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CAN THE “HOT TUB” ENHANCE JURORS’ UNDERSTANDING AND USE OF EXPERT TESTIMONY?

*Edie Greene and Natalie Gordon**

I. INTRODUCTION

The presence and prominence of expert testimony has grown markedly in recent years as matters of increasing complexity have come before the courts. As a result, lay jurors must try to understand and apply the oft-complicated information provided by expert witnesses. But, are they willing and able to do so? The increased complexity of trial evidence also raises questions about whether traditional, adversarial trial procedures, in which experts often reach markedly different opinions about the same set of facts and testify at different points during the trial, allow for full comprehension and rational judgments.

This article will focus on how jurors understand and apply expert testimony as presented during adversarial trial proceedings and how those proceedings pose challenges for them. It will also explore the possibility that both understanding and application can be enhanced if the presentation and structure of expert testimony is changed. Part II of this article will describe the extent of experts’ “reach,” focusing particularly on experts who testify about scientific and technical matters.¹ This section details the frequency with which these experts testify in trials in the United States and the types of trials in which they are involved.² We adopt the framework used by social psychologists to capture the elements of persuasion inherent in expert testimony, including attention to the communicator (the expert witness), message (the testimony itself), and audience (jurors and

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¹ See *infra* Part II.

² See *infra* Part II.

juries).³ Part III will evaluate what psychologists and other social scientists have learned about laypeople's use of expert testimony.⁴ On the one hand, there is reason for cautious optimism given jurors' relatively careful scrutiny of experts' information and objectives.⁵ On the other hand, jurors experience difficulties in understanding and using probabilistic and statistical expert evidence.⁶ Part IV introduces a novel concept regarding the presentation of expert testimony, namely hot tubbing, also referred to as concurrent evidence presentation.⁷ In this process, expert witnesses with differing positions reconcile *some* of those differences out-of-court and then testify concurrently, or immediately after one another, about ongoing disagreements.⁸ This procedure is primarily used in administrative hearings and tribunals in Australia and New Zealand, and on rare occasions during hearings in federal court in the United States.⁹ Hot tubbing challenges the standard chronology of adversarial trial proceedings.¹⁰ It confers various putative advantages, but also raises some concerns.¹¹ Part V covers some practical considerations associated with concurrent evidence presentation.¹² On balance, we believe that hot tubbing will enhance jurors' understanding of expert testimony and lead to more rational and predictable verdicts, particularly in cases involving complex and probabilistic evidence.

II. HOW OFTEN DO EXPERT WITNESSES TESTIFY AND ABOUT WHAT?

Although good data is exceedingly hard to come by,¹³ the few available sources suggest that expert witnesses, particularly those conveying scientific and technical evidence, play an increasingly important role in criminal and civil trials.¹⁴

³ See *infra* Part II.

⁴ See *infra* Part III.

⁵ See *infra* notes 94–97 and accompanying text.

⁶ See *infra* notes 111–16 and accompanying text.

⁷ See *infra* Part IV.

⁸ See *infra* Part IV.

⁹ See *infra* notes 165–70 and accompanying text.

¹⁰ See *infra* Part IV.A.

¹¹ See *infra* Part IV.B.

¹² See *infra* Part V.

¹³ See Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113, 1118 (1991) (stating that “[t]here is next to nothing to be learned from published data on the use of experts in American litigation.”).

¹⁴ See Deborah Connolly et al., *Predicting Expert Social Science Testimony in Criminal Prosecutions of Historic Child Sexual Abuse*, 11 LEGAL & CRIMINOLOGICAL PSYCHOL. 55, 55 (2006) (“There has been a significant increase in the frequency of expert testimony over the past [twenty-five] years in Canada.” (citation omitted)); Hon. Geoffrey L. Davies, *The Changing Face of Litigation*, 6 J. JUD. ADMIN. 179, 188 (1997) (“Scientific and technical evidence has increased dramatically [since the 1960s] both in its frequency and its complexity; and the difficulty of a trier of fact . . . in understanding and consequently in assessing the reliability of such evidence, though not a new

According to a recent commentary, diverse areas of science, including geology, chemistry, physics, and biology, commonly factor into court proceedings.¹⁵ Thus, judges and jurors must often evaluate expert scientific evidence in the process of reaching verdicts.

A. *Expert Testimony in Criminal Cases*

In the criminal realm, expert witnesses tend to be involved in trials that feature forensic evidence.¹⁶ Typically, this testimony—presented by both prosecution and defense experts—addresses the questions of whether, and by what means, defendants could have committed crimes. Defense counsels are increasingly likely to introduce expert testimony on defendants’ biological predispositions to negate the presumption that their behavior was voluntary.¹⁷

Expert testimony in criminal cases was not always common. For example, in their study of criminal jury trials conducted throughout the United States in the 1950s, Harry Kalven and Hans Zeisel determined that experts testified in only one in four cases.¹⁸ An in-depth analysis of 201 criminal cases tried by juries in Marion County, Indiana between January 1974 and June 1976 noted that experts testified in only approximately one-third of cases, and two or more experts testified in a mere 5% of trials.¹⁹ Experts who *did* testify focused on matters such as the results of polygraph tests, fingerprint and ballistics analyses, and defendants’ capacity to stand trial.²⁰ However, conviction rates in these cases showed that most jury verdicts did not depend on them.²¹

The studies noted above were conducted prior to the significant advances in forensic sciences and other technologies of the past few decades. But even by the 1980s, expert testimony was becoming more common in both state and federal

problem, has now become a critical one.”); *see also* Gen. Elec. Co. v. Joiner, 522 U.S. 136, 149 (1997) (Breyer, J., concurring) (noting that “science-related issues have increased in number.”).

¹⁵ *See* Megan Yarnall, *Dueling Scientific Experts: Is Australia’s Hot Tub Method a Viable Solution for the American Judiciary?*, 88 OR. L. REV. 311, 313 (2009) (“Criminal trials relying on forensic evidence, claims brought under the Endangered Species Act, toxic tort litigation, hazardous waste cleanup disputes, and other proceedings almost always involve expert testimony from at least one scientific discipline.”).

¹⁶ *See id.*

¹⁷ *See* Nita A. Farahany & William Bernet, *Behavioural Genetics in Criminal Cases: Past, Present and Future*, 2 GENOMICS SOC. POL’Y 79, 79 (2006).

¹⁸ *See* HARRY KALVEN JR. & HANS ZEISEL, *THE AMERICAN JURY* 139–40 (1966). These experts were typically medical doctors called by the prosecution.

¹⁹ Martha A. Myers, *Rule Departures and Making Law: Juries and Their Verdicts*, 13 LAW & SOC’Y REV. 781, 786–87 (1979).

²⁰ *Id.* at 787.

²¹ *Id.* at 795.

jurisdictions.²² Today, criminal proceedings often include expert testimony,²³ and the nature of that testimony is varied and sophisticated.²⁴ Experts in criminal trials testify about medical and biological processes,²⁵ physical properties of evidence,²⁶ and psychological issues,²⁷ among others.

Still, data on the frequency of expert testimony is sparse: The most recent analysis we were able to find was a survey of state prosecutors from 2,281 offices across the country about the types of evidence they used in felony trials in 1994.²⁸ Results showed that prosecutors employed expert witnesses in 83% of criminal trials.²⁹ Expert testimony was more commonly used by prosecutors in offices

²² See Irving Younger, *A Practical Approach to the Use of Expert Testimony*, 31 CLEV. ST. L. REV. 1, 1 (1982) (“With ever increasing frequency, trials in the state and federal courts, civil and criminal, tort and otherwise, turn upon expert witnesses. It is fair to say that it is impossible for a lawyer to proceed with any confidence these days unless that lawyer has a very good grasp of the considerable body of law that has been developed with respect to expert witnesses.”).

²³ See Sonja K. Ivkovic & Valerie P. Hans, *Jurors’ Evaluations of Expert Testimony: Judging the Messenger and the Message*, 28 LAW & SOC. INQUIRY 441, 443 (2003) (“Compared to jurors from the 1950s, jurors today face more scientific and technical evidence presented through expert testimony.”).

²⁴ See *infra* notes 25–27 and accompanying text.

²⁵ See, e.g., OLAF H. DRUMMER & DIMITRI GEROSTAMOULOS, *FORENSIC DRUG ANALYSIS* (2013) (alcohol and drug intoxication testing); Edwin E. Steussy et al., *Microbial Forensics: The Biggest Thing Since DNA?*, 51 CRIM. L. BULL. 726 (forthcoming 2015) (analysis of bodily fluids such as blood, semen, and saliva); Daniel Albert et al., *Ensuring Appropriate Expert Testimony in Cases Involving the “Shaken Baby”*, 308 J. AM. MED. ASS’N 39 (2012) (cause of death).

