UNCERTAINTY AHEAD: A SHIFT IN HOW FEDERAL SCIENTIFIC EXPERTS CAN TESTIFY

BY **DANIELLE WEISS** AND **GERALD LAPORTE**

A new directive instructs Department of Justice forensic scientists working in federal laboratories and United States Attorneys to refrain from using the phrase "reasonable degree of scientific certainty" when testifying. How will state and local forensic scientists and other attorneys alter their testimonial practice?

When scientific experts express their opinions (or conclusions) in court, they are often asked if their opinion is to a "reasonable degree of scientific certainty," "reasonable degree of medical certainty," or some variation of this terminology. This phrase has been used in courts throughout the nation for decades and signals that the expert's testimony is based on sound scientific or technical analysis rather than conjecture.

Forensic scientists working in federal laboratories have been instructed to no longer use the phrase "reasonable degree of scientific certainty" in court testimony. On September 6, 2016, the Department of Justice's Office of the Attorney General issued a memorandum[1] and directed forensic laboratories to review their policies and procedures to ensure that forensic examiners do not use "reasonable degree of scientific certainty" or "reasonable degree of [forensic discipline] certainty." Department prosecutors were also asked to abstain from using these expressions when presenting forensic reports or questioning forensic experts in court unless required by a judge or applicable law.

Undoubtedly, the new policy to refrain from using the phrase "reasonable degree of scientific certainty" represents a significant change to the testimonial language that attorneys and scientific experts have routinely used. While the directive issued by the Attorney General was issued to federal laboratories and prosecutors, there is some question as to if or how state and local courts, attorneys, and nonfederal forensic science service providers' experts will alter their testimonial practices. Two important questions have since emerged: (1) Why not use "reasonable degree of scientific certainty" in testimony and (2) How will courts proceed?[2]

The History of "Reasonable Degree of Certainty"

According to a document issued by the National Commission on Forensic Science (NCFS),[1] "reasonable degree of certainty" was first used — not legally mandated — in *Herbst v. Levy* in 1935, when the plaintiffs' expert, Fred Ludolph, testified about the circumstances of a capsized boat. Ludolph was "then given a hypothetical question containing some of the facts in evidence relating to the speed of the boat, the number of passengers, the condition of the water, and other circumstances, and asked whether he could determine with reasonable scientific certainty the cause of the capsizing of the boat."[2]

It was not until 1969 that the terminology was linked to the admissibility determination. In *Twin City Plaza, Inc. v. Central Sur.* (1969), the court wrote:

> If the witness, based upon his background skill, possesses extraordinary training to aid laymen in determining facts and if he bases his answer upon what he believes to be *reasonable scientific or engineering certainty*, generally the evidence should be admitted, subject, of course, to the cross-examination of the adversary. The weaker the scientific opinion or the less qualified the expert, the more vigorous will be the cross-examining attack and undoubtedly the less persuasive will be the opinion to the trier of fact.[3] [emphasis added with italics]

According to NCFS, this statement was made without legal or scientific analysis as to what the term meant or why its use was being mandated.

Notes

1. Views of the Commission Regarding Use of the Term "Reasonable Scientific Certainty," National Institute of Standards and Technology, at https://www.justice.gov/archives/ncfs/page/file/831786/download.

2. *Herbst v. Levy,* 279 Ill. App. 353, 358 (Ill. App. Ct. 1935), at https://casetext.com/case/herbst-v-levy.

3. *Twin City Plaza, Inc. v. Central Sur.* INS, 409 F.2d 1195, 1203 (8th Cir. 1969).

Why Not Use "Reasonable Degree of Scientific Certainty"?

One of the first and most important concepts introduced to aspiring scientists is the scientific method. This method can vary because not all questions can be answered using controlled experiments, but it has some basic tenets:[3]

1. Posing a question or hypothesis based on the appropriate background facts, knowledge, and information.
2. Collecting and analyzing information.
3. Evaluating and synthesizing that information.
4. Reaching a final conclusion.

During their education and training, scientists are neither taught nor required to state that the conclusion they reach in the final step is to a "reasonable degree of scientific certainty" (see sidebar, "The History of 'Reasonable Degree of Certainty'").

