composition and share unusual characteristic(s) that would not be expected to be found in the population of this evidence type.
- An example of this type of association would be a four layer automotive paint transfer where two were OEM and two were architectural paint.

Type III Association

- Typical Association
- An association in which items are consistent in all measured physical properties and/or chemical composition and could have originated from the same source. Because similar items have been manufactured and would be indistinguishable from the submitted evidence, an individual source cannot be determined.
- An example of this type of association would be a four layer automotive paint transfer where all the layers are OEM paint.

Type IV Association

- Association of common materials
- An association where the two items are consistent in measured physical properties and chemical composition. This sample type is commonly encountered in our environment and has limited probative value.
- An example of this type of association might be class only footwear association of size 10 Nike Air Force One shoes in SE Michigan.

Type V Association

- Problematic Association
- An association where the two items are consistent in some measured physical properties and chemical composition. Some minor variation exists between the known and questioned items and could be due to sample heterogeneity or contamination of the questioned sample.
- An example of this type of association would be an automotive paint smear transfer where the analyst cannot find an uncontaminated portion of the sample.

Inconclusive

- Results of the examination and comparison of the two items were inconclusive.
- An example of a situation where this situation would be warranted would be a paint smear where the colored topcoat transfers to a clear coat but spectra is almost all clear coat.

Elimination

- The two items were dissimilar in physical properties and/or chemical composition and did not originate from the same source.

Example Report Result

- Item #1: Red Trilobal Nylon Carpet Fiber, 40-45 micron
- Item #2: Red Trilobal Nylon Carpet Fiber, 40-45 micron
- Item #1/Item #2 Comparison: Type III Association

- **Terminology Key for Associative Evidence:**

- *Note: This key provides general statements of association and may not be applicable in every case.*

- Type I Association: A positive identification; an association in which items share individual characteristics that show that the items were once from the same source.
- Type II Association: An association in which items are consistent in all measured physical properties and/or chemical composition and share unusual characteristic(s) that would not be expected to be found in the population of this evidence type.
- Type III Association: An association in which items are consistent in all measured physical properties and/or chemical composition and could have originated from the same source. Because similar items have been manufactured and would be indistinguishable from the submitted evidence, an individual source cannot be determined.
- Type IV Association: An association in which items are consistent in measured physical properties and/or chemical composition. This sample type is commonly encountered in our environment and may have limited associative value.
- Type V Association: An association in which items are consistent in some, but not all, physical properties and/or chemical composition. Some minor variation exists between the known and questioned items and could be due to factors such as sample heterogeneity or contamination of the sample(s).
- Inconclusive: No conclusion could be reached regarding an association between the items.
- Elimination: The items were dissimilar in physical properties and/or chemical composition and did not originate from the same source.

Example Report Result

- The questioned red fibers from Item #1 were consistent in color, diameter, microscopic properties and chemical composition with the known red fibers from the blanket from Item #2 and could have originated from the same source (Type III association).

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- *Note: This key provides general statements of association and may not be applicable in every case.*

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- Type II Association: An association in which items are consistent in all measured physical properties and/or chemical composition and share unusual characteristic(s) that would not be expected to be found in the population of this evidence type.
- Type III Association: An association in which items are consistent in all measured physical properties and/or chemical composition and could have originated from the same source. Because similar items have been manufactured and would be indistinguishable from the submitted evidence, an individual source cannot be determined.
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- Inconclusive: No conclusion could be reached regarding an association between the items.
- Elimination: The items were dissimilar in physical properties and/or chemical composition and did not originate from the same source.

Why?

- Gives the report reader a better idea of the continuum of possible conclusions and thus the relative strength of association (provides context)
- Report more accurately reflects the conclusions that would be presented at trial.
- Easily formatted for MIS
- Flexible: Can write conclusions in analyst's own words but still use terminology that lends context.

Typ I (Individualidentifizierung / Identitätsnachweis)

Die zu vergleichenden Proben weisen übereinstimmend Individualmerkmale auf, die zeigen, dass sie von derselben Quelle herkommen.

Typ II (Gruppenidentifizierung anhand seltener Merkmale bzw. seltener Merkmalskombinationen)

Die zu vergleichenden Proben sind hinsichtlich der untersuchten physikalischen und chemischen Merkmale nicht zu unterscheiden und weisen Merkmale auf, die üblicherweise in Hinblick auf Herstellung und Anwendung nicht in der Vergleichspopulation zu erwarten sind.