²⁶ See, e.g., Fred E. Inbau, *Firearms Identifications—Ballistics*, 89 J. CRIM. L. & CRIMINOLOGY 1293 (1999) (firearms and bullet identification); Chris Lennard et al., *Forensic Application of Laser-Induced Breakdown Spectroscopy for the Discrimination of Questioned Documents*, 254 FORENSIC SCI. INT’L. 68 (2015) (neutron activation analysis of questioned documents); Harry Hollien et al., *Issues in Forensic Voice*, 28 J. VOICE 170 (2014) (spectrographic voice identification and voice stress analysis).

²⁷ See, e.g., Amanda White et al., *Fitness to Stand Trial: Views of Criminal Lawyers and Forensic Mental Health Experts Regarding the Role of Neuropsychological Assessment*, 22 PSYCHIATRY, PSYCHOL., & L. 880 (2015) (defendants’ capacity to stand trial); Kristy A. Matire & Richard I. Kemp, *Can Experts Help Jurors to Evaluate Eyewitness Evidence? A Review of Eyewitness Expert Effects*, 16 LEGAL & CRIMINOLOGICAL PSYCHOL. 24 (2011) (reliability of eyewitness testimony); Evelyn Maeder & Emily Pica, *Secondary Confessions: The Influence (or Lack Thereof) of Incentive Size and Scientific Expert Testimony on Jurors’ Perceptions of Informant Testimony*, 38 LAW & HUM. BEHAV. 560 (2014) (reliability of confessions); Margaret B. Kovera & Eugene Borgida, *Expert Testimony in Child Sexual Abuse Trials: The Admissibility of Psychological Science*, 11 APPLIED COGNITIVE PSYCHOL. 105 (1997) (behavior of abused children); FIONA E. RAITT & SUZANNE ZEEDYK, *THE IMPLICIT RELATION OF PSYCHOLOGY AND LAW: WOMEN AND SYNDROME EVIDENCE* (2000) (responses of sexual assault victims); Brenda Russell et al., *Expert Testimony of the Battered Person Syndrome, Defendant Gender, and Sexual Orientation in a Case of Duress: Evaluating Legal Decisions*, 27 J. FAM. VIOLENCE 659 (2012) (characteristics of battered women).

²⁸ See Carol J. DeFrances et al., *Prosecutors in State Courts, 1994*, BUREAU OF JUST. STATS. BULL., Oct. 1996, at 1–2, <https://perma.cc/4LQJ-BT4Y>.

²⁹ *Id.* at 4.

servicing jurisdictions with populations of 500,000 or more than by prosecutors who served part-time.³⁰ Prosecutors also reported how often defense attorneys called expert witnesses in these trials; the survey found defense-retained experts were less common than prosecution-retained experts and provided testimony in only 66% of trials overall.³¹

B. Expert Testimony in Civil Cases

Other studies have examined the prevalence of expert testimony in civil trials. Samuel Gross provided data from 529 civil trials that ended in jury verdicts in the California State Superior Courts in 1985 and 1986.³² Experts testified in 86% of these trials, with an average of 3.3 experts per trial, underscoring Gross's contention that "[w]hole categories of cases are dominated by issues that can only be resolved with expert knowledge."³³ Multiple experts was the norm, with most trials involving between two and five.³⁴ Experts were approximately twice as likely to be called by the plaintiff as by the defendant.³⁵ Nearly all (95%) personal injury and wrongful death trials, which comprised 70% of the sample, involved expert testimony, at an average rate of 3.8 expert witnesses per trial.³⁶ Not surprisingly, given the nature of the cases, half of the experts in the dataset were medical doctors and an additional 9% were other medical and clinical professionals such as rehabilitation therapists, psychologists, and dentists.³⁷ There were fewer product liability trials in the sample, but all of them involved expert testimony, with an average of 4.7 experts per trial, including engineers, scientists, and authorities in other technical fields.³⁸ Professionals with expertise in business and finance and in accident reconstruction and investigation testified less often, in 11% and 8% of the trials respectively.³⁹ In nearly 75% of the trials, jurors were confronted with experts called by both sides, with the experts testifying on the same general topic in two-thirds of these trials.⁴⁰ Thus, jurors were often forced

³⁰ *Id.* (Prosecutors in offices servicing jurisdictions with populations of 500,000 or more used expert testimony in 99% of cases, whereas, part-time prosecutors used expert testimony in 68% of cases. This difference is probably accounted for by the fact that prosecutors in larger jurisdictions handle both a higher volume and more complicated kinds of cases.)

³¹ *Id.* (including 98% of trials in large jurisdictions and only 50% of trials in jurisdictions with a part-time prosecutor).

³² *See* Gross, *supra* note 13, at 1119.

³³ *Id.* at 1116.

³⁴ *Id.* at 1119.

³⁵ *Id.*

³⁶ *Id.*

³⁷ *Id.*

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ *Id.* (most commonly, these were medical experts).

to resolve disputes between opposing experts by evaluating their conflicting conclusions about the evidence.

Additional data reflecting the prevalence of expert testimony in civil trials comes from a 1998 study of judges' experiences with expert witnesses in 297 federal cases.⁴¹ Judges responded to a series of questions about their most recent civil trial in which expert testimony was admitted and their general impressions of the expert testimony in those cases.⁴² Findings showed that experts were most likely to testify in tort cases, primarily those involving personal injury or medical malpractice.⁴³ In terms of the nature of their expertise, the most common testifying expert was someone in a medical or mental health field.⁴⁴ These experts were typically asked to opine on the existence, nature, extent, and cause of injuries or damage.⁴⁵ Expert economists also testified frequently, reflecting the fact that these experts are often called to calculate and forecast the present and future economic losses claimed by plaintiffs in civil lawsuits.⁴⁶ Engineers and other safety and process experts, as well as experts in business, law, and finance, testified in a smaller number of trials.⁴⁷ Their expertise addressed product design and testing, industry standards, and the standard of care owed by professionals, among other things.⁴⁸

C. *Expert Testimony as Persuasive Communication*

At its core, expert testimony is intended to persuade. Factfinders evaluate various aspects of expert testimony, including the credibility of its source and the consistency of the arguments, to gauge how much weight to give it. One can understand the notion of expert testimony as persuasion by examining it within a framework of persuasive communications developed by psychologists at Yale University in the early 1950s.⁴⁹ In their influential book, *Communication and Persuasion: Psychological Studies of Opinion Change*, Carl Hovland, Irving Janis, and Howard Kelley posited that three factors are important in persuasive speech: (1) the source, (2) the nature of the persuasive message, and (3) the audience.⁵⁰

⁴¹ See Molly T. Johnson et al., *Expert Testimony in Federal Civil Trials a Preliminary Analysis*, FED. JUD. CTR., 3 (2000), <https://perma.cc/4ZG9-A87K>.

⁴² *Id.* at 1.

⁴³ *Id.* at 2.

⁴⁴ *Id.*

⁴⁵ *Id.* at 4.

⁴⁶ *Id.* at 2.

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ See CARL I. HOVLAND ET AL., *COMMUNICATION AND PERSUASION: PSYCHOLOGICAL STUDIES OF OPINION CHANGE* 13–14 (1953).

⁵⁰ See *id.*

In practical terms, the source—the expert witness—is persuasive to the extent that he or she is credible, trustworthy, and dynamic.⁵¹ The message—the expert testimony—is persuasive if it is structured, organized, and presented in ways that facilitate opinion change.⁵² The audience—judges and jurors—will be persuaded if they attend to, understand, and accept the persuasive message.⁵³ Variables related to the expert, the message, and the audience influence the persuasive impact of an expert's testimony.

A source's credibility stems from his or her expertise, including training, experience, knowledge, and competence.⁵⁴ These are the factors that judges consider when determining the admissibility of expert testimony and, all other things being equal, sources with greater credibility are deemed to be more persuasive than those with less.⁵⁵ However, over time people tend to forget exactly who said what, so although they may not be persuaded immediately upon hearing a non-credible source, they may become more persuaded by that person's message with the passage of time.⁵⁶

Other components of credibility include trustworthiness and dynamism.⁵⁷ An argument made by a trustworthy source is more likely to be accepted than one made by an untrustworthy source.⁵⁸ Similarly, an argument made by a physically attractive⁵⁹ and powerful⁶⁰ speaker will have a more persuasive punch than an argument made by a person who lacks these features.

⁵¹ See Carl I. Hovland & Walter Weiss, *The Influence of Source Credibility on Communication Effectiveness*, 15 PUB. OPINION Q. 635, 642 (1951).

⁵² See Carl I. Hovland & Henry A. Pritzker, *Extent of Opinion Change as a Function of Amount of Change Advocated*, 54 J. ABNORMAL & SOC. PSYCHOL. 257, 260 (1957).

