

1-1-2007

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Hans, Valerie P., "Judges, Juries, and Scientific Evidence" (2007). *Cornell Law Faculty Publications*. Paper 302.
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JUDGES, JURIES, AND SCIENTIFIC EVIDENCE

Valerie P. Hans*¹

INTRODUCTION

The rise in scientific evidence offered in American jury trials, along with court rulings thrusting judges into the business of assessing the soundness of scientific evidence, have produced challenges for judge and jury alike.² Many judges have taken up the

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¹ Author's Note: This article had its origins in a presentation at the Science for Judges IX conference at Brooklyn Law School, April 13–14, 2007. I thank Margaret Berger for inviting me to speak at the conference and for encouraging me to educate judges about jury science by having them participate directly in research. I was gratified by the willingness of many judges who generously agreed to take part. Shari Diamond and Jeffrey Rachlinski made extremely helpful recommendations about the judge research project. Margaret Berger and Jeffrey Rachlinski also offered insightful reactions to the original draft of this article.

This article draws on findings from a mock jury research project funded by Grant No. 2002-IJ-CX-0026 awarded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. Michael Dann, David Kaye, Erin Farley, and Stephanie Albertson were my collaborators on the jury research project. Points of view expressed in this article are mine and do not necessarily represent the official position or policies of the U.S. Department of Justice.

² Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113 (1991) (documenting substantial presence of expert witnesses); Margaret A. Berger, *The Supreme Court's Trilogy on the Admissibility of Expert Testimony*, in 9 FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE (2d ed. 2000) [hereinafter FEDERAL JUDICIAL CENTER]. The trilogy of cases that led to an enhanced gatekeeper role for federal judges include, in chronological

duty of becoming “amateur scientists”³ by participating in judicial workshops like Science for Judges conferences, acquiring some degree of familiarity with scientific methodology and scientific principles.⁴ Judges also can use background resources like the Federal Judicial Center’s Reference Manual on Scientific Evidence, which includes superb comprehensive overviews of scientific fields and techniques.⁵ Science-minded law clerks can also provide invaluable support. Finally, in especially complex cases, judges may employ special masters or court-appointed experts.⁶

But what about juries? Surely they too could benefit from assistance as they attempt to master and apply complex testimony about scientific matters during the course of a trial. Concerns about the jury’s ability to understand, critically evaluate, and employ scientific evidence in deciding complex trials have led to many suggestions for reform. Nevertheless, most jurors sit on a single case, are not screened for scientific background knowledge, and adopt a predominantly passive role as fact-finders within the adversary system. How well do laypersons understand complex scientific and technical testimony presented in this adversarial context? If they need help, how can jury assistance be integrated into the unique setting of the jury trial? After all, we are not likely

order: *Daubert v. Merrill Dow Pharms., Inc.*, 509 U.S. 579 (1993); *General Elec. Co. v. Joiner*, 522 U.S. 136 (1997); *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999). See also Margaret A. Berger, *Science for Judges I: Papers on Toxicology and Epidemiology*, 12 J.L. & POL’Y 1 (2003).

³ In his dissenting opinion in the *Daubert* case, Justice William Rehnquist wrote that “I defer to no one in my confidence in federal judges. . . . But I do not think [Rule 702 imposes on judges] either the obligation or the authority to become amateur scientists” 509 U.S. at 600–01.

⁴ There have been a total of nine Science for Judges conferences, ably organized by Professor Margaret Berger of Brooklyn Law School. The collected papers may be found at the Science for Judges website, <http://www.brooklaw.edu/centers/scienceforjudges/> (last visited Nov. 30, 2007).

⁵ FEDERAL JUDICIAL CENTER, *supra* note 2.

⁶ Joe S. Cecil & Thomas E. Willging, *Accepting Daubert’s Invitation: Defining a Role for Court-Appointed Experts in Assessing Scientific Validity*, 43 EMORY L. J. 995 (1994) (finding that judges infrequently appointed experts, because many cases did not require court-appointed experts and judges saw such practice as a fundamental intrusion on the adversary system).

to require jurors to undertake background reading, send them off to workshops, or hire instructors to get them up to speed before they evaluate scientific expert testimony in their trials.

This article begins by summarizing what we currently know about how juries respond to scientific evidence. Then, it describes a mock jury experiment that my research collaborators and I conducted to examine whether trial reforms could improve jurors' comprehension and appropriate use of scientific evidence, specifically mitochondrial DNA (mtDNA) evidence.⁷ This article also reports the intriguing findings of a new study involving state and federal judges who watched clips of the same mtDNA mock trial and answered some of the same questions as the jurors.⁸ The article concludes with a consideration of the implications of the judge and jury mtDNA studies for three broad remedies often suggested to deal with jury trials involving complex cases: (1) having judges instead of juries decide the cases; (2) using "blue ribbon" juries of highly educated citizens; and (3) implementing

⁷ The study is reported in B. MICHAEL DANN, VALERIE P. HANS & DAVID H. KAYE, TESTING THE EFFECTS OF SELECTED JURY TRIAL INNOVATIONS ON JUROR COMPREHENSION OF CONTESTED MTDNA EVIDENCE, FINAL TECHNICAL REPORT (2004), available at <http://www.ncjrs.gov/pdffiles1/nij/grants/211000.pdf> [hereinafter TESTING THE EFFECTS]. The findings regarding jury innovations are summarized in B. Michael Dann, Valerie P. Hans & David H. Kaye, *Can Jury Trial Innovations Improve Juror Understanding of DNA Evidence?*, 90 JUDICATURE 152 (2007) [hereinafter *Jury Trial Innovations and Juror Understanding*]. Analysis of the jurors' treatment of statistics and probability may be found in David H. Kaye, Valerie P. Hans, B. Michael Dann, Erin J. Farley & Stephanie Albertson, *Statistics in the Jury Box: How Jurors Respond to Mitochondrial DNA Match Probabilities*, 4 J. EMPIRICAL LEGAL STUD. 797 (2007) [hereinafter *Statistics in the Jury Box*]. Analysis of jurors' treatment of the biological science may be found in Valerie P. Hans, David H. Kaye, B. Michael Dann, Erin J. Farley & Stephanie Albertson, *Science in the Jury Box: Jurors' Views and Understanding of Mitochondrial DNA Evidence* (October 29, 2007) (Cornell Legal Studies Research Paper No 07-021), available at <http://ssrn.com/abstract=1025582> [hereinafter *Science in the Jury Box*].

⁸ Judges attending the Science for Judges IX workshop participated in the study as part of my presentation on jury research methodology and jurors' reactions to scientific evidence. See *supra* note 1, and *infra* Part IV, The Judge MtDNA Study.

trial innovations.⁹

I. COMPLEX SCIENTIFIC EVIDENCE AND JURY FACT FINDING COMPETENCE

Researchers have studied the performance of juries in criminal and civil trials for more than fifty years.¹⁰ Multiple methods are employed to explore jury competence, including comparison of jury verdicts with judicial evaluations, analysis of verdict patterns and trends, questionnaires and interviews with jurors and other trial participants, and mock jury studies.¹¹ Each of these methods has particular strengths and limitations.¹² Nonetheless, taken as a whole, the scholarly work indicates that juries do quite well in understanding most trial evidence.

Studies have asked judges to evaluate jury verdicts and to provide the verdict they would have reached had they been deciding the case.¹³ These projects have routinely found substantial

⁹ The literature on the topic of jury competence in complex cases, and discussion of these reforms, is substantial. For an overview of the debate, see NEIL VIDMAR & VALERIE P. HANS, *AMERICAN JURIES: THE VERDICT*, ch. 7 & 8 (2007). For information about the historical development and current status of the special jury, see JAMES C. OLDHAM, *TRIAL BY JURY: THE SEVENTH AMENDMENT AND ANGLO-AMERICAN SPECIAL JURIES* (2006). See also Michael A. Fisher, *Going for the Blue Ribbon: The Legality of Expert Juries in Patent Litigation*, 2 COLUM. SCI. & TECH. L. REV. 1 (2000–2001).