Although the scientific community has not defined this phrase or any of its variations, it has been

offered in an attempt to demonstrate that the expert's conclusion is not based on mere speculation, but rather scientific principles, education, training, experience, or specialized knowledge. Even though the phrase is commonly used, it has no definition from a scientific perspective outside of the courtroom. It is not a standard applied to scholarly publications or peer review, nor is it taught, defined, or generally accepted in scientific practice. Consequently, one could argue that if the terminology is not generally used in scientific practice, then scientists should not be expected to express their conclusions to a "reasonable degree of certainty." Additionally, the Federal Rules of Evidence 702-705 do not require its use,[4] and while very few states require an obligatory recitation of this phrase contemporaneous with the admission of an expert's testimonial conclusions, many states still ask for the recitation.

Does this phrase really bolster a jury's assessment of forensic evidence? No scientific study has determined whether an expert who uses a statement like "reasonable degree of scientific certainty" either misleads fact-finders or changes the actual meaning of the testimony. Scientific testimony can be quite extensive and complex, possibly taking several hours or even days to explain results and conclusions. Without having evidence through comprehensive research, it is impossible to truly assess the impact of using "reasonable degree of scientific certainty." But it is incumbent upon scientists to always communicate their findings accurately, especially in a courtroom setting when they are testifying to nonscientists and where certain words or phrases may be misunderstood or misconstrued. In that setting, there is a valid concern that inexact terminology could be misunderstood or taken out of context by the jury. As such, technical terms of art, including those used in the expert's conclusions, should be defined — in reports and during testimonial presentations — particularly when a layperson could reasonably understand the expert's conclusions to imply certainty.

In a recent NIJ-sponsored study, Nicholas Schweitzer of Arizona State University conducted three experiments involving jury simulations and mock trials to assess how jurors respond to certain types of forensic testimony (see sidebar, "Study of Juror Judgments").[5] Schweitzer concluded that a forensic science expert's experience and display of confidence while testifying were the most powerful factors that caused jurors to perceive his or her testimony as credible. The intangible aspects of a testimonial presentation (expert's credentials, influence, and confidence) seem to substantiate an expert's conclusions. Interestingly, civil fact-finders were more likely to find a defendant liable when testimonial evidence was presented than when records and data alone were placed into evidence. Even when the jury was already aware of the underlying information, the evidence became more persuasive when offered through expert testimony.[6] Accordingly, it may be the case that, rather than being overwhelmed by the impact of scientific evidence, jurors are more influenced by a combination of factors, including the expert's demeanor, his or her background and experience, and the overall persuasiveness of the testimonial presentation. Taking all of these factors into account, it is imperative that the jury not also be influenced by words implying certainty when that level of assurance cannot be substantiated, regardless of the discipline.

Additionally, the phrase has never received a cross-disciplinary definition and continues to evoke differing interpretations. For example, Black's Law Dictionary defines "reasonable degree of 'medical' certainty" as "a standard requiring a showing that the injury was more likely than not caused by a particular stimulus, based on the general consensus of recognized medical thought."[7] However, some have argued that when used by expert witnesses in criminal cases, the term "reasonable scientific certainty" conveys a stronger degree of probability or level of certainty and may be interpreted by jurors as equivalent to the government's burden of proving all the elements of a crime beyond a reasonable doubt.[8] And while neither the courts nor published research cites a definition with such a high standard, researchers Dawn McQuiston-Surrett and Michael J. Saks note that "forensic expert witnesses cannot simply adopt a term, define for themselves what they wish it to mean, and expect judges and juries to understand what they meant by it."[9] Nevertheless, the intent for using

Study of Juror Judgments

by **Eric Martin** and **Angela Moore**

Forensic science can be a powerful tool, but there has been limited robust scientific inquiry into how jurors perceive and weigh forensic testimony. To fill this knowledge gap, Arizona State University researcher Nicholas Schweitzer conducted an NIJ-supported study examining the impact of forensic evidence testimony on juror decisions.[1] Schweitzer designed a study of jurors' reactions to forensic science using three criteria. First, he used juror-eligible participants. Second, Schweitzer videotaped a dramatization of a criminal case but altered three factors of interest: expertise of the forensic expert testifying, admonitions of the jury, and challenges of the forensic expert by the defense counsel. Trial practitioners verified the realism of the case transcripts to ensure that the variables of interest were studied in a realistic courtroom application and would mirror what actual jurors would have to consider. Finally, he focused on the use of non-DNA forensic science in the courtroom, specifically testimony on fingerprint and bite mark analysis.