⁵³ See Carl Hovland & Wallace Mandell, *An Experimental Comparison of Conclusion-Drawing by the Communicator and by the Audience*, 47 J. ABNORMAL & SOC. PSYCHOL. 581, 587 (1952).

⁵⁴ See, e.g., Hovland & Weiss, *supra* note 51, at 13–14; Zakary Tormala et al., *Multiple Roles of Source Credibility Under High Elaboration: It's All in the Timing*, 25 SOC. COGNITION 536 (2007).

⁵⁵ See Joel Cooper et al., *Complex Scientific Testimony: How Do Jurors Make Decisions?*, 20 LAW & HUM. BEHAV. 379, 388 (1996).

⁵⁶ This phenomenon is known as the "sleeper effect." See G. Tarcan Kumkale & Dolores Albarracín, *The Sleeper Effect in Persuasion: A Meta-Analytic Review*, 130 PSYCHOL. BULL. 143, 165 (2004).

⁵⁷ See Hovland & Weiss, *supra* note 51, at 642. Trustworthiness includes honesty and objectivity, and dynamism includes charisma, attractiveness, and style of delivery.

⁵⁸ See Joseph R. Priester & Richard E. Petty, *The Influence of Spokesperson Trustworthiness on Message Elaboration, Attitude Strength, and Advertising Effectiveness*, 13 J. CONSUMER PSYCHOL. 408, 418 (2003).

⁵⁹ See Elizabeth A. LeVan, *Nonverbal Communication in the Courtroom: Attorney Beware*, 8 LAW & PSYCHOL. REV. 83 (1984).

⁶⁰ See Bonnie Erickson et al., *Speech Style and Impression Formation in a Court Setting: The Effects of "Powerful" and "Powerless" Speech*, 14 J. EXPERIMENTAL SOC. PSYCHOL. 266 (1978).

Whether the message itself—for our purposes, the expert's testimony—is persuasive is also influenced by a number of factors including: the message's complexity,⁶¹ the extent to which other experts agree with the message,⁶² whether it contains counterarguments,⁶³ whether it is presented in a narrative or fragmented style,⁶⁴ and whether the message is presented at the beginning, middle, or end of a sequence of information.⁶⁵ In general, opinions or messages presented in the middle of a sequence are less persuasive than opinions or messages presented earlier or later in the set.⁶⁶ Consistent with this finding, when two messages concern the same topic—as is often the case with expert testimony—the first will be more persuasive than the second if there is a delay between the second message and recipients' use of the information, a concept known as the primacy effect.⁶⁷ On the other hand, the second message will be more persuasive than the first if it comes immediately before recipients need to use the information conveyed in the messages; this is called the recency effect.⁶⁸

The third constellation of persuasion-relevant variables focus on the recipient of a persuasive message.⁶⁹ A variety of factors related to the recipient influence the extent to which a message is persuasive.⁷⁰ Two factors, in particular, are relevant to jurors' receptiveness to expert testimony regarding scientific or technical evidence.⁷¹ High-level reasoning skills enhance the likelihood that a persuasive communication can be analyzed and its message can be deemed informative.⁷² These reasoning skills can be taught, suggesting that even complex expert testimony can be persuasive if it incorporates an educative component.⁷³ Recipients'

⁶¹ See Cooper et al., *supra* note 55.

⁶² See Margaret B. Kovera et al., *Reasoning About Scientific Evidence: Effects of Juror Gender and Evidence Quality on Juror Decisions in a Hostile Work Environment Case*, 84 J. APPLIED PSYCHOL. 362 (1999).

⁶³ See William McGuire, *Inducing Resistance to Persuasion: Some Contemporary Approaches*, in 1 ADVANCES IN EXPERIMENTAL SOCIAL PSYCHOLOGY (Leonard Berkowitz ed., 1964).

⁶⁴ See STANLEY L. BRODSKY, *TESTIFYING IN COURT: GUIDELINES AND MAXIMS FOR THE EXPERT WITNESS* (2d ed. 2013).

⁶⁵ See Richard E. Petty et al., *Motivation to Think and Order Effects in Persuasion: The Moderating Role of Chunking*, 27 PERSONALITY & SOC. PSYCHOL. BULL. 332, 341 (2001).

⁶⁶ *Id.*

⁶⁷ *Id.* at 332.

⁶⁸ *Id.*

⁶⁹ See generally Darrin R. Lehman et al., *The Effects of Graduate Training of Reasoning: Formal Discipline and Thinking about Everyday-Life Events*, 43 AM. PSYCHOLOGIST 431, 431–33 (1988).

⁷⁰ See *id.*

⁷¹ See *id.*; John T. Cacioppo & Richard E. Petty, *The Need for Cognition*, 42 J. PERSONALITY & SOC. PSYCHOL. 116, 116–17 (1982).

⁷² See Lehman et al., *supra* note 69, at 431–33.

⁷³ See Geoffrey Fong et al., *The Effects of Statistical Training on Thinking about Everyday Problems*, 18 COGNITIVE PSYCHOL. 253, 278 (1986).

motivation to expend effort to understand expert testimony also plays a role.⁷⁴ This variable, known as the need for cognition, is a relatively stable personality factor.⁷⁵ It distinguishes people who tend to seek out, think about, and use information to understand the world—people with a high need for cognition—from those who tend to rely on less cognitively taxing ways of gleaning information—people with a low need for cognition.⁷⁶ Mock juror studies have shown that the former have a greater ability than the latter to incorporate complex expert evidence into their judgments.⁷⁷

In recent years, psychologists and other observers of juries have also examined juror decision-making according to information-processing models of persuasion.⁷⁸ Two models have been especially influential: the heuristic-systematic model (HSM)⁷⁹ and the elaboration likelihood model (ELM).⁸⁰ According to these models, jurors who engage in careful scrutiny of the content and quality of a message are using systematic (according to HSM)⁸¹ or central (according to ELM) processing.⁸² They will attend to and endorse a persuasive argument if it contains high-quality, valid arguments.⁸³ By contrast, jurors who rely on mental shortcuts or surface-level analysis are using heuristic (according to HSM)⁸⁴ or peripheral (according to ELM) processing.⁸⁵ They focus less on the quality and content of the message and more on cues such as the number of arguments made and the expertise or likeability of the source of the message.⁸⁶

A significant concern about some types of expert testimony—particularly testimony regarding science and statistics—is that jurors may lack the ability

⁷⁴ See Cacioppo & Petty, *supra* note 71, at 116–17.

⁷⁵ *Id.* at 119.

⁷⁶ *Id.* at 128.

⁷⁷ See Saul M. Kassir et al., *Juror Interpretations of Ambiguous Evidence: The Need for Cognition, Presentation Order, and Persuasion*, 14 *LAW & HUM. BEHAV.* 43, 51 (1990); Bradley D. McAuliff & Margaret B. Kovera, *Juror Need for Cognition and Sensitivity to Methodological Flaws in Expert Evidence*, 38 *J. APPLIED SOC. PSYCHOL.* 385, 400 (2008).

⁷⁸ See Bradley McAuliff et al., *Juror Decision-making in the Twenty-first Century: Confronting Science and Technology in Court*, in *HANDBOOK OF PSYCHOLOGY IN LEGAL CONTEXTS* 303 (David Carson & Ray Bull eds., 2d ed. 2003).

⁷⁹ See Shelley Chaiken, *Heuristic Versus Systematic Information Processing and the Use of Source Versus Message Cues in Persuasion*, 39 *J. PERSONALITY & SOC. PSYCHOL.* 752, 762 (1980).

⁸⁰ See Richard Petty & John Cacioppo, *The Elaboration Likelihood Model of Persuasion*, in *ADVANCES IN EXPERIMENTAL SOCIAL PSYCHOLOGY* 123, 125 (Leonard Berkowitz ed., 1986) (providing the elaboration likelihood model).

⁸¹ See Chaiken, *supra* note 79, at 752.

⁸² *Id.*; see Petty & Cacioppo, *supra* note 80, at 175.

⁸³ See Chaiken, *supra* note 79, at 752; Petty & Cacioppo, *supra* note 80, at 138.

⁸⁴ See Chaiken, *supra* note 79, at 753.

⁸⁵ See *id.*; Petty & Cacioppo, *supra* note 80, at 125.