¹⁰ See VIDMAR & HANS, *supra* note 9 (summarizing jury research and concluding that juries are generally competent as fact-finders).

¹¹ Shari Seidman Diamond, *How Jurors Deal with Expert Testimony and How Judges Can Help*, J.L. & POL'Y (forthcoming Jan. 2008); Valerie P. Hans & Stephanie Albertson, *Empirical Research and Civil Jury Reform*, 78 NOTRE DAME L. REV. 1497, 1500–03 (2003).

¹² Hans & Albertson, *supra* note 11, at 1500–03.

¹³ PAULA L. HANNAFORD-AGOR, VALERIE P. HANS, NICOLE L. MOTT & G. THOMAS MUNSTERMAN, *ARE HUNG JURIES A PROBLEM?* (National Center for State Courts 2002), available at http://www.ncsconline.org/WC/Publications/Res_Juries_HungJuriesProblemPub.pdf (describing a study in four U.S. state courts in which judges and juries completed post-trial questionnaires about felony trials, including preferred verdicts); Larry Heuer & Steven D. Penrod, *Trial Complexity: A Field Investigation of Its Meaning and Its Effects*,

verdict agreement between judges and juries.¹⁴ Analyses of the factors that contribute to jury verdicts have found that the strength of trial evidence, whether it is rated by judges or juries, is the most important determinant of jury verdicts.¹⁵ Furthermore, the agreement rates of judge and jury are similar in both straightforward and complex trials, indicating that failure to understand the evidence is not a major determinant of judge-jury disagreement.¹⁶ Instead, many disagreements are explained by the fact that compared to judges, juries appear to require a stronger case by the prosecution to convict the defendant; or by the fact that juries infuse community notions of justice into their verdicts.¹⁷

Although the jury's general "report card" would make most parents happy, jurors themselves have identified the task of interpreting scientific and technical evidence and expert testimony as particularly challenging.¹⁸ Case studies examining juror

18 LAW & HUM. BEHAV. 29 (1994) (describing study of jury innovations that included judicial assessments); HARRY KALVEN, JR. & HANS ZEISEL, *THE AMERICAN JURY* (Little, Brown 1966) (describing study in which judges evaluated jury trials and provided hypothetical verdicts).

¹⁴ HANNAFORD-AGOR ET AL., *supra* note 13, at 55–56 (reporting agreement in most cases); Heuer & Penrod, *supra* note 13, at 46–48 (showing substantial agreement); KALVEN & ZEISEL, *supra* note 13, at 58 (finding a 78% agreement in criminal jury trials), 63 (finding a 78% agreement in civil jury trials).

¹⁵ Theodore Eisenberg, Paula L. Hannaford-Agor, Valerie P. Hans, Nicole L. Mott, G. Thomas Munsterman, Stewart J. Schwab & Martin T. Wells, *Judge-jury Agreement in Criminal Cases: A Partial Replication of Kalven & Zeisel's The American Jury*, 2 J. EMPIRICAL LEGAL STUD. 171, 196–98 (2005) (finding that the strength of evidence, whether rated by jurors or by judges, is the strongest factor in explaining a verdict); Steven P. Garvey, Paula L. Hannaford-Agor, Valerie P. Hans, Nicole L. Mott, G. T. Munsterman & Martin T. Wells, *Juror First Votes in Criminal Trials*, 1 J. EMPIRICAL LEGAL STUD. 371, 380 (2004) (finding strength of evidence is the most important factor determining first votes of jurors).

¹⁶ Eisenberg et al., *supra* note 15, at 190–92 (rates of judge-jury disagreement not strongly linked to case complexity); Heuer & Penrod, *supra* note 13, at 46–48 (no effect of case complexity on judge-jury agreement); KALVEN & ZEISEL, *supra* note 13, at 157 (judge-jury disagreement similar in easy and difficult cases).

¹⁷ Eisenberg et al., *supra* note 15, at 185–89; KALVEN & ZEISEL, *supra* note 13, at 111–17.

¹⁸ See summaries of the research by Joseph S. Cecil, Valerie P. Hans &

comprehension of scientific testimony, and some experimental research, point out the types of expert evidence that can present problems for juries.¹⁹ For example, statistical and economic evidence is particularly challenging to jurors.²⁰ DNA evidence, particularly the statistical arguments and inferences that may be drawn from evidence of a match between DNA found at a crime scene and a suspect's DNA, can also present problems for jurors.²¹ However, because agreement rates with legal experts do not differ as a function of case complexity, we have some confidence that difficulties that juries might have with complex evidence do not seem to be major contributors to unreasonable verdicts.²²

Elizabeth C. Wiggins, *Citizen Comprehension of Difficult Issues: Lessons from Civil Jury Trials*, 40 AM. U. L. REV. 727, 728–29 (1991); Neil Vidmar & Shari Seidman Diamond, *Juries and Expert Evidence*, 66 BROOK. L. REV. 1121, 1126 (2001); Sanja Kutnjak Ivković & Valerie P. Hans, *Jurors' Evaluations of Expert Testimony: Judging the Messenger and the Message*, 28 LAW & SOC. INQUIRY 441, 442 (2003).

¹⁹ Two case studies reached critical conclusions about jury comprehension of scientific and technical testimony: MOLLY SELVIN & LARRY PICUS, *THE DEBATE OVER JURY PERFORMANCE: OBSERVATIONS FROM A RECENT ASBESTOS CASE* (1987); and JOSEPH SANDERS, *BENEDICTIN ON TRIAL* 117–42 (1998).

²⁰ *Statistics in the Jury Box*, *supra* note 7; Michael J. Saks & Robert F. Kidd, *Human Information Processing and Adjudication: Trial by Heuristics*, 15 LAW & SOC'Y REV. 123, 149 (1981); David H. Kaye & Jonathan J. Koehler, *Can Jurors Understand Probabilistic Evidence?*, 154 J. ROYAL STAT. SOC'Y ANN. 75 (1991); William C. Thompson, *Are Juries Competent to Evaluate Statistical Evidence?*, 52 LAW & CONTEMP. PROBS. 9 (1989).

²¹ Dale A. Nance & Scott B. Morris, *An Empirical Assessment of Presentation Formats for Trace Evidence with a Relatively Large and Quantifiable Random Match Probability*, 42 JURIMETRICS J. 403 (2002); Dale A. Nance & Scott B. Morris, *Juror Understanding of DNA Evidence: An Empirical Assessment of Presentation Formats for Trace Evidence with a Relatively Small Random Match Probability*, 34 J. LEGAL STUD. 395 (2005); Jason Schklar & Shari Seidman Diamond, *Juror Reactions to DNA Evidence: Errors and Expectancies*, 23 LAW & HUM. BEHAV. 159 (1999); Brian C. Smith et al., *Jurors' Use of Probabilistic Evidence*, 20 LAW & HUM. BEHAV. 49 (1996); William C. Thompson & Edward L. Schumann, *Interpretation of Statistical Evidence in Criminal Trials: The Prosecutor's Fallacy and the Defense Attorney's Fallacy*, 11 LAW & HUM. BEHAV. 167, 180 (1987).

²² See Eisenberg et al., *supra* note 15, at 190–92; Heuer & Penrod, *supra* note 13, at 46–48; KALVEN & ZEISEL, *supra* note 13, at 157.