After watching the video, the mock jury deliberated on the merits of the case. The deliberations were recorded to assess the impact of the forensic testimony on the jury. Also, each juror was given a survey before and after jury deliberations to capture their attitudes regarding forensic testimony and how these attitudes may have changed after deliberating with their colleagues. Schweitzer used the survey results to gauge the impact of the deliberation process on jurors' thoughts about forensic science and their decision-making.

Schweitzer conducted three experiments to study different aspects of forensic expert testimony. In the first experiment, he analyzed juror responses to determine if the forensic scientist's expertise and the validity of the forensic science discipline influenced juror decision-making. Schweitzer found that the forensic scientist's experience appeared to have more influence on the jurors than the scientific validation of the methods. The experience of the scientist, however, did not seem to affect the jury's verdict when the mock jury recommended a verdict to acquit or convict the defendant.

The second experiment examined the effect of the forensic expert's degree of certainty regarding the presence of exculpatory evidence on jurors' decision-making. Schweitzer found that the mock jurors initially were not swayed by the possibility of exculpatory evidence, but the influence of this potential evidence became greater through the deliberation process. In the post-deliberation survey, the presence of exculpatory evidence was as influential on jury decision-making as the forensic scientist's experience.

Finally, the third experiment investigated how jurors perceived the forensic expert's concession that the analysis may include errors. The results were mixed. When the trial involved bite mark analysis, the concession of potential errors decreased the value of the evidence. However, when the case included fingerprint analysis, the concession increased the perceived credibility of the analysis. Schweitzer concluded that this may be indicative of the jurors' own a priori attitudes toward the forensic method being used; fingerprint analysis may have had more credence among jurors prior to their participation in the mock trial.

These findings represent a first step in understanding how jurors perceive forensic testimony, how those initial perceptions change through deliberations, and how those perceptions are ultimately translated into verdicts. A potential limitation of the study is that it focused only on bite mark and fingerprint analysis. Future research should be conducted to try to replicate these findings with other forensic methods to understand how the type of method used may affect juror impressions of forensic testimony.

Note

1. Nicholas J. Schweitzer, "Communicating Forensic Science," Final report to the National Institute of Justice, grant number 2008-DN-BX-0003, May 2016, NCJ 249804, https://www.ncjrs.gov/pdffiles1/nij/grants/249804.pdf.

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the phrase has meaning and purpose to courts and legal practitioners, which is to summarily demonstrate that the expert's opinion rises above the level of speculation and conjecture. This leads us to the next logical question: How will courts proceed?

Moving Forward: Exploring Options on How to Proceed

One alternative is to discontinue using "reasonable degree of scientific certainty" and not replace this "summary" term with another. That is, let the conclusions and statements expressed by an expert stand on their own. But if there is an option to replace the term, how do we move forward?

Bridging the fields of science and law creates challenges for forensic scientists. The intended meaning of a particular word or phrase may not be what criminal justice stakeholders — investigators, lawyers, and fact-finders — understand it to mean.

Scientists regularly share theories, analyses, and conclusions with each other, and peers often challenge or reproduce their conclusions. Yet when they share the same information externally with nonscientists, intended meanings can get lost in translation or the information may be misconstrued. For example, forensic scientists have used phrases like "consistent with" or "similar to" to qualitatively conclude that two items cannot be differentiated based on the examinations performed. When these terms are used without any further explanation and qualification, a layperson may interpret these phrases to mean that the items being compared share a common source, which may not, in fact, be how the expert intended to convey their findings since they are qualifying terms. These phrases are not intended to convey the forensic examiner's belief that the two items examined are identical in every respect. In those instances, the examiner will typically assert that he or she has "identified" a questioned item as originating from a known source.