⁸⁶ See Chaiken, *supra* note 79, at 753; Petty & Cacioppo, *supra* note 80, at 186.

or motivation to engage in the effortful, systematic processing required for comprehension. Instead, they may rely on peripheral cues unrelated to the quality or consistency of the experts' arguments.⁸⁷ In Part IV we consider whether hot tubbing, in which experts present evidence concurrently, can enhance the likelihood of systematic processing by lay jurors.⁸⁸

III. HOW LAYPEOPLE EVALUATE EXPERT TESTIMONY

A. *Jurors Are Aware of the Possibility of Adversarial Bias in Expert Testimony*

Over the years, various jury observers, including federal judges, have claimed that jurors will be mesmerized by the presumed infallibility of expert witnesses.⁸⁹ The concern has been that because jurors lack relevant knowledge and sophistication, they are unable to carefully scrutinize experts' assumptions and conclusions, and thus, are overly deferential to experts' opinions.⁹⁰ However, studies have found that jurors' evaluations of expert testimony are actually quite careful⁹¹ and even skeptical and critical.⁹² The studies indicate that jurors are fully aware of the adversarial nature of expert testimony⁹³ and that they assume experts are biased in favor of the side that called them.⁹⁴

As part of their empirical analysis of the use of expert witnesses, Daniel Schuman, Elizabeth Whitaker, and Anthony Champagne interviewed jurors in a large sample of cases in Seattle, Baltimore, and Tucson, and found no evidence of blind deference to experts' positions.⁹⁵ Rather, jurors said they carefully scrutinized expert witnesses on the basis of the logic and rationality of their

⁸⁷ See Kovera et al., *supra* note 62.

⁸⁸ See *infra* Part IV.

⁸⁹ See Neil Vidmar, *The Performance of the American Civil Jury: An Empirical Perspective*, 40 ARIZ. L. REV. 849, 849–51 (1998) [hereinafter *The Performance of the American Civil Jury*]; Neil Vidmar, *Expert Evidence, the Adversary System, and the Jury*, 95 AM. J. PUB. HEALTH 137, 137 (2005) (stating, “a jury . . . would likely be even less equipped than the judge to make reliability and relevance determinations and more likely than the judge to be awestruck by the expert’s mystique.” (citation omitted)).

⁹⁰ See *The Performance of the American Civil Jury*, *supra* note 89, at 849.

⁹¹ See Shari S. Diamond & Jonathan D. Casper, *Blindfolding the Jury to Verdict Consequences: Damages, Experts, and the Civil Jury*, 26 LAW & SOC’Y REV. 513 (1992).

⁹² See *id.*; Daniel Shuman et al., *An Empirical Examination of the Use of Expert Witnesses in the Courts—Part II: A Three City Study*, 34 JURIMETRICS 193, 203, 206 (1994).

⁹³ See Christopher T. Robertson & David V. Yokum, *The Effect of Blinded Experts on Jurors’ Verdicts*, 9 J. EMPIRICAL LEGAL STUD. 765, 767 (2012).

⁹⁴ See *id.*; Nicholas Scurich et al., *Venire Jurors’ Perceptions of Adversarial Allegiance*, 21 PSYCHOL., PUB. POL’Y, & L. 161, 163 (2015).

⁹⁵ Shuman et al., *supra* note 92, at 197.

testimony, and their partiality and professionalism.⁹⁶ Evidence confirming this conclusion comes from a study by Neil Vidmar that involved in-depth interviews with jurors in five medical malpractice cases.⁹⁷ Jurors in the study were able to identify and articulate motives underlying experts' testimony, including allegiance to the side that paid their fees and a desire to validate the actions of professionals in their fields.⁹⁸ Finally, by questioning 269 jurors who decided cases involving business and corporate defendants, Sonya Ivkovich and Valerie Hans found that jurors spent considerable time evaluating the completeness and consistency of experts' analyses, and were unlikely to accept experts' conclusions that lacked those ingredients.⁹⁹

Additional support for the notion that jurors are neither over-awed by experts, nor blithely accepting of their conclusions, derives from experimental studies that used mock jury methodology to vary the nature and type of expert evidence.¹⁰⁰ A recent example demonstrated that mock jurors are readily attuned to the adversarial nature of expert testimony.¹⁰¹ In the study, researchers varied whether the results of structured risk assessment instruments designed to allow mental health experts to reach conclusions about sexual predators were conveyed by court-appointed experts or by partisan experts.¹⁰² The researchers found that mock jurors deemed the former more objective, credible, and persuasive than the latter.¹⁰³ In deciding whether to commit the sexually violent predator, jurors discounted input from the partisan experts but relied on input from the court-appointed experts.¹⁰⁴ Jurors appeared to adjust their evaluations of the experts' testimony as a function of those experts' presumed biases.

Further support comes from a mock jury study involving a staged medical malpractice trial that included testimony of two medical experts, one of whom was a "blind expert," and the other expert had been hired by a party in the case.¹⁰⁵ After hearing the evidence, jurors assessed the defendant's negligence, awarded

⁹⁶ *Id.* at 200–01.

⁹⁷ See NEIL VIDMAR, *MEDICAL MALPRACTICE AND THE AMERICAN JURY: CONFRONTING THE MYTHS ABOUT JURY INCOMPETENCE, DEEP POCKETS, AND OUTRAGEOUS DAMAGE AWARDS* 131–60 (1st ed. 1997).

⁹⁸ See *id.* at 158, 171, 173.

⁹⁹ See Ivkovic & Hans, *supra* note 23, at 469.

¹⁰⁰ See Scurich et al., *supra* note 94, at 163.

¹⁰¹ *Id.* at 166.

¹⁰² *Id.* at 164.

¹⁰³ *Id.* at 166.

¹⁰⁴ *Id.*

¹⁰⁵ See Robertson & Yokum, *supra* note 93, at 765–70 (a "blind expert" is a qualified professional who reviewed the case materials without knowing which side had requested his or her opinion).

damages, and also gauged the experts' credibility.¹⁰⁶ The study suggested that jurors were aware of the possibility of expert bias because they deemed the blind expert significantly more credible and persuasive than the adversarial expert.¹⁰⁷

Taken together, these findings suggest that jurors are able and willing to analyze experts' conclusions with the adversarial nature of trials in mind, and they are not unthinkingly impressed by experts' knowledge and professional standing. Whether recognition of experts' partisan interests in a case is sufficient to enable jurors to comprehend the essence of their testimony—the nature, objectivity, thoroughness of their analyses, and the reasonableness of their conclusions—is an open question. Some critics claim that it is insufficient, reasoning that in the context of traditional trial practices, jurors are constrained from analyzing experts' conclusions objectively and rationally.¹⁰⁸ This is especially concerning when jurors are required to understand and apply experts' conclusions regarding probabilistic or statistical evidence.¹⁰⁹

B. Jurors Have Difficulty Comprehending and Applying Probabilistic Expert Evidence

By its very nature, expert testimony often deals with concepts and issues that are beyond the knowledge and experience of most laypeople. Jurors are especially challenged by complex probabilistic and statistical evidence at the core of nearly all scientific enterprises,¹¹⁰ citing it as particularly difficult to understand.¹¹¹ Studies of laypersons' reasoning skills provide one explanation as to why this is a difficult undertaking for jurors: Even when people understand how to reason inferentially, they have difficulty applying that understanding to unfamiliar tasks and domains.¹¹² As a result, they tend to underutilize expert probabilistic evidence relative to Bayesian norms that assign a prior probability to a particular

¹⁰⁶ See *id.* at 771–74 (damages were only awarded where appropriate).

¹⁰⁷ See *id.* at 783.

¹⁰⁸ See *id.* at 766–67.

¹⁰⁹ See *infra* notes 112–15 and accompanying text.

¹¹⁰ See, e.g., Shari S. Diamond & Mary R. Rose, *Real Juries*, 1 ANN. REV. L. & SOC. SCI. 255 (2005); Jane Goodman, *Jurors' Comprehension and Assessment of Probabilistic Evidence*, 16 AM. J. TRIAL ADVOC. 361 (1992); David Kaye et al., *Statistics in the Jury Box: How Jurors Respond to Mitochondrial DNA Match Probabilities*, 4 J. EMPIRICAL LEGAL STUD. 797 (2007); Jonathan J. Koehler et al., *The Random Match Probability (RMP) in DNA Evidence: Irrelevant and Prejudicial?*, 35 JURIMETRICS 201 (1995); Jason Schklar & Shari S. Diamond, *Juror Reactions to DNA Evidence: Errors and Expectancies*, 23 LAW & HUM. BEHAV. 159 (1999); Gary Wells, *Naked Statistical Evidence of Liability: Is Subjective Probability Enough?*, 62 J. PERSONALITY & SOC. PSYCH. 739 (1992).

¹¹¹ See Joseph S. Cecil et al., *Citizen Comprehension of Difficult Issues: Lessons from Civil Jury Trials*, 40 AM. U. L. REV. 727, 728–29 (1991).