Supporting this view, Richard Lempert's review of thirteen complex trials concluded that even when juries did not completely understand all of the scientific and technical details, jurors could usually comprehend enough of the testimony to engage in rational decision making.²³

How judges fare with similarly complex scientific material has not been extensively studied. Although political scientists and other scholars have conducted many analyses of judicial decisions and opinions, the research literature on judicial reactions to scientific evidence is modest.²⁴ The most extensive project to date surveyed 400 judges about their opinions on the *Daubert* case, and asked questions regarding related scientific concepts, including falsifiability, error rate, peer review, publication, and general acceptance.²⁵ In the survey, judges showed very good understanding of peer review, publication, and general acceptance; they had more trouble with the concepts of falsifiability and error rate.²⁶ Other research suggests that judges might be susceptible, as lay persons are, to various cognitive processing errors and biases, which in turn could compromise their ability to make sound inferences from scientific and statistical evidence.²⁷ In sum,

²³ Richard Lempert, *Civil Juries and Complex Cases: Taking Stock After Twelve Years*, in VERDICT: ASSESSING THE CIVIL JURY SYSTEM 181 (Robert Litan ed., 1993). Professor Lempert rated the jury verdicts as high, moderate, or low on their defensibility and concluded that although eleven verdicts were highly or moderately defensible, two of the thirteen jury verdicts were low on defensibility. *Id.*

²⁴ Scholars have observed that "few systematic studies of judicial decision making exist." Chris Guthrie, Jeffrey J. Rachlinski & Andrew J. Wistrich, *Inside the Judicial Mind*, 86 CORNELL L. REV. 777, 781 (2001) (reporting empirical study of judicial decision making). Scholarly study has focused on other issues such as the role of the judge's political views or personal characteristics and the dynamics of opinion writing. See LAWRENCE BAUM, *THE PUZZLE OF JUDICIAL BEHAVIOR* (1997).

²⁵ Sophia I. Gatowski, Shirley A. Dobbin, James T. Richardson, Gerald P. Ginsburg, Mara L. Merlino & Veronica Dahir, *Asking the Gatekeepers: A National Survey of Judges on Judging Expert Evidence in a Post-Daubert World*, 25 LAW & HUM. BEHAV. 433 (2001).

²⁶ *Id.* at 444-48.

²⁷ Guthrie et al., *supra* note 24; Andrew J. Wistrich, Chris Guthrie & Jeffrey J. Rachlinski, *Can Judges Ignore Inadmissible Information? The*

although judge and jury decision making has been the subject of some study, little work directly compares judge and jury responses to the same scientific issues.

A study of judicial responses to scientific evidence within the context of a specific case is worthwhile. First, judges' reactions are valuable in their own right, as they regularly encounter scientific evidence in both criminal and civil cases and must now evaluate the scientific soundness of such evidence in making admissibility decisions. They preside over the trial and have considerable power. Second, judges are the obvious alternative to juries. Comparing judge and jury responses to the same material might highlight distinctive attitudes, skills, and abilities of judges versus juries, which in turn could have implications for structuring their decision making and allocating tasks between them. In a 2005 survey of research contrasting judge and jury decision making, Professor Jennifer Robbennolt concluded that while direct contrasts of judge and jury responses are still relatively uncommon, they can be valuable "to define the contours of . . . differences and similarities and to inform mechanisms by which the decision making process can be improved."²⁸ This project allows us to obtain comparative information about judicial and juror reactions to scientific material presented in the courtroom.

II. THE JURY MTDNA STUDY

The mock jury study employed a case involving scientific evidence to facilitate the analysis of juror responses to scientific information.²⁹ The study also explored whether suggested jury trial reforms could improve the jurors' comprehension and use of the

Difficulty of Deliberately Disregarding, 153 U. PA. L. REV. 1251 (2005) (finding judges are susceptible to several cognitive biases). For a summary of this literature, see Joseph Sanders, Michael J. Saks & N.J. Schweitzer, *Trial Factfinders and Expert Evidence*, in DAVID FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE (forthcoming 2008).

²⁸ Jennifer K. Robbennolt, *Evaluating Juries by Comparison to Judges: A Benchmark for Judging?*, 32 FLA. ST. U. L. REV. 469, 509 (2005) (surveying research comparing judge and jury decision making).

²⁹ TESTING THE EFFECTS, *supra* note 7.

scientific evidence. The mock trial, based on the facts and evidence presented in *State v. Pappas*,³⁰ purposefully included ambiguous nonscientific evidence along with dueling scientific expert testimony about mitochondrial DNA evidence that linked hairs from the sweatshirt of a fleeing robber to the defendant in the case.

Typically, forensic DNA testing employs strands of nuclear DNA, but when the quantity or quality of nuclear DNA makes it unsuitable for analysis, mitochondrial DNA (“mtDNA”) analysis may be used.³¹ Because there are hundreds or thousands of mitochondria in each cell, fewer cells are needed for mtDNA analysis than for nuclear DNA analysis.³² The mitochondria in all cells are copied from the fertilized egg cell with mitochondria exclusively from the mother.³³ Therefore, individuals in the same maternal line of descent have the identical mtDNA sequence. MtDNA matches are not as definitive as nuclear DNA matches because of the maternal inheritance issue and the smaller number of base pairs that are compared in mtDNA as opposed to nuclear DNA analyses.³⁴ Nonetheless, it is useful in some forensic contexts and has been admitted as evidence in U.S. courts.³⁵

The jury study used volunteers from the jury pool in New Castle County, Delaware who were not needed for a trial that day.

³⁰ 776 A.2d 1091 (Conn. 2001); *see also* Marlan D. Walker, Note, *Mitochondrial DNA Evidence in State v. Pappas*, 43 JURIMETRICS J. 427 (2003) (discussing the *Pappas* case).

³¹ U.S. DEPT. OF JUSTICE, LESSONS LEARNED FROM 9/11: DNA IDENTIFICATION IN MASS FATALITY INCIDENTS 66–65 (2006), *available at* <http://www.ncjrs.gov/pdffiles1/nij/214781.pdf> (describing DNA techniques employed in identifying remains from 9/11 disaster).

³² Julian Adams, *Nuclear and Mitochondrial DNA in the Courtroom*, 13 J. L. & POL’Y 69 (2005); David H. Kaye & George F. Sensabaugh, Jr., *Reference Guide on DNA Evidence*, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 485, 495 (2d ed. 2000), *available at* [http://www.fjc.gov/public/pdf.nsf/lookup/sciman09.pdf/\\$file/sciman09.pdf](http://www.fjc.gov/public/pdf.nsf/lookup/sciman09.pdf/$file/sciman09.pdf) (providing basic and advanced reference material on DNA).

³³ Adams, *supra* note 32, at 73–74; Kaye & Sensabaugh, *supra* note 32, at 495.

³⁴ Kaye & Sensabaugh, *supra* note 32, at 495.

³⁵ Adams, *supra* note 32; Edward K. Cheng, *Mitochondrial DNA: Emerging Legal Issues*, 13 J.L. & POL’Y 99 (2005).

The jurors were assembled in groups of eight and watched a videotape of the mock trial. The study varied whether mock jurors were able to use specific trial reforms such as note-taking, asking questions of experts, following a checklist, and using notebooks containing experts' slides and a glossary of DNA terms. We assessed overall comprehension of the scientific evidence and then further compared jurors who were permitted to employ different reforms for how well they understood mtDNA.

The research employed a variety of measures to assess juror comprehension. Jurors rated how well they thought they understood the evidence, provided their own definitions of mtDNA, and answered a set of true-false questions about mtDNA evidence and inferences that could be drawn from the evidence. Dissertation research by Erin Farley further examined how mtDNA evidence was discussed in the mock jury deliberations.³⁶ The results have been reported in a series of articles.³⁷ This article integrates selected juror responses with those of judges who responded to the same mock trial materials.