An expert's clear and complete explanation of his or her findings, including the limitations of the method employed, is critical to a juror's accurate understanding of an expert's scientific conclusions.

Scientists and laypersons involved in the criminal justice system share common language, but they speak with very different dialects. A linguistic bridge needs to be identified and implemented that will enable scientists to accurately communicate their opinions and conclusions to interested parties while neither overstating nor understating their significance and intended meaning. The desire to build a linguistic bridge may have originally led to the use of phrases like "reasonable degree of scientific certainty" as a way for the legal and scientific communities to express to the fact-finder in a more concise manner the degree of confidence that an expert held in his or her opinions and conclusions.[10] There is no indication that the phrase was intended to confuse or obfuscate scientific findings. Instead, it seems that its purpose was to convey the expert's degree of confidence in his or her conclusions and to clarify that they are not based upon mere speculation.

One misconception about the field of forensic science is that it consists of a single discipline. In reality, forensic science comprises various scientific disciplines that use a diverse range of applied methods and techniques to help answer questions of legal significance. So there is an immense challenge to develop and define an appropriate phrase that can be used by all scientific disciplines. The National Institute of Standards and Technology's Organization of Scientific Area Committees, which has the primary responsibility to coordinate development of a quality infrastructure for forensic science standards, has established 23 subcommittees representing various forensic disciplines that range from computer forensics to DNA to forensic pathology. Hence, it will be quite a daunting task to identify a single phrase that all forensic disciplines can use to accurately distinguish between speculation and the relative degree of confidence that a scientist has in his or her findings and opinions. One likely approach will be that each discipline develops and defines its own terminology — through a formalized standards development process, during which the unique aspects of each discipline and the needs of those who will use this information will be taken into account.

Research has shown that jurors struggle with complex testimony and statistical information, which puts them at risk for misinterpreting evidence or dismissing information that they do not understand.[11] Some research has provided insight into the impact that scientific testimony can have on juror decision-making. However, this information is currently limited. Generally, the available research has shown that confident testimony by an experienced forensic expert has a positive influence on juries. Conversely, the use of highly technical methods, validation studies, cross-examination, exculpatory evidence,[12] concessions of error, explanations of the limitations of a methodology, and jury instructions had little overall impact on juror decision-making in the research setting.[13] The research appears to reinforce the hypothesis that the perceived experience[14] and capabilities of a forensic expert may, in fact, outweigh the probative value of the evidence. However, in some cases, the scenarios offered to a mock jury in a research setting do not reflect, in totality, the overall deliberative process of a real trial.

In any case, jurors are noticeably influenced by confirmatory statements and an expert's ability to explicitly connect evidence to aspects or issues in a case. It is clear that the language used by forensic experts while testifying can have a substantial impact on a fact-finder's comprehension of the subject matter and decision-making.[15] However, additional research is still needed to determine whether a direct correlation exists between specific words or phrases and the decisions made by jurors. Further research is also needed to determine which factors may directly affect how jurors react to and interpret the information provided by expert witnesses. Case type, factual context, jury composition, evidentiary complexities, and legal issues all play a role in the process of evaluating the evidence and deliberating on a verdict.

Moreover, the nature and design of studies will affect how mock jurors will evaluate the variables to which they are exposed. For example, will test subjects be exposed solely to mock testimony, or will they also be provided with instructions to guide

their deliberations? Will test subjects be exposed to expert testimony in isolation, or will they participate with other mock jurors in a more realistic deliberative process? When studying how jurors evaluate expert testimony, it is critical not only to understand and control the variables that form component parts of the experimental hypothesis but also to understand the broader factors at play that may affect a juror's perception of the entire trial process.

Conclusion

There is no evidence to show that abstaining from the use of the phrase "reasonable degree of scientific certainty" will affect the inferences that jurors might draw from an expert's testimony or whether its omission will influence the outcome of a trial. However, we do know that jurors will continue to make decisions that will be based, in part, on expert testimony. Accordingly, we must bridge the linguistic divide that separates scientists and laypersons. Informed by studies of juror comprehension, scientists must continue to develop and define terminology that accurately conveys both their opinions and the limitations of their methodology, cognizant of the risk that nonscientists may misunderstand their intended meaning. Each discipline in the forensic science community must standardize and define its terminology — with the comprehension of stakeholders and fact-finders in mind — and eliminate vague and ambiguous words and phrases. This will be the challenge for nonfederal forensic science service providers and lawyers — will they effectively eliminate the use of "reasonable degree of scientific certainty" and, if so, is an alternative necessary?