¹¹² See, e.g., Lehman et al., *supra* note 69, at 431–33; Richard E. Nisbett et al., *Teaching Reasoning*, 238 SCI. 625 (1987).

hypothesis and then update as new information becomes available.¹¹³ Furthermore, they are reluctant to base their verdicts on statistical evidence alone.¹¹⁴ Laypeople are especially unlikely to use probabilistic evidence if they can rely on salient, anecdotal information instead.¹¹⁵ An understanding of statistical evidence is essential to fact-finding and decision-making in many trials because scientific evidence, and its underlying statistics, is increasingly ubiquitous in both the criminal and civil realms.¹¹⁶

Probabilistic evidence factors into civil trials involving trademark infringement, antitrust, race and gender discrimination in employment, and causes of injuries and losses in tort lawsuits, among others.¹¹⁷ For example, an expert epidemiologist may draw conclusions and testify about the development of a particular disease or birth defect and its association with exposure to certain environmental or chemical agents. As another example, testimony from an expert economist or actuary is likely to be a part of nearly all personal injury trials, as these professionals will present probabilistic evidence about the monetary value—both past and future—of various losses and injuries. They do this by making a variety of probabilistic assumptions about lost income, medical and rehabilitative costs, inflation, interest rates, etc.¹¹⁸

Another common form of probabilistic evidence comes from forensic analysts who, in controlled laboratory settings, conduct analyses of evidence collected at the scene of a crime and report their conclusions to the court or to the attorneys requesting their assistance. At trial, forensic analysts describe the procedures by which the evidence was gathered, stored, and tested, as well as their conclusions about the degree of association between test results and the actions or identity of

¹¹³ See Goodman, *supra* note 110; David Kaye & Jonathan Koehler, *Can Jurors Understand Probabilistic Evidence?*, 154 J. ROYAL STAT. SOC'Y 75, 75–77 (1991); Schklar & Diamond, *supra* note 110.

¹¹⁴ See Keith Niedermeier et al., *Jurors' Use of Naked Statistical Evidence: Exploring Bases and Implications of the Wells Effect*, 76 J. PERSONALITY & SOC. PSYCHOL. 533 (1999); Wells, *supra* note 110.

¹¹⁵ See Daniel Kahneman & Amos Tversky, *On the Psychology of Prediction*, 80 PSYCHOL. REV. 237 (1973); Keith E. Stanovich & Richard F. West, *Who Uses Base Rates and P(D/-H)? An Analysis of Individual Differences*, 26 MEMORY & COGNITION 161 (1998). In a jury context, see, Brian H. Bornstein, *The Impact of Different Types of Expert Scientific Testimony on Mock Jurors' Liability Verdicts*, 10 PSYCHOL. CRIME & L. 429, 429–31 (2004).

¹¹⁶ See, e.g., DAVID L. FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY (2010); Jonathan Koehler, *Misconceptions about Statistics and Statistical Evidence*, in HANDBOOK OF TRIAL CONSULTING 121, 121 (Richard L. Wiener & Brian H. Bornstein eds., 2011) (describing a 56% increase in the use of the terms “statistic” or “statistical” in the Federal Cases database from 1990 to 2004).

¹¹⁷ See FAIGMAN ET AL., *supra* note 116.

¹¹⁸ See generally EDIE GREENE & BRIAN H. BORNSTEIN, DETERMINING DAMAGES: THE PSYCHOLOGY OF JURY AWARDS (2003).

the alleged perpetrator. These evaluations are typically expressed as estimates of probabilities or likelihoods.

One form of forensic evidence, DNA evidence, was first introduced in criminal trials in the 1980s.¹¹⁹ Its usage grew rapidly, and approximately two-thirds of state court judges who responded to a national survey conducted in the late 1990s indicated that it had been presented as evidence in their courtrooms.¹²⁰ By its very nature, DNA evidence also involves judgments of probability.¹²¹ A growing body of research has examined jurors' abilities to use probability estimates associated with DNA evidence.¹²² These studies assess how laypeople evaluate the presence of a "match" between DNA samples taken from a defendant and a crime scene.¹²³ Though some data suggests that mock jurors *collectively* are capable of understanding DNA testing procedures and error rates, and weighing DNA evidence in accordance with its diagnosticity, not all mock jurors have these abilities.¹²⁴ A typical layperson tends to attribute less weight to statistical information concerning a DNA match than would be prescribed by probability theory alone.¹²⁵ Furthermore, he or she is relatively insensitive to statistical testimony that describes potential sources of error and are more persuaded by statistical evidence that ignores those risks.¹²⁶

Variations in how DNA evidence is framed and presented also affect how jurors interpret and use the evidence. For example, DNA match statistics described as probabilities (e.g., "[t]he probability that the suspect would match the blood specimen if he were not the source is 0.1%") are more persuasive than evidence

¹¹⁹ See Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 SCI. 892, 894 (2005).

¹²⁰ See Sophia L. Gatowski et al., *Asking the Gatekeepers: A National Survey of Judges on Judging Expert Evidence in a Post-Daubert World*, 25 LAW & HUM. BEHAV. 433, 441–51 (2001).

¹²¹ Scientists compare suspects' DNA with crime scene DNA evidence and, using databases that provide the frequency of particular alleles (one member of a pair of genes located on a particular position on a chromosome), determine the probability of random matches across different reference populations (e.g., races, ethnicities). See Saks & Koehler, *supra* note 119, at 893.

¹²² See *infra* notes 124–28 and accompanying text.

¹²³ See *infra* notes 124–28 and accompanying text.

¹²⁴ See Suzanne O. Kaasa et al., *Statistical Inference and Forensic Evidence: Evaluating a Bullet Lead Match*, 31 LAW & HUM. BEHAV. 433 (2007); Kaye et al., *supra* note 110; William C. Thompson & Eryn J. Newman, *Lay Understanding of Forensic Statistics: Evaluation of Random Match Probabilities, Likelihood Ratios, and Verbal Equivalents*, 39 LAW & HUM. BEHAV. 332 (2015).

¹²⁵ See, e.g., Kaasa et al., *supra* note 124, at 14; Jonathan J. Koehler, *When are People Persuaded by DNA Match Statistics?*, 25 LAW & HUM. BEHAV. 493, 509 (2001); Schklar & Diamond, *supra* note 110, at 178.

¹²⁶ See Jonathan J. Koehler, *If the Shoe Fits They Might Acquit: The Value of Forensic Science Testimony*, 8 J. EMPIRICAL LEGAL STUD. 21, 39 (2011) (potential sources for error include laboratory error, coincidence, and being framed, among others).

that describes a broad suspect population (e.g., all people in a large city) or that incorporates frequencies (e.g., “one in one thousand people in Houston would also match the blood drops”).¹²⁷ As another example, forensic science evidence conveyed using numerical formulations of uncertainty associated with likelihood ratios yield more accurate fact-finding than the same evidence communicated through verbal expressions.¹²⁸

These studies suggest that the persuasiveness of expert evidence would be enhanced by presentation formats that are consistent with laypeople’s preferences and intuitive beliefs about statistical measurements and errors.¹²⁹ More broadly, expert testimony will be more persuasive to the extent that it is consistent with jurors’ pre-existing knowledge and intuitions about a particular topic. But frequently, experts’ analyses and conclusions are at odds with the common knowledge and prior beliefs of many laypeople, particularly concerning matters of science and technology.¹³⁰

There are various reasons why some expert evidence is difficult for jurors to understand; we comment briefly on three: (1) that many laypeople are uninformed about, and lack intuition about, methodological issues in scientific testimony; (2) that legal concepts conveyed by experts may be at odds with laypeople’s knowledge and beliefs; and (3) that jurors have difficulty making sense of conflicting opinions, particularly on topics about which they lack knowledge.¹³¹

1. *Naivety About Scientific Methodology*

Outside of the realm of legal decisions, statistical and methodological aspects of science and technology pose reasoning difficulties for many people.¹³² For example, laypeople tend to neglect base-rate information and fail to account for small sample sizes when judging probabilities of particular events.¹³³ They are not

¹²⁷ Jonathan J. Koehler, *The Psychology of Numbers in the Courtroom: How to Make DNA Match Statistics Seem Impressive or Insufficient*, 74 S. CAL. L. REV. 1275, 1278 (2001).

¹²⁸ See Kristy A. Matire et al., *On the Interpretation of Likelihood Ratios in Forensic Science Evidence: Presentation Formats and the Weak Evidence Effect*, 240 FORENSIC SCI. INT’L. 61, 66 (2014). Research participants read the summary of a burglary trial that included expert testimony given in numerical, verbal, tabled, or visually scaled format. *Id.* Of these presentation methods, numerical estimates yielded judgments that were most comparable to those intended by the expert. *Id.*

¹²⁹ *Id.* at 67.

¹³⁰ *See id.*

¹³¹ Thompson & Newman, *supra* note 124, at 15.