III. THE JUDGE MTDNA STUDY

During my presentation at Science for Judges IX, I asked judges to contribute to their own scientific education by agreeing to take part in a research project. The 65 judges who agreed to do so became participants in a mock trial study, using many of the same materials as the Jury MtDNA Study. The Judge MtDNA Study fulfilled several purposes. First, it used active learning to convey methodological details of mock jury research. It allowed judges to see close up how jurors' understanding of scientific evidence was measured.³⁸ By participating as subjects themselves, judges could

³⁶ Erin Jennifer Farley, *Deliberating Science: Juries, Scientific Evidence and Commonsense Justice* (2006) (unpublished Ph.D. dissertation, University of Delaware) (on file with author).

³⁷ See sources cited *supra* note 7.

³⁸ Scientific studies have demonstrated some of the advantages of active learning in educational settings. For a review, see DEE FINK, *CREATING SIGNIFICANT LEARNING EXPERIENCES* (2003). For an application of learning theory to jury decision making, see B. Michael Dann, "Learning Lessons" and

gain an appreciation of the strengths and limitations of mock jury experiments.

The Judge MtDNA Study was also valuable as a scientific project. It permitted an opportunity for a direct contrast between judge and jury responses to the evidence about mtDNA. We could compare judicial responses to jury responses, allowing us to observe overlap and divergence. The ability to contrast judge and jury reactions to the same scientific evidence within the context of a mock trial is a novel contribution of this project.

From a scientific perspective, it would have been ideal for judges to view exactly the same videotape as the jurors. For practical reasons—there was not enough time in the event-filled Science for Judges IX conference schedule—such a viewing was not possible. Consequently, judges read a short summary of background information about the case in lieu of watching the lay witnesses be examined and cross-examined in the mock trial video. Judges then watched video clips of the prosecution's expert, the defense expert, closing arguments by both attorneys, and the judicial instructions. The judges completed two questionnaires, one before and one after watching the mock trial, that contained many of the same questions the mock jurors answered. The following morning, a presentation of the preliminary results to judges highlighted the areas in which they overlapped and the domains in which they diverged from the jurors who saw the mock trial.

IV. JUDGES AND JURORS: SOME BACKGROUND DIFFERENCES

It is important to note a number of background differences between the judges and the jurors so that their respective responses to the scientific testimony are in context. The most obvious difference is their educational experiences. The juror participants in the study represented a wide range of educational levels, including 2% who had not graduated from high school, 24% who had a high school degree, 30% who had taken some college courses, 29% with college degrees, and 14% who did post-graduate work beyond their

"Speaking Rights": Creating Educated and Democratic Juries, 68 IND. L. J. 1229 (1993).

four-year college degrees. Judges weighed in at the top end of this spectrum with college degrees and post-graduate law degrees.

But how much science background do judges have? Some scholars have speculated that many judges have little attraction to or aptitude for math and science.³⁹ The twin mtDNA studies offer a first comparative look at the math and science background of judges and jurors, albeit jurors from a single jurisdiction and judges who attended a Science for Judges workshop. These judges might differ in unknown but relevant ways from their colleagues who did not attend the workshop. A priori, it seems likely that they would be more interested in science and also that they might have more background in science than their judicial peers (the reverse could be the case, however, if judges are drawn to the workshop because they believe they do not have sufficient scientific background to manage their cases).

Jurors and judges both indicated the number of science and math classes they took in high school and in college. For judges, the reported average was 10.29 courses across high school and college. This number was not statistically different from the average number of science and math courses (9.72 courses) reported by members of the jury pool.

Because policymakers regularly argue in favor of highly educated or blue ribbon juries in technically demanding cases, it is informative to compare both of these averages to the subgroup of jurors, 33% of the overall juror sample, who possessed college degrees and who thus might be a reasonable blue ribbon jury option. This group reported an average of 14.04 science and math courses in high school and college—significantly more courses on average than the judges.⁴⁰ If science and math courses provide crucial background for the understanding of scientific evidence in the courtroom, then the college educated blue ribbon jurors possess more of that background than either the pool of judges or the full pool of jurors.

Of the pool of judges, five reported having some job experience in math or science. Not surprisingly, these judges also reported

³⁹ See Sanders et al., *supra* note 27, at 2 (manuscript page).

⁴⁰ $F(1, 241) = 8.35, p = .004$.

significantly more coursework (an average of 18.6 courses) than those without job experience (an average of 9.39 courses).⁴¹ Sixteen percent of the jurors and 52% of the blue ribbon college educated jurors reported job experience in math or science. Like the judges, jurors with job experience in math and science tended to have more math and science coursework. For example, college educated jurors with relevant job experience reported 16.88 math and science courses in high school and college, compared to 11.11 courses for those without job experience.⁴²

When asked how much scientific evidence they had encountered in their work as judges, most judges at the conference reported that they had at least moderate exposure to scientific evidence in the courtroom. Thirteen percent reported only a small amount, 66% recalled a moderate amount, and 21% said they had a great deal of exposure. Notably, the judges who said they encountered “a great deal” of scientific evidence in their judicial work did not report having more of a science and math background. The average for these judges was 7.9 courses—slightly but not significantly below the average for all judges.

V. REACTIONS TO THE MOCK TRIAL VIDEOTAPE AND MTDNA EVIDENCE

Upon examining judges’ responses to the questionnaires and mock trial videotape clips, one is struck by the overall similarity to the average responses of the jurors. When differences emerged, it was often in the direction of judges, compared to jurors, giving greater credence to experts and the mtDNA evidence. The college educated jurors resembled other jurors more than they did the judges.

Before watching the video excerpts, jurors and judges were asked to give their views about the reliability of DNA evidence as a category of evidence. Judges averaged 4.49 on a 1 to 5 point scale,

⁴¹ $F(1, 49) = 9.65, p = .003$.

⁴² College educated jurors were significantly more likely than judges to have math and science job experience, $F(1, 265) = 38.91, p < .0001$. And in turn, college educated jurors with math and science job experience had more related coursework, $F(1, 189) = 24.41, p < .0001$.

where 5 equaled extremely reliable. These findings were quite comparable to the jurors' and college educated jurors' average ratings of 4.56 and 4.59, respectively. Thus, both judges and jurors began the study with similar and highly favorable views about the general reliability of DNA evidence.

We asked both judges and jurors how much they had heard about mtDNA analysis before they participated in the study. A total of 52% of the jurors who participated had heard nothing about mtDNA, compared to 25% of the judges. This circumstance is undoubtedly at least partly explained by the fact that the jury study was conducted in 2003, when the use of mtDNA evidence was beginning to be used more extensively in courtrooms.⁴³ Judges, on the other hand, were surveyed in 2007 when the forensic use of mtDNA evidence had become more common and was generally accepted in legal cases.⁴⁴

Judges for the most part reported that it was easy to follow the expert testimony and that they understood it well. They reported greater comfort with the expert testimony than did jurors. Forty percent of the jurors, 50% of the college educated jurors, and 62% of the judges said it was easy to follow the expert testimony about mtDNA evidence.⁴⁵ Similar minorities of all three groups admitted having problems following the testimony: 21% of the jurors, 19% of the college educated jurors, and 17% of the judges said it was difficult to follow the testimony. Forty-seven percent of the jurors, 54% of the college educated jurors, and 55% of the judges were confident that they understood the mtDNA well or very well after hearing the expert witnesses.⁴⁶