Typ III (Gruppenidentifizierung ohne seltene Merkmale bzw. seltene Merkmalskombinationen)

Die zu vergleichenden Proben sind hinsichtlich der untersuchten physikalischen und chemischen Merkmale nicht zu unterscheiden. Es liegen keine seltenen Merkmale oder Merkmalskombinationen Bezug auf die Vergleichspopulation vor. Diese Übereinstimmung ist im Sinne einer Gruppenidentifizierung zu verstehen. Dies bedeutet, dass aufgrund der Untersuchungsergebnisse nicht festgestellt werden kann, ob die Spur und die Vergleichsprobe denselben Ursprung haben, oder ob sie jeweils aus anderen Quellen gleicher chemischer Zusammensetzung stammen.

Typ IV (Weder Zuordnung noch Ausschluss möglich)

Anhand der vorliegenden Untersuchungsergebnisse ist nicht entscheidbar, ob das Spurenmaterial und die Vergleichsproben einer Spurenquelle (Identitätsnachweis), einer Gruppe von Objekten mit gleichem Merkmalssatz (Gruppenidentifizierung) zugeordnet werden können oder ob eine entsprechende Zuordnung auszuschließen ist.

Typ V (Ausschluss)

Die zu vergleichenden Proben sind eindeutig hinsichtlich ihrer physikalischen und/oder chemischen Merkmale zu unterscheiden. Homogenitätsunterschiede oder Verunreinigungen kommen als Grund für die physikalischen und chemischen Unterschiede nicht in Frage.

I am not one of those who in expressing opinions confine themselves to facts.

■ Mark Twain

NAS Report

- Potentially will change the practice of forensic science in the US
- How will it change the writing of reports?

NAS Report- Admissibility

- Two very important questions should underlie the law's admission of and reliance upon forensic evidence in criminal trials:
- (1) the extent to which a particular forensic discipline is founded on a reliable scientific methodology that gives it the capacity to accurately analyze evidence and report findings and:
- (2) the extent to which practitioners in a particular forensic discipline rely on human interpretation that could be tainted by error, the threat of bias, or the absence of sound operational procedures and robust performance standards.

NAS Report- Admissibility

- (1) the extent to which a particular forensic discipline is founded on a reliable scientific methodology that gives it the capacity to accurately analyze evidence and report findings
 - This is fairly easy to represent. SWGMAT reporting guidelines represent what needs to be in a report. Methodology used to collect data, measurements, etc. should be in the report
 - Makes it possible for a peer to review the report and see what was done.

NAS Report- Admissibility

- (2) the extent to which practitioners in a particular forensic discipline rely on human interpretation that could be tainted by error, the threat of bias, or the absence of sound operational procedures and robust performance standards.
 - Background
 - Limitations
 - Stating your entire opinion and basis in the report.
 - Procedures
 - Positive and negative controls, etc.

NAS Report

The terminology used in reporting and testifying about the results of forensic science investigations must be standardized. Many terms are used by forensic scientists in scientific reports and in court testimony that describe findings, conclusions, and degrees of association between evidentiary material (e.g., hairs, fingerprints, fibers) and particular people or objects. Such terms include, but are not limited to “match,” “consistent with,” “identical,” “similar in all respects tested,” and “cannot be excluded as the source of.”

NAS Report

The use of such terms can and does have a profound effect on how the Trier of fact in a criminal or civil matter perceives and evaluates scientific evidence. Although some forensic science disciplines have proposed reporting vocabulary and scales, the use of the recommended language is not standard practice among forensic science practitioners.

NAS Report

Some forensic science laboratory reports meet this standard of reporting, but many do not. Some reports contain only identifying and agency information, a brief description of the evidence being submitted, a brief description of the types of analysis requested, and a short statement of the results (e.g., “the greenish, brown plant material in item #1 was identified as marijuana”), and they include no mention of methods or any discussion of measurement uncertainties.

NAS Report

As a general matter, laboratory reports generated as the result of a scientific analysis should be complete and thorough. They should contain, at minimum, “methods and materials,” “procedures,” “results,” “conclusions,” and, as appropriate, sources and magnitudes of uncertainty in the procedures and conclusions (e.g., levels of confidence).

NAS Report

Although some disciplines have developed vocabulary and scales to be used in reporting results, they have not become standard practice. This imprecision in vocabulary stems in part from the paucity of research in forensic science and the corresponding limitations in interpreting the results of forensic analyses.

NAS Report-Recommendation 2

The National Institute of Forensic Science (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.

Similarly, it should establish model laboratory reports for different forensic science disciplines and specify the minimum information that should be included. As part of the accreditation and certification processes, laboratories and forensic scientists should be required to utilize model laboratory reports when summarizing the results of their analyses.