¹³² *See id.*

¹³³ See Kahneman & Tversky, *supra* note 115 (base-rate neglect); Fong et al., *supra* note 73, at 260–61 (sample size neglect).

sufficiently critical of methodologies that lack appropriate control groups and they fail to recognize sample bias.¹³⁴

In the context of juror and jury decision-making, Margaret Kovera and her colleagues have found that laypeople acting as jurors have difficulty understanding methodological aspects of scientific expert evidence.¹³⁵ Specifically, mock jurors are either insensitive or insufficiently sensitive to limitations and oversights in scientific methods, even when those flaws are made apparent and explained to them by expert witnesses.¹³⁶ In one study, community mock jurors were exposed to variations in the scientific rigor of research conveyed by an expert witness.¹³⁷ Although the mock jurors were able to identify a missing control group as one threat to internal validity, they failed to recognize others, including experimenter bias and confounding variables.¹³⁸

A more recent study suggests that jurors' reasoning can be aided by effective cross-examination but only if it is scientifically-informed.¹³⁹ In this study, mock jurors watched a simulated armed robbery trial in which an expert witness testified about scholarly research on the reliability of eyewitness memory.¹⁴⁰ When the expert was cross-examined in a scientifically-informed way, jurors were made aware of, and accounted for, the lack of a control group in the research the expert had described.¹⁴¹ When the expert was questioned in a scientifically-naïve way, they did not.¹⁴² Lacking scientifically-rigorous guidance from an expert, jurors overlook methodological flaws in scientific research.

¹³⁴ See Davina Mill et al., *Influence of Research Methods and Statistics Courses on Everyday Reasoning, Critical Abilities, and Belief in Unsubstantiated Phenomena*, 26 CANADIAN J. BEHAV. SCI. 246 (1994) (failure to account for control groups); Ruth Hamill et al., *Insensitivity to Sample Bias: Generalizing from Atypical Cases*, 39 J. PERSONALITY & SOC. PSYCHOL. 578 (1980) (failure to recognize sample size).

¹³⁵ See, e.g., Lora M. Levett & Margaret B. Kovera, *The Effectiveness of Opposing Expert Witnesses for Educating Jurors About Unreliable Expert Evidence*, 32 LAW & HUM. BEHAV. 363, 370 (2007); McAuliff & Kovera, *supra* note 77, at 400.

¹³⁶ See McAuliff & Kovera, *supra* note 77, at 400.

¹³⁷ See Bradley D. McAuliff et al., *Can Jurors Recognize Missing Control Groups, Confounds, and Experimenter Bias In Psychological Science?*, 33 LAW & HUM. BEHAV. 247, 249–52 (2009).

¹³⁸ *Id.* at 253.

¹³⁹ See Jacqueline L. Austin & Margaret B. Kovera, *Cross-Examination Educates Jurors about Missing Control Groups in Scientific Evidence*, 21 PSYCHOL. PUB. POL'Y, & L. 252, 258 (2015).

¹⁴⁰ *Id.* at 254.

¹⁴¹ *Id.* at 261.

¹⁴² *Id.*

2. *Legal Concepts Are at Odds with Laypeople's Common Knowledge and Beliefs*

It is well-established that even informed citizens have knowledge and beliefs that are inconsistent with legal doctrine and policy.¹⁴³ Expert testimony may require jurors to contemplate matters at variance with their personal beliefs, and even to consider conclusions and opinions that conflict strongly with their common sense notions. This can explain why, on occasion, jurors fail to apply expert testimony on issues about which they have some familiarity including sexual and child abuse, domestic violence, mental states and insanity, police investigations, and corporate policies and practices.

In his ground-breaking book, *Commonsense Justice*, Norman Finkel pointed out that legal concepts such as self-defense, privacy, euthanasia, cruel and unusual punishment, the *mens rea* associated with various crimes, and the insanity defense may be at odds with laypeople's notions of those concepts.¹⁴⁴ As a result, trials in which these issues arise often involve expert testimony that challenges laypeople's beliefs. Consider the law's conceptions of defendants' mental states—a topic commonly addressed by psychiatrists and clinical psychologists who interview and assess defendants and testify about their conclusions during trial.¹⁴⁵ Researchers have conducted experimental studies in which they varied the nature and extent of psychiatric expert testimony to examine its impact on jurors' judgments of defendants.¹⁴⁶ Results showed that jurors' pre-existing beliefs about defendants' mental states tended to trump their interpretation and use of the experts' evidence,¹⁴⁷ a result confirmed by interview data.¹⁴⁸ Jurors who were interviewed after serving in capital trials acknowledged that they ignored expert testimony from mental health professionals when it challenged their prior beliefs about abnormal thoughts and behaviors.¹⁴⁹

¹⁴³ See, e.g., Michael L. Perlin, "She Breaks Just Like a Little Girl": Neonaticide, The Insanity Defense, and the Irrelevance of "Ordinary Common Sense", 10 WM. & MARY J. WOMEN & L. 1, 5 (2003); Vicki L. Smith, *Prototypes in the Courtroom: Lay Representations of Legal Concepts*, 61 J. PERSONALITY & SOC. PSYCHOL. 857 (1991); Vicki L. Smith & Christina A. Studebaker, *What Do You Expect? The Influence of People's Prior Knowledge of Crime Categories on Fact-Finding*, 20 LAW & HUM. BEHAV. 517, 517–18 (1996).

¹⁴⁴ See NORMAN J. FINKEL, *COMMONSENSE JUSTICE* 319 (1995).

¹⁴⁵ *Id.* at 329–34.

¹⁴⁶ See, e.g., Phoebe C. Ellsworth et al., *The Death-Qualified Jury and the Defense of Insanity*, 8 LAW & HUM. BEHAV. 81, 81–85 (1984); Caton F. Roberts & Stephen L. Golding, *The Social Construction of Criminal Responsibility and Insanity*, 15 LAW & HUM. BEHAV. 349 (1991).

¹⁴⁷ See Roberts & Golding, *supra* note 146, at 371.

¹⁴⁸ See Roberts & Golding, *supra* note 146, at 371; Scott E. Sundby, *The Jury as Critic: An Empirical Look at How Capital Juries Perceive Expert and Lay Testimony*, 83 VA. L. REV. 1109, 1139 (1997).

¹⁴⁹ See Sundby, *supra* note 148, at 1134.

In regard to statistical evidence presented in a courtroom, Jonathan Koehler delineated a number of misconceptions that laypeople hold and suggested that these misconceptions cause them to misweigh statistical evidence and render unfair verdicts.¹⁵⁰ He pointed out that laypeople assume that data from small samples is not informative; that correlation implies causation; and that base rates, or background probabilities of some event, are irrelevant to case-related judgments.¹⁵¹ Also, studies of laypeople's assessments of damage awards showed that they were not naturally inclined to factor exponential growth into the calculations, and that they often relied on the monetary figures provided by expert witnesses or by the parties themselves in a process called "anchoring."¹⁵²

3. *Trial Procedures Often Require Jurors to Make Sense of Conflicting Opinions*

The difficulties inherent in comprehending and applying expert testimony are often exacerbated in situations which involve contradictory expert opinions that force jurors to decide whom to believe.¹⁵³ Although expert testimony offered by adversaries is not inherently conflicting, it often is.¹⁵⁴ This tends to occur because experts rely on different assumptions and reach divergent conclusions about the same set of data.¹⁵⁵ As a result, jurors are often left adrift to sort out the reasonableness and logic underlying the experts' opinions on their own. This

¹⁵⁰ Koehler, *supra* note 116, at 121–31.

¹⁵¹ *Id.*

¹⁵² See Jane Goodman et al., *Runaway Verdicts or Reasoned Determinations: Mock Juror Strategies in Awarding Damages*, 29 JURIMETRICS 285 (1989); Allan Raitz et al., *Determining Damages: The Influence of Expert Testimony on Jurors' Decision Making*, 14 LAW & HUM. BEHAV. 385, 386–87 (1990). Anchoring refers to a process in which an irrelevant or meaningless value provides a starting point for a judgment and adjustments from the anchor are often insufficient. See Tarika Daftary-Kapur & Melissa Cahoon, *The Effects of Outcome Severity, Damage Amounts and Counterfactual Thinking on Juror Punitive Damage Award Decision Making*, 28 AM. J. FORENSIC PSYCHOL. 21 (2010); Mollie W. Marti & Roselle L. Wissler, *Be Careful What You Ask For: The Effect of Anchors on Personal Injury Damages Awards*, 6 J. EXPERIMENTAL PSYCHOL. APPLIED 191 (2000); Bradley D. McAuliff & Brian H. Bornstein, *All Anchors Are Not Created Equal: The Effects of Per Diem Versus Lump Sum Requests on Pain and Suffering Awards*, 34 LAW & HUM. BEHAV. 164, 164–66 (2010); W. Kip Viscusi, *The Challenge of Punitive Damages Mathematics*, 30 J. LEGAL STUD. 313, 313–16 (2001).