Figure 1 shows how judges and jurors rated the defense and

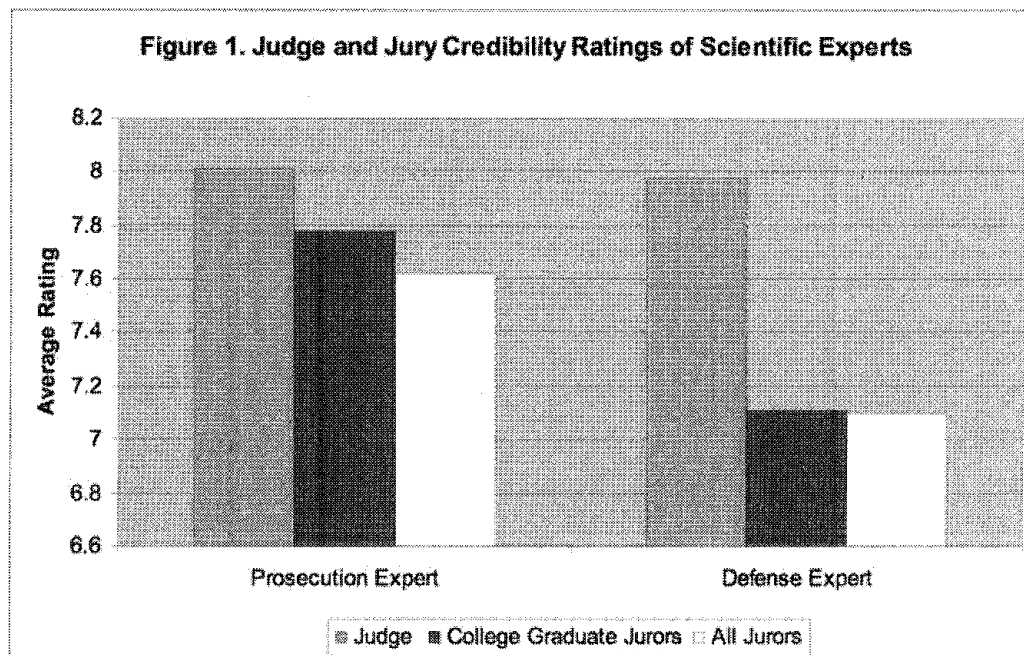
⁴³ Adams, *supra* note 32; Cheng, *supra* note 35 (describing changes over time in acceptance of mtDNA evidence).

⁴⁴ Adams, *supra* note 32 (describing growing judicial acceptance of mtDNA evidence); Cheng, *supra* note 35 (discussing legal questions arising with the use of mtDNA evidence).

⁴⁵ The judges expressed significantly more ease in following the testimony compared to the full jury sample ($F(1, 542) = 5.12, p = .024$); but not compared to college educated jurors ($F < 1, ns$).

⁴⁶ Responses of judges and jurors did not differ significantly on this question.

prosecution expert witnesses. Credibility ratings for the prosecution expert were comparable (8.01 for judges; 7.62 for jurors). However, judges rated the defense expert as significantly more credible than did jurors (7.98 for judges and 7.10 for jurors).⁴⁷ The college educated jurors rated the experts' credibility nearly identically to the other jurors (7.78 for the prosecution expert and 7.11 for the defense expert). It is interesting to speculate about why the defense expert is rated differently by judge and jury. Judges may be more accustomed to the adversarial and back-and-forth character of expert testimony, or, judges may have recognized the validity of some of the defense expert's points that were not identified by the jurors.

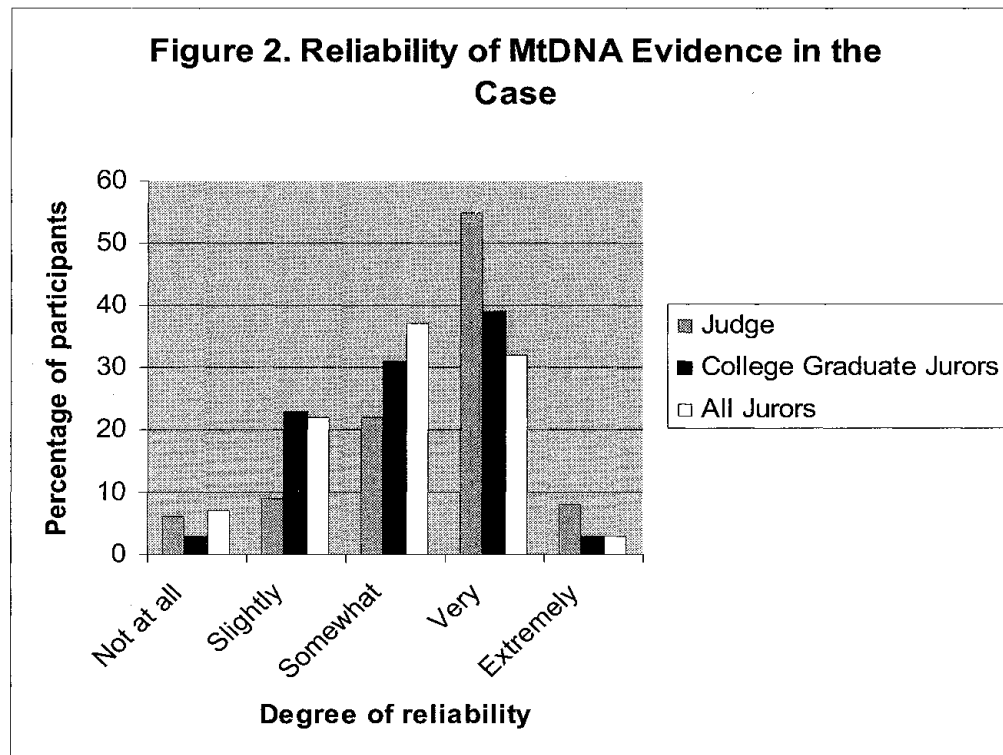


Judges watched only portions of the videotaped trial, whereas jurors watched the entire videotaped trial, including testimony by a police officer, an eyewitness, and the defendant. Thus, their exposure to the case facts was not identical. Interestingly, however, judges' estimates of the likelihood that the defendant was the robber were significantly higher than those of the jurors (85%

⁴⁷ Credibility ratings for the prosecution expert did not differ significantly between judges and the full sample of jurors; however, ratings of the defense expert did differ significantly: $F(1, 539) = 11.38, p = .001$.

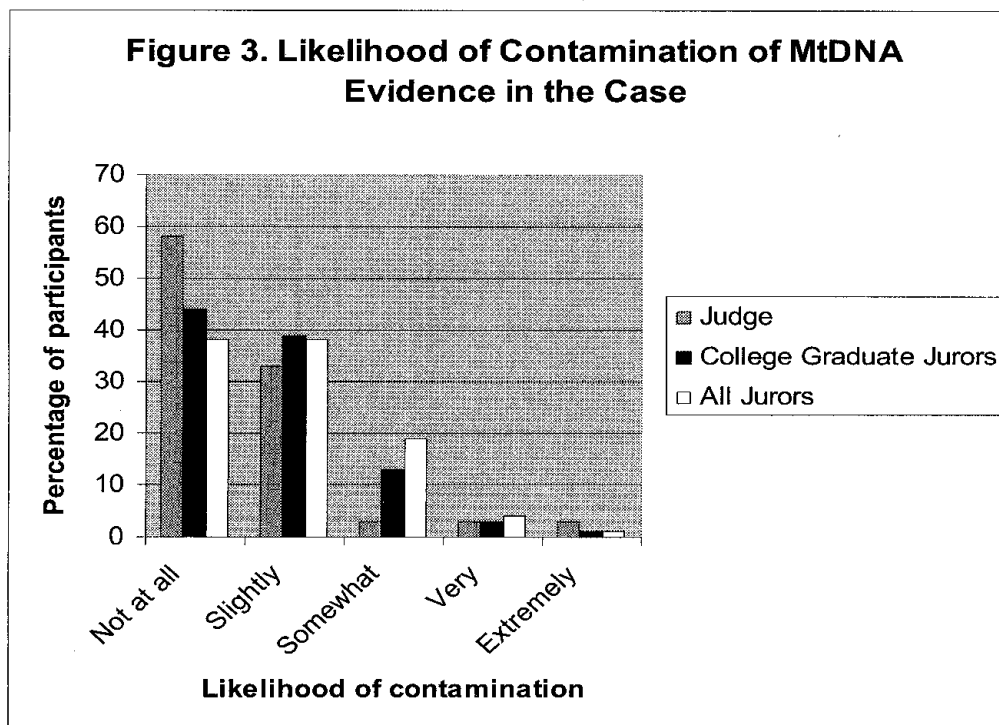
probability for judges, versus 69% for all jurors and 73% for college educated jurors). Judges were also more likely to convict. This result converges with the typical finding in judge-jury agreement studies that judges are more willing to convict when juries would acquit.⁴⁸