In the meantime, "reasonable degree of scientific certainty" continues to be a phrase that is still taught in some law schools and used in state and local courts on a daily basis. It is incumbent upon testifying scientists to identify and define appropriate terminology to help bridge the communication gap while enhancing juror comprehension of statements that convey scientific conclusions. In the absence of a clear alternative phrase, many legal professionals may be apprehensive about its disuse. However, the ultimate responsibility remains with the testifying expert to clearly explain his or her opinions and conclusions within the limitations of science and with words and phrases whose meaning is clearly understood by all.

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For More Information

Learn more about forensic science at NIJ at NIJ.ojp.gov, keyword: forensic science.

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- "Jurors' Judgments About Forensic Identification Evidence," grant number 2008-DN-BX-0003

Notes

1. U.S. Department of Justice, Office of the Attorney General, *Memorandum for Heads of Department Components* (Recommendations of the National Commission on Forensic Science), September 6, 2016, https://www.justice.gov/opa/file/891366/download.
2. Although expert witness testimony related to medicine, engineering, and a host of other non-forensic-science disciplines is regularly presented in courts, the focus of this discussion is on the forensic sciences.
3. See "Principles of Scientific Inquiry," at http://onlinepubs.trb.org/onlinepubs/nchrp/cd-22/manual/v1chapter2.pdf.

4. See Federal Rules of Evidence (2015), at http://federalevidence.com/rules-of-evidence.
5. Nicholas J. Schweitzer, "Communicating Forensic Science," Final report to the National Institute of Justice, grant number 2008-DN-BX-0003, May 2016, NCJ 249804, https://www.ncjrs.gov/pdffiles1/nij/grants/249804.pdf.
6. Ibid.
7. "Reasonable Medical Probability," *Black's Law Dictionary* (10th ed.) (Westlaw, 2014).
8. See *Views of the Commission Regarding Use of the Term "Reasonable Scientific Certainty,"* National Institute of Standards and Technology, at https://www.justice.gov/archives/ncfs/page/file/831786/download.
9. Dawn McQuiston-Surrett and Michael J. Saks, "Communicating Opinion Evidence in the Forensic Identification Sciences: Accuracy and Impact," *Hastings Law Journal* 1159 (2007-2008): 59.
10. Loene M. Howes, "The Communication of Forensic Science in the Criminal Justice System: A Review of Theory and Proposed Directions for Research," *Science and Justice* 55 (2015): 145-154.
11. Some research has shown that, in some cases, judges are more capable than jurors at understanding complex testimony.
12. Exculpatory evidence seemed to be more influential on jurors during the deliberation phase of the trial. See Schweitzer, "Communicating Forensic Science."
13. Dawn McQuiston-Surrett and Michael J. Saks, "The Testimony of Forensic Identification Science: What Expert Witnesses Say and What Fact Finders Hear," *Law and Human Behavior* 33 (2009): 436-453; Joseph Eastwood and Jiana Caldwell, "Educating Jurors about Forensic Evidence: Using an Expert Witness and Judicial Instructions to Mitigate the Impact of Invalid Forensic Science Testimony," *Journal of Forensic Science* 60 no. 6 (2015): 1523-1528; and McQuiston-Surrett and Saks, "Communicating Opinion Evidence."
14. Jurors seem to think that credibility is akin to being an expert "who is a good teacher, with sound credentials and acceptable motives," in Sanja Kutnjak Ivkovic and Valerie P. Hans, "Jurors' Evaluations of Expert Testimony: Judging the Messenger and the Message" (Cornell Law Faculty Publications, 2003): 385, http://scholarship.law.cornell.edu/facpub/385.
15. McQuiston-Surrett and Saks, "The Testimony of Forensic Identification Science"; and McQuiston-Surrett and Saks, "Communicating Opinion Evidence."

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