¹⁵³ See Neil Vidmar & Shari S. Diamond, *Juries and Expert Evidence*, 66 BROOK. L. REV. 1121, 1134 (2001).

¹⁵⁴ See, e.g., Carol McKinley, *James Holmes Trial Marked by Emotional Moments, Key Evidence*, ABC NEWS (July 14, 2015, 4:32 PM), <http://abcnews.go.com/US/10-notable-aspects-james-holmes-trial/story?id=32388217> (all of the experts who testified in the 2015 trial of Aurora, Colorado theater shooter, James Holmes, agreed that Holmes was suffering from schizophrenia at the time of the shooting, though they diagnosed different forms of the illness).

¹⁵⁵ See Daniel C. Murrie et al., *Are Forensic Experts Biased by the Side that Retained Them?*, 24 PSYCHOL. SCI. 1889, 1890–92 (2013) (the partisan nature of adversary proceedings can push experts to reach opinions consistent with the side that hired them).

is particularly problematic when the expert testimony concerns statistical or probabilistic evidence.¹⁵⁶

Useful information comes from studies of jurors’ understanding and use of conflicting expert testimony concerning damage awards. In an early effort, Allan Raitz and his colleagues found that when mock jurors were confronted with opposing expert testimony concerning compensatory damage awards in a wrongful death case, they tended to simply endorse the plaintiff’s or the defendant’s figure—the anchoring phenomenon¹⁵⁷—rather than using those opinions as end points on a range of acceptable awards and selecting a figure between them.¹⁵⁸ Another study that found a lack of adjustment in awards following expert testimony involved a simulated employment discrimination case.¹⁵⁹ Jurors’ compensatory damage awards were not significantly different whether they heard testimony from only the plaintiff’s expert or from both the plaintiff’s and defendant’s experts, suggesting that they paid little heed to alternative interpretations.¹⁶⁰

The nature of the experts’ testimony also influences jurors’ analysis of conflicting opinions. Jurors in a simulated price-fixing case viewed an expert who presented a statistical model of damages as having greater expertise than an expert who presented a more concrete, “yardstick” model, but the former was also less clear than the latter.¹⁶¹ Ultimately, that lack of clarity may have discouraged jurors from accepting the expert’s conclusions.¹⁶² This finding suggests that jurors will discount or ignore testimony that involves any complex statistical calculations that lack clarity.

IV. A NEW MODEL FOR EXPERT TESTIMONY: THE HOT TUB APPROACH

In traditional trial proceedings, one party presents all of its evidence on all relevant issues before the opposing party has an opportunity to provide alternative viewpoints and contrasting evidence. This arrangement makes it difficult for fact-finders to compare the two positions or even to recognize the issues upon which

¹⁵⁶ See *supra* notes 111–31 and accompanying text.

¹⁵⁷ See generally Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 *SCI.* 1124 (1974).

¹⁵⁸ See Raitz et al., *supra* note 152, at 394. Conceivably, one expert’s figure may be more appropriate than another’s, though the partisan nature of adversarial expert testimony suggests that the “truth” will usually lie between. In the least, jurors should deliberate the merits of conflicting perspectives, rather than simply endorse one opinion.

¹⁵⁹ See Edie Greene et al., *Juror Decisions about Damages in Employment Discrimination Cases*, 17 *BEHAV. SCI. & L.* 107, 118 (1999).

¹⁶⁰ *Id.* at 119.

¹⁶¹ See Diamond & Casper, *supra* note 91, at 542.

¹⁶² *Id.*

the parties agree. Traditional trial procedures also make it particularly difficult for jurors to compare the methods, procedures, and conclusions of opposing expert witnesses whose testimony may be separated by days, weeks, or even months, and who may have presented complicated statistical or probabilistic evidence.

One method of remedying these challenges is to allow experts to present their evidence either concurrently, or one after another, from the witness stand.¹⁶³ Known as the “hot tub,” or as concurrent evidence presentation, this novel approach is currently used by courts and tribunals throughout Australia, particularly in New South Wales, and New Zealand.¹⁶⁴ It has been formally adopted by the Federal Court and Administrative Appeals Tribunal of Australia, and by the Supreme Court and the Land and Environment Court of New South Wales.¹⁶⁵ It is used predominantly in civil cases—including medical litigation, patent cases, and insurance cases—and, on occasion, in criminal cases.¹⁶⁶ Importantly, in the Australian system, experts give written pledges to not stake out clearly partisan positions as advocates but to serve as functionaries of the court.¹⁶⁷

The use of concurrent evidence presentation in the United States is very limited, in part, perhaps, because it runs counter to the strict adversarial nature of the American legal system in which experts are expected to show allegiance to the side that retained them.¹⁶⁸ The first reported example of concurrent evidence presentation in the U.S. came from a voting rights case in the District of Massachusetts in 2003 which involved two political scientists who testified about statistical evidence of discrimination in a challenge to the legislature’s redistricting plan.¹⁶⁹ Since then, it has been used in a smattering of cases including breach of contract, products liability, and patent infringement.¹⁷⁰

¹⁶³ See Rita Farrell, *‘Hot Tubbing’ Anthropological Evidence in Native Title Mediations*, NAT’L NATIVE TITLE TRIBUNAL (2007).

¹⁶⁴ See Gary Edmond, *Merton and the Hot Tub: Scientific Conventions and Expert Evidence in Australian Civil Procedure*, 72 LAW & CONTEMP. PROBS. 159, 166 (2009).

¹⁶⁵ See Steven Rares, *Using the “Hot tub”: How Concurrent Expert Evidence Aids Understanding Issues*, FED. CT. AUSTRALIA n.20 (Oct. 12, 2013), <https://perma.cc/SC7L-TKXV>.

¹⁶⁶ See Tina Cockburn & Bill Madden, *Adapting to Concurrent Expert Evidence in Medical Litigation*, 22 J.L. & MED. 610, 610 (2015) (“Concurrent expert evidence is most well entrenched in the civil disputes arena, where courts are required to determine private disputes such as medical negligence claims . . .”).

¹⁶⁷ See John Emmerig et al., *Room in American Courts for an Australian Hot Tub?*, JONES DAY (Apr. 2013), <https://perma.cc/82ZL-X36Z>.

¹⁶⁸ However, Australia also uses adversarial trial procedures.

¹⁶⁹ See *Black Political Task Force v. Galvin*, 300 F. Supp. 2d 291 (D. Mass. 2004); see also Defendant’s Motion for Judgment as a Matter of Law, *Black Political Task Force v. Galvin*, No. 2002-11190 DPW (D. Mass. Nov. 14, 2003) (the hot tub method is described in the transcript of the third day of the trial). For a description of the concurrent evidence presentation in *Black Political Task Force*, see Lisa C. Wood, *Experts in the Tub*, 21 ANTITRUST 95 (2007).

¹⁷⁰ See Emmerig et al., *supra* note 167.

Importantly, the Federal Rules of Evidence provide a framework that allows for the practice, including the opportunity for courts to manage the presentation of testimony and to question witnesses.¹⁷¹ For example, Rule 611 gives judges “control over the mode and order of examining witnesses and presenting evidence so as to: (1) make those procedures effective for determining the truth; [and] (2) avoid wasting time”¹⁷² Additionally, Rule 614 permits judges to call and question witnesses.¹⁷³ More broadly, Rule 102 grants flexibility in evidentiary procedures.¹⁷⁴ Rule 102 states, “[t]hese rules shall be construed so as to administer every proceeding fairly, eliminate unjustifiable expense and delay, and promote the development of evidence law, to the end of ascertaining the truth and securing a just determination.”¹⁷⁵

A. *How the Process Works*

Although variations exist,¹⁷⁶ hot tubbing typically begins by having each party’s expert prepare a written report, which the experts exchange prior to the hearing or trial.¹⁷⁷ Sometimes they confer in order to prepare a joint report about the topics on which they agree and disagree, providing short explanations of the reasons for their disagreements.¹⁷⁸ Generally, this exercise reduces the extent of disagreement to a few points and, with the dissension clarified, facilitates settlements.¹⁷⁹ If a case goes to trial, the experts testify together or directly after one another.¹⁸⁰ Their testimony usually occurs after both parties have presented their case-in-chiefs.¹⁸¹

¹⁷¹ See Scott Welch, *From Witness Box to the Hot Tub: How the “Hot Tub” Approach to Expert Witnesses Might Relax an American Finder of Fact*, 5 J. INT’L. COM. L. & TECH. 155, 160–62 (2010).

¹⁷² FED. R. EVID. 611(a)(1)–(2).