Additionally, judges were more positive than jurors about the reliability and integrity of the mtDNA evidence used in the case. Figure 2 compares the responses of judges and jurors to a question asking, "How reliable was the mtDNA evidence presented in this case?" More judges saw it as very or extremely reliable. The opinions of college educated jurors about mtDNA's reliability fell between judges and the rest of the jurors.



⁴⁸ For the judge-all jury comparison of the probability that the defendant is the robber, $F(1, 541) = 14.72, p < .0001$; for judges versus college educated jurors, $F(1, 268) = 8.03, p < .005$. For findings of judge and jury verdict differences in other studies, see KALVEN & ZEISEL, *supra* note 13, at 58 (showing judges more likely to convict when juries would acquit than vice versa); Eisenberg et al., *supra* note 15, at 181 (showing judges more willing to convict than juries).

Both judges and jurors thought the mtDNA evidence presented by the prosecution was very unlikely to be contaminated.⁴⁹ As shown in Figure 3, the most common response in both groups is that it is not at all likely to be contaminated. Judges are extraordinarily confident; 91% of judges rated the likelihood of contamination as not at all likely or only slightly likely. The majority of jurors (76%) responded the same. However, significant minorities of both judges (9%) and jurors (24%) thought that contamination was at least somewhat likely. The views of college graduate jurors fell between the judges and the whole jury sample.



⁴⁹ TESTING THE EFFECTS, *supra* note 7, at 52–54 (presenting study findings related to judgments of reliability and contamination); Science in the Jury Box, *supra* note 7 (analyzing judgments of reliability and contamination). For the reliability item, comparing judges and all jurors, $F(1, 541) = 13.27, p < .0001$; for judges versus college educated jurors, $F(1, 269) = 6.18, p = .01$. For the contamination item, comparing judges and all jurors, $F(1, 542) = 6.17, p = .01$. Judges and college educated jurors did not differ significantly on their responses to the contamination item.

VI. JUDGE AND JURY COMPREHENSION OF THE SCIENTIFIC EVIDENCE

Eleven true-false questions tested the participants' understanding of the basic science behind mtDNA and the understanding of inferences that could be drawn from mtDNA evidence. These questions included asking about biological facts concerning mtDNA, including the location of the mitochondria within the cell, the importance of the sequence of base pairs, the maternal heritage of mtDNA, and the concept of heteroplasmy. They also included questions about inferences that could be drawn from a mtDNA match.⁵⁰ Jurors were asked most of these questions both before and after deliberating with other jurors. For the purposes of comparing responses to the individual items with judges, I used the post-deliberation measures of the jurors since jury deliberation is an essential and important part of jury fact-finding.

Overall judges and jurors responded similarly and accurately to most of the individual items testing knowledge and inferences about mtDNA evidence. Of eleven items, the responses were significantly different for three items and statistically indistinguishable on the remaining eight items.

Notably, an inspection of responses to the individual true-false items for overlap and divergence reveals that one item produced the largest difference between judges and jurors. Judges and jurors were asked whether the following claim was true or false: "The mtDNA evidence in this case is completely irrelevant because a substantial number of other people could also be the source of the hairs." As a scientific matter, the mtDNA evidence is not completely irrelevant; it should be weighed and considered along with the other evidence that points to the defendant as the robber.⁵¹ Nevertheless, the defense attorney asked both experts about the likelihood of other people being the source of the hairs, and he made the (false) claim of complete irrelevance in his closing argument. Judge and jury

⁵⁰ TESTING THE EFFECTS, *supra* note 7, at 47 (listing questions probing specific knowledge about mtDNA).

⁵¹ See *Statistics in the Jury Box*, *supra* note 7, at 804.

responses diverged on this item: 51% of the jurors and 85% of the judges answered correctly that the mtDNA information was nonetheless relevant.⁵²

Responses to two other items showed smaller differences—one in which jurors were more likely to provide an accurate response and the other in which judges were more likely to be correct. When asked whether the mtDNA evidence could have come from the defendant's brother if he and the defendant had the same mother but different fathers, 90% of the jurors and 82% of the judges correctly answered yes.⁵³ It is interesting that jurors performed so well on this item. Erin Farley's analysis of the mock jury deliberations revealed that most jury deliberations included a discussion about the maternal line of inheritance of mtDNA.⁵⁴ The jurors' superiority on this question as compared to the judges' performance could well be due to the fact that they deliberated and discussed the matter.

The final item showing a statistically significant difference between judges and jurors involved a basic question about whether nuclear DNA or mtDNA had the same ability to prove identity, or whether one was superior to the other. The correct answer is that nuclear DNA is superior. Most jurors (89%) answered this question correctly, as did all but one judge. The higher performance of the judges is statistically significant.⁵⁵

Not surprisingly, college educated jurors, jurors with a substantial number of math and science courses in high school and college, and jurors with extensive job experience in math and science all performed better on the true-false questions as compared to jurors with less education, fewer relevant courses, or no relevant job experience.⁵⁶ The same group of jurors also significantly out-performed the judges on three of the eleven questions. All three items in which the college educated jurors

⁵² $\chi^2(1, N = 545) = 26.38, p < .001$.

⁵³ $\chi^2(1, N = 545) = 4.46, p = .04$.

⁵⁴ Farley, *supra* note 36, at 166–68.

⁵⁵ $\chi^2(1, N = 545) = 5.63, p = .02$.

⁵⁶ TESTING THE EFFECTS, *supra* note 7, at 50–52 (analyzing impact of education on juror performance); Science in the Jury Box, *supra* note 7 (analyzing impact of education on juror performance).

showed greater accuracy than the judges involved the maternal lineage of mtDNA—whether mtDNA came from both the mother and the father (no), whether the same father was sufficient (no), and whether the same mother was sufficient (yes) for an mtDNA match.⁵⁷ The only item showing an advantage of judges over college-educated jurors was the “completely irrelevant” question about the mtDNA evidence. Like their peers, the college educated jurors were divided in their responses to this question; by a substantial margin, judges were more likely to get it right.⁵⁸

In defense of both the jurors and the judges, even on the questions on which the other decision maker showed a relative advantage, substantial majorities of both types of decision makers answered correctly. The one exception was the “completely irrelevant” question in which a bare majority of jurors answered the question correctly (51%).

The responses were combined into an 11-item MtDNA Comprehension Scale. Each correct answer contributed one point to the scale. Responses of “no answer,” “don’t know,” and incorrect answers were all assigned zero points. Thus, the scale could range from zero (all questions incorrect) to eleven (all questions correct). Both judges and jurors performed reasonably well, as measured by this scale, scoring between eight and nine questions correct on average. The full sample of jurors answered an average of 8.26 questions correct, and judges answered a marginally higher average of 8.69 questions correct. The college educated jurors answered 8.80 questions correct on average.⁵⁹

⁵⁷ On the question about whether mtDNA comes from both mother and father: 95% correct for college educated jurors and 88% correct for judges; $\chi^2(1, N = 272) = 4.48, p = .03$; the same father question: 94% college educated jurors and 86% judges, $\chi^2(1, N = 545) = 4.50, p = .03$; the same mother question: 93% for college educated jurors and 82% for judges, $\chi^2(1, N = 545) = 7.83, p = .005$.