NAS Report- Paint Reporting

SWGMAAT sets guidelines for this field, but it has not recommended report wording, and there are no set criteria for determining a conclusion, although a range of conclusions may be used to show the significance of the examination results. The strength of a conclusion depends on such variables as the number of layers present, the sample condition, and the type of paint (vehicular or structural). Terms such as “matched,” “indistinguishable,” “consistent,” or “similar” are used along with the properties of the paints that were compared in stating the results of the comparison.

FTS Proficiency (Exp)

Item #1: Triple Seven

Item #2: NaClO₄

Item #3: Double Based SP

Testing issues:

Can differentiate 777 from Pyrodex?

Can differentiate NaClO₄ from Item #2 from KClO₄
and Na Benzoate in 777?

FTS Proficiency Reports (Exp)

Results

The examination revealed that item #1 contains the following chemical components:

- Sodium
- Potassium
- Chloride
- Perchlorate
- Nitrate
- Ammonium

Item #2, the Sodium Perchlorate, cannot be excluded as being present in Item #1.

Item #3, the Smokeless Powder, was not detected in Item #1.

FTS Proficiency Reports (Exp)

Item 1 contained a 1/2 inch nominal diameter galvanized, Mueller Industries end cap. Original components and combustion products of Hodgdon TRIPLE SEVEN were identified inside the end cap.

Item 2 contained a mixture of anhydrous and mono-hydrated sodium perchlorate. Sodium perchlorate can be used as an oxidizer.

Item 3 contained a disk shaped double base smokeless powder.

Neither Item 2 nor Item 3 could be associated with the explosive in Item 1.

FTS Proficiency Reports (Exp)

Item 1 consisted of a metal endcap approximately 7/8 inch in length and with an inner diameter of approximately $\frac{3}{4}$ inch. The item 1 endcap was commercially labeled "CHINA...NP...NSF61-4..." A black and gray residue was present on the interior of the endcap.

Item 1 was examined visually and analyzed using stereomicroscopy. Extracts of Item 1 were analyzed using microchemical tests, Fourier Transform Infrared Spectrophotometry (FTIR), Ion Chromatography (IC), and Scanning Electron Microscopy-Energy Dispersive X-ray Spectrometry (SEM-EDS). An extract of Item 1 was chemically consistent with that expected from a deflagrated black powder substitute such as Triple Se7en®.

Item 2 was analyzed using stereomicroscopy, X-Ray Diffraction (XRD), and SEM-EDS, and was identified as sodium perchlorate. Item 2 could not be eliminated as having been present in the Item 1 end cap based on chemical properties.

Item 3 was analyzed using stereomicroscopy, an ignition test, microchemical tests, and FTIR, and was identified as smokeless powder. Item 3 was eliminated as having been present in the Item 1 end cap based on chemical properties.

FTS Proficiency Reports (Exp)

Item #1 contains a 1/2 inch diameter metal pipe cap with a gray/black burnt residue. The residue of Item #1 contains materials consistent with cyanoguanadine, benzoate, 3-nitrobenzoate, potassium, sodium, chloride, nitrite, nitrate, perchlorate, carbonate, wood charcoal and hydrocarbons. These materials are consistent with the post combustion residue of a commercial black powder substitute Triple 7. Triple 7 contains potassium nitrate, potassium perchlorate, cyanoguanadine, sodium benzoate, 3-nitrobenzoate and wood charcoal.

Item #2 contains a chunky white substance identified as sodium perchlorate.

Item #3 contains five shiny gray disks consistent with smokeless gunpowder.

No residue of smokeless gunpowder was identified in Item #1. No sodium perchlorate was identified in Item #1, although the sodium and perchlorate found in Item #1 cannot be eliminated as having originated from sodium benzoate and the perchlorate from potassium perchlorate.

FTS Proficiency Reports (Exp)

Item 1 - Metal cap: Particles consistent with Triple Seven, a black powder substitute, were detected on the metal cap.

Item 2 - White powder: The white powder is sodium perchlorate, an oxidizer used in pyrotechnic devices. Sodium and perchlorate were detected in residues from the cap; however, Triple Seven also contains sodium and perchlorate. It cannot be determined if sodium perchlorate was added to the improvised device prior to its ignition.

Item 3 - Black flakes: The black flakes are consistent with smokeless powder particles. Smokeless powder was not detected in the residues from the metal cap.

What I do:

- Varies between State and Private Work
 - Include a brief summary of background of the material that I'm examining that includes:
 - Manufacturing process
 - Techniques I used in that case
 - Statement that the techniques I use are commonly accepted in the field
 - Limitations of analysis
 - Results of Analyses
 - Scale of Association