⁵⁸ 55% for the college educated jurors versus 85% for the judges; $\chi^2(1, N = 545) = 18.35, p < .001$.

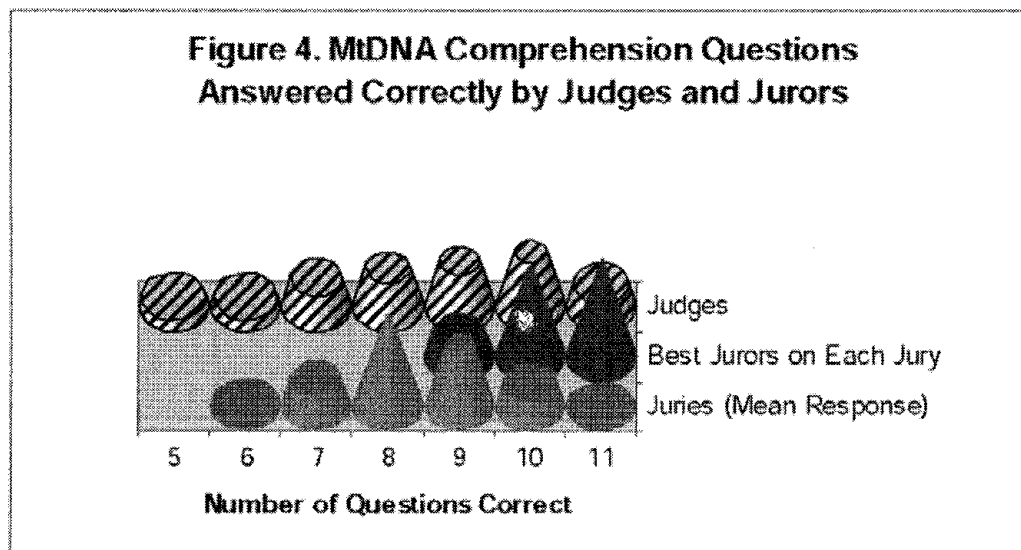
⁵⁹ The comparison between the full juror sample and judges was marginally significant: $F(1, 543) = 2.69, p = .101$. The comparison between college educated jurors and judges was not statistically different, $F < 1, ns$. To avoid reader confusion, I point out that two other reports of these jury data, TESTING THE EFFECTS, *supra* note 7; Science in the Jury Box, *supra* note 7, employ a

Thus far this article has compared individual judges and individual jurors. However, juries decide as a group. To take into account the group nature of jury decision making, it would be useful to obtain an average of the individual jurors' responses for each jury and compare those average responses to the individual responses of judges. Since juries can benefit from their more knowledgeable members, it is also of interest to include in the comparison the highest scoring members of each jury.

Figure 4 compares the responses of the judges, the average jury responses post-deliberation (that is, the mean of the juror responses within each jury), and the responses of the best performing juror in each jury.⁶⁰ The figure employs cones to indicate the proportion of each group at each number of correctly answered questions. The heights of the cones reflect the relative proportions of each group answering a particular number of questions correctly. The figure reinforces the individual numerical comparisons presented above, showing that the vast majority of all types of decision makers perform reasonably well. The jury averages peak at eight and nine questions correct, with 44% and 30% of juries at each point. The best jurors on each jury score at the top end of the scale, understandably, with 42% and 47% answering ten and eleven questions correct respectively. Individual judges are spread a bit more broadly over the range from five to eleven questions, with the highest proportions of judges answering nine and ten questions correctly (22% and 26%, respectively).

different set of items in the comprehension scale, eight items that were asked both before and after the jury deliberations.

⁶⁰ Average responses for each jury were rounded to the nearest whole number for the purposes of the figure.



VII. JURY TRIAL INNOVATIONS TO IMPROVE THE JURY'S COMPREHENSION AND USE OF SCIENTIFIC EVIDENCE

The focus of this article has been on comparing judges and jurors and considering how educational attainment and science and mathematics background are related to judgments about scientific evidence. Policymakers who are concerned about jury performance in complex trials have advocated the use of a range of trial innovations designed to improve a juror's ability to understand scientific evidence and apply it in the context of a legal case. Many of these innovations are summarized in the recently revised Jury Trial Innovations compendium from the National Center for State Courts, as well as the 2005 American Bar Association publication, *Principles for Juries and Jury Trials* (the "Principles"), a set of guiding ideals for the conduct of jury trials.⁶¹ To promote juror understanding of the facts and the law, the Principles encourage a range of techniques, including juror note-taking, the use of jury notebooks in appropriate cases, the careful consideration of using

⁶¹ AMERICAN BAR ASSOCIATION, PRINCIPLES FOR JURIES AND JURY TRIALS (2005) [hereinafter PRINCIPLES FOR JURIES AND JURY TRIALS]; JURY TRIAL INNOVATIONS (G. Thomas Munsterman, Paula L. Hannaford-Agor & G. Marc Whitehead eds., National Center for State Courts, 2d ed. 2006).

juror questions, and the option of allowing jurors to discuss evidence as the case proceeds rather than waiting for the final deliberations.⁶²

To compare and contrast how different jury trial innovations might help jurors master the details of scientific evidence, the Jury MtDNA Study varied whether mock jurors could use note-taking, ask questions about the scientific expert testimony, use a checklist, employ a jury notebook containing the experts' slides and a glossary of DNA terms, or use multiple innovations. Jurors reported that they benefited from using the innovations.⁶³ We measured the impact of the use of these innovations on jurors' scientific understanding using a subset of the true-false questions analyzed in this article. The results were mixed, but two innovations produced small but statistically significant benefits on jury comprehension. Jurors who were allowed to use checklists and jury notebooks did better on the true-false questions compared to jurors who were not permitted to use these trial innovations. Although a juror's opportunity to take notes has been linked to better performance in other jury studies,⁶⁴ note-taking was not associated with higher scores in this mtDNA project. One likely explanation for this departure is that juror note-taking is most helpful as a memory aid, and the Jury MtDNA Study was a relatively short couple of hours from start to finish.⁶⁵ Similarly, the

⁶² PRINCIPLES FOR JURIES AND JURY TRIALS, *supra* note 61, at 91–105 (recommending specific jury innovations to promote juror understanding).

⁶³ TESTING THE EFFECTS, *supra* note 7, at 55–74 (describing in technical detail the juror responses to trial innovations); *Jury Trial Innovations and Juror Understanding*, *supra* note 7, at 155 (summarizing juror responses to innovations).

⁶⁴ B. Michael Dann & Valerie P. Hans, *Recent Evaluative Research on Jury Trial Innovations*, 41 CT. REV. 12, 13–14 (2004) (reviewing studies of juror note-taking); Lynne ForsterLee & Irwin Horowitz, *The Effects of Jury-Aid Innovations on Juror Performance in Complex Civil Trials*, 86 JUDICATURE 184 (2003) (describing research project finding that juror notes improved jury performance).

⁶⁵ See JURY TRIAL INNOVATIONS, *supra* note 61, at 126–27 (describing multiple advantages of juror note-taking); PRINCIPLES FOR JURIES AND JURY TRIALS, *supra* note 61, at 94–95 (commenting on the benefits of juror note-taking).

chance to ask questions did not improve performance possibly because very few mock jurors in the mtDNA study availed themselves of the opportunity to ask questions of the experts.⁶⁶

CONCLUSION

As is common in scientific research, the Jury MtDNA Study had both strengths and limitations. Strengths include the fact that it used jurors from a jury pool, adapted an actual case, and presented it in substantial detail following the format of an actual trial. Although the trial was presented on videotape, for purposes of control, the taped trial included a real judge, real attorneys, and real scientific experts, and jurors deliberated in groups to reach a verdict. Nonetheless, it was a videotaped simulation rather than a real trial—it was shorter, included less evidence, and used actors instead of real witnesses. Jurors came from a single jurisdiction. Jurors were selected randomly from volunteers, so the effects of attorney and judicial decisions about jury selection did not influence the composition of the mock juries. This circumstance is relevant because of the possibility that attorneys may attempt to “deselect” highly educated jurors in complex trials when attorneys presume it will advantage their side to do so. As one state judge who participated in the study commented: “in jurisdictions with lots of peremptory challenges allowed on both sides, jurors can be picked through too much to get rid of almost all ‘educated’ people”⁶⁷

Likewise, the Judge MtDNA Study and the comparative analysis of judge and jury responses possessed some strengths and limitations. Because the group of judges had chosen to attend a Science for Judges conference it is quite likely they differed in science-relevant ways from their peers. The conference facility and environment were probably more distracting than a courtroom. As mentioned above, to the extent that judges and the general public

⁶⁶ For extensive discussion of juror questions of experts, see Diamond, *supra* note 11.

⁶⁷ Written comment by state judge, Judge MtDNA Study, Science for Judges conference, Brooklyn Law School, Brooklyn NY (2007) (on file with author).

became more familiar with the forensic use of mtDNA evidence from 2003 to 2007, differences in comprehension between judges and juries could be due to the expansion of knowledge rather than the different identities of the decision makers. Furthermore, a strict comparison between jurors who deliberated and judges who responded individually is not completely fair to the judges who in real life can avail themselves of numerous resources in trial decision making.⁶⁸ Nonetheless, the comparative study was a unique opportunity to contrast responses of judges and jurors to the same scientific material and learn more about the areas in which they are likely to react distinctively or converge in their judgments.

The results of the judge study affirm the basic similarity of judge-jury decision making in cases with scientific evidence, although they point to some distinctive qualities of each type of decision maker. Judges gave more credence to the defense expert's testimony, yet at the same time were more convinced that the mtDNA evidence was reliable and not contaminated. Jurors, including college educated jurors, were more concerned than judges about reliability and contamination, although, like the judges, they generally had substantially positive views of the scientific evidence. Another striking difference was that judges saw the case against the defendant as stronger and were more likely to convict on the evidence. Because the judges read a summary of the nonscientific evidence while jurors viewed it on videotape, one cannot make too much of the differential in case evaluations, but other studies have found judges somewhat more likely to convict on the same evidence compared to juries.⁶⁹

Most judges and jurors showed good command of mtDNA evidence, as evaluated by the true-false questions both groups answered. A substantial minority of jurors were susceptible to errors in reasoning about the statistical inferences that could be drawn from the scientific evidence. The mock jurors' educational

⁶⁸ Judges, for example, may draw on reference manuals and other background materials, helpful law clerks, special masters, and court-appointed experts. *See supra* text accompanying notes 4–6.

⁶⁹ KALVEN & ZEISEL, *supra* note 13, at 58 (showing judges more likely to convict when juries would acquit than vice versa); Eisenberg et al., *supra* note 15, at 181 (showing judges more willing to convict than juries).

attainment and their background in science and math were associated with better comprehension of the scientific evidence. Two jury innovations in particular—the use of jury notebooks and the use of a checklist—also increased jury comprehension, but the effects were rather modest.

Of the three specific true-false questions that produced statistically significant differences between judges and juries, judges performed better on two questions and jurors on one question. Judges had the advantage on two inferential questions—whether mtDNA or nuclear DNA was superior in proving identity and whether the mtDNA evidence was irrelevant because people other than the defendant could be the source of the hairs. In addition to both matters being discussed by the experts, the inferences were also part of the prosecutor's and defense attorneys' arguments. It may be that the more extensive exposure judges have to adversary presentations and trial court questioning encouraged them to evaluate more critically the adversarial statements about the expert evidence.

Jurors were more accurate than judges on a scientific question involving the maternal heritage of mtDNA, and this question was discussed in the vast majority of jury deliberations. This finding underscores the importance and value of jury deliberation in promoting jury fact-finding competence. In addition to the benefits of jury deliberation, some of the trial innovations that have been recommended as aids to fact-finding appear to help, but results of the Jury MtDNA Study indicate that we need to be more creative in fashioning jury innovations, especially when it comes to assisting jurors in developing appropriate inferences from scientific evidence presented in adversarial contexts.

Looking separately at college educated jurors and analyzing their scientific backgrounds and responses to true-false items, this study found that the college educated jurors possessed some fact finding advantages over their juror peers with less education, and even in some instances over judges. The significance of such educational factors leads one to consider the possible advantages of employing blue ribbon juries in extremely complex trials. The state of Delaware, where the mock jury experiment was conducted, is one of the few states that still has the option for a special jury

drawn from a pool of highly educated or specially trained prospective jurors.⁷⁰

Although blue ribbon juries were used more frequently in the past, they have fallen out of favor in recent years as more significance has been placed upon juries that can represent the full range of community experiences and perspectives.⁷¹ Other research focusing upon complex trials has found that jurors with relevant background knowledge tend to take the lead in group discussion.⁷² The vigorous discussion characteristic of diverse decision making bodies also promotes fact-finding.⁷³ Is the fact-finding ability of a jury consisting only of jurors with college degrees sufficiently superior to that of a jury consisting of jurors with a mix of educational backgrounds that the value of using a special jury outweighs the fact-finding (and other) advantages of a broadly representative jury? That is an interesting question for future research. At the very least, the presence of scientifically capable members in the regular jury pool suggests that concerns about the jury's inability to handle scientific evidence, so apparent in the *Daubert* trilogy of cases,⁷⁴ were overblown.

In sum, the study reinforces the conclusions of other researchers that judges and jurors overlap considerably yet diverge

⁷⁰ OLDHAM, *supra* note 9, at 207–09.

⁷¹ VIDMAR & HANS, *supra* note 9, at ch. 3 (describing historical waxing and waning of the use of special and blue ribbon juries).

⁷² Diamond and Casper conducted a mock jury study that included complex expert testimony. The mock jurors were more likely to select fellow jurors with relevant coursework (a statistics course) as foreperson, and the forepersons with statistics knowledge were more influential. Shari Seidman Diamond & Jonathan D. Casper, *Blindfolding the Jury to Verdict Consequences: Damages, Experts, and the Civil Jury*, 26 LAW & SOC'Y REV. 513, 552–53 (1992).

⁷³ Phoebe Ellsworth, *Are Twelve Heads Better than One?*, 52 LAW & CONTEMPORARY PROBLEMS 205 (1989) (presenting evidence that robust deliberations by diverse juries produce superior fact-finding); Samuel R. Sommers, *On Racial Diversity and Group Decision Making: Identifying Multiple Effects of Racial Composition on Jury Deliberations*, 90 J. PERSONALITY & SOC. PSYCHOL. 597 (2006) (finding better decision making in racially diverse juries).

⁷⁴ The trilogy of cases began with *Daubert v. Merrill Dow Pharms., Inc.*, 509 U.S. 579 (1993), and continued with *General Elec. Co. v. Joiner*, 522 U.S. 136 (1997) and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999).

in particular ways.⁷⁵ Although it is important to keep in mind the limitations of this particular comparison between judges and jurors, the findings of both similarities and differences provide us with a sense about how the same case might be decided by a judge, a jury, or a blue ribbon jury.

⁷⁵ See *supra* text accompanying notes 13–17.