¹⁷³ See FED. R. EVID. 614(a)–(b).

¹⁷⁴ See FED. R. EVID. 102; see also Welch, *supra* note 171, at 162.

¹⁷⁵ FED. R. EVID. 102.

¹⁷⁶ This is often the result of judicial discretion in implementing this procedure. See Wayne Condon et al., *Concurrent Expert Evidence in Patent Cases*, PRAC. L., <https://perma.cc/HJT6-VVYS> (last visited Apr. 10, 2016) [hereinafter *Concurrent Expert Evidence*]. In some courts the experts may be allowed to provide opening statements. See Welch, *supra* note 171. In other courts the attorneys may not be able to question the experts until the experts have been questioned by the judge. See Hon. Garry Downes, *Concurrent Expert Evidence in the Administrative Appeals Tribunal: The New South Wales Experience* (Feb 27, 2004), <https://perma.cc/ZN47-5FDB> [hereinafter *The New South Wales Experience*].

¹⁷⁷ For a general description of the process, see Edmond, *supra* note 164, at 165; Rares, *supra* note 165, at n.25; Yarnall, *supra* note 15, at 323.

¹⁷⁸ See Rares, *supra* note 165, at 8.

¹⁷⁹ See Edmond, *supra* note 164, at 165.

¹⁸⁰ See *id.* at 162 (explaining that experts come from similar or closely related fields and either know, or know of, each other).

¹⁸¹ See Rares, *supra* note 165, at 9.

Thereafter, a rather informal process—compared with traditional trial procedures—unfolds, in which the experts are asked by the judge to explain the main issues of the case, and then to comment or ask questions of the other expert.¹⁸² Only one expert speaks at a time, allowing them to have a respectful, constructive dialogue.¹⁸³ The lawyers and judge are also able to ask questions during the discussion.¹⁸⁴ This process is typically mediated by the judge and, as a whole, represents the greatest departure from what occurs during a trial conducted by the rules of the adversarial system.¹⁸⁵

After the initial dialogue, more traditional questioning commences, as power is returned to the attorneys who have the opportunity to cross-examine the opposing sides' experts.¹⁸⁶ During this stage, the experts are able to question one another and add to the other expert's testimony.¹⁸⁷ This entire process repeats until all of the issues have been addressed sufficiently.

B. Putative Advantages and Disadvantages of the Hot Tub Procedure

A few commentaries posit various benefits and costs of the hot tub approach.¹⁸⁸ The hot tub may represent a more efficient way to present expert testimony because the experts can identify topics on which they agree and disagree early in the process and then focus their presentations and discussions on the issues that are most contentious or that lack consensus.¹⁸⁹ These organized presentations presumably reduce the time spent on cross-examination and overall trial time.¹⁹⁰ In one of the first cases in which expert evidence was presented concurrently, a hearing that was estimated to last six months was shortened to five weeks, a difference attributed in part to the use of the hot tub approach.¹⁹¹ Reducing the amount of information presented and the length of the trial also lessens the cognitive load placed on judges and jurors and increases the likelihood of rational decision-making.

Similarly, having experts testify together or sequentially reduces the amount of information that must be remembered at any given time.¹⁹² This reduction

¹⁸² See Edmond, *supra* note 164, at 164.

¹⁸³ See Rares, *supra* note 165, at 10.

¹⁸⁴ See Edmond, *supra* note 164, at 164.

¹⁸⁵ *Id.*

¹⁸⁶ *Id.*

¹⁸⁷ See Rares, *supra* note 165, at 9.

¹⁸⁸ *Id.*

¹⁸⁹ See *Concurrent Expert Evidence*, *supra* note 176; Rares, *supra* note 165, at 12.

¹⁹⁰ See *The New South Wales Experience*, *supra* note 176, at 14; Rares, *supra* note 165, at 12.

¹⁹¹ See *Coonawarra Penola Wine Indus. Ass'n Inc. v. Geographical Indications Comm.* [2001] AATA 844 (5 October 2001) (Austl.), <https://perma.cc/UR7M-DSPH>.

¹⁹² See Peter Heerey, *Recent Australian Developments*, 23 CIV. JUST. Q. 386, 391 (2004).

should enable judges, lawyers, and jurors to make more direct comparisons between the positions staked out by the experts.¹⁹³ Hot tubbing also reduces the adversarial bias present in much expert testimony because it allows for informal, open discussions that are less argumentative and confrontational than traditional cross-examination.¹⁹⁴ Rather than having the experts’ testimony colored by the rhetorical skills of the attorneys, the experts’ opinions are expressed in their own words.¹⁹⁵

Concurrent evidence presentation may be especially useful as a mechanism for conveying scientific or statistical information because it enables fact-finders to observe a public peer review by other experts in the “tub.”¹⁹⁶ This process could help jurors understand the scientific methodologies and statistical analyses that experts undertook and the scientific bases for their conclusions.¹⁹⁷ Because the experts must also answer questions put forth by the judge and attorneys, fact-finders would have additional opportunities to enhance their understanding of the issues and improve their comprehension of the evidence. Finally, having the experts occupy the witness stand together and question one another could enhance judgments of their credibility.¹⁹⁸

However, concurrent evidence sessions also have some disadvantages. One concern is that more experienced, confident, or assertive experts will dominate the procedure and, as a result, win over the fact-finders.¹⁹⁹ Similarly, experts may not be well matched with respect to credentials or experience, and experts with more of those attributes might prevail, regardless of the soundness of their opinions.²⁰⁰

Critics worry that attorneys will coach their experts on how to respond to questions based on the opinions of the other party’s expert, even though it is just as likely to occur in the traditional presentation of expert testimony.²⁰¹ Another concern is that experts will over-simplify the testimony about their analyses to make their discussion more accessible to fact-finders.²⁰² On the other hand, the opposite concern has also been expressed; that experts might engage in such high-

¹⁹³ See *Concurrent Expert Evidence*, *supra* note 176.

¹⁹⁴ See Rares, *supra* note 165, at 13.

¹⁹⁵ See *Concurrent Expert Evidence*, *supra* note 176; Rares, *supra* note 165, at 9.

¹⁹⁶ See Edmond, *supra* note 164, at 169.

¹⁹⁷ *Id.* at 172; Yarnall, *supra* note 15, at 333–35.

¹⁹⁸ See Rares, *supra* note 165, at 9.

¹⁹⁹ See *Concurrent Expert Evidence*, *supra* note 176; Rares, *supra* note 165, at 14.

²⁰⁰ See Edmond, *supra* note 164, at 178.

²⁰¹ See Rares, *supra* note 165, at 15.

²⁰² *Id.*

level discussions with one another that only those trained in the field will be able to understand, leaving others out in the cold.²⁰³

Judges and attorneys have expressed various concerns about the ways that concurrent evidence sessions will change their role in the courtroom. Judges are concerned that hot tubbing would place additional managerial burdens on them, and attorneys worry that it would remove their control of witness examination, which might disrupt their planned trial strategies.²⁰⁴ Attorneys may prefer to cover certain issues through traditional cross-examination rather than to have their experts question the opponent's expert on those topics. For some judges and advocates, the change may simply be too radical of a departure from the known procedures. There is also the obvious practical concern about how to fit more than one or two experts on the witness stand together.²⁰⁵

C. Data On the Effectiveness of the Hot Tub Procedure

The limited data that exist on the effectiveness of the hot tub comes primarily from Australia. The Administrative Appeals Tribunal (AAT) examined the effectiveness of the hot tub approach through surveys administered to judges, experts, and attorneys at the conclusion of certain cases.²⁰⁶ The purpose was to determine general opinions of the procedure and thoughts on how it worked in a particular case.²⁰⁷ Judges were also asked about the perceived impact of concurrent evidence presentation.²⁰⁸ The majority of cases chosen for the procedure came from the Compensation and Veterans' Affairs jurisdictions, and most of the expert testimony was from medical specialists.²⁰⁹

All of the judges who presided over trials involving a hot tub were satisfied—and most were very satisfied—with the process.²¹⁰ They reported that the hot tub took either the same amount of time, or less time than the traditional

²⁰³ Henry Ergas, *Reflections on Expert Economic Evidence*, B. NEWS 39 (2006-2007), <https://perma.cc/RJ86-GAVZ>.

²⁰⁴ See *Concurrent Expert Evidence*, *supra* note 176.

²⁰⁵ See Edmond, *supra* note 164, at 176. In the hearing described by Wood, *supra* note 169, at 6, two experts were able to sit in a witness box in the federal courthouse in Boston because the box had been built to accommodate a witness and an interpreter.

²⁰⁶ See generally *The New South Wales Experience*, *supra* note 176.

²⁰⁷ *Id.* at 10.

²⁰⁸ *Id.* at 11.

²⁰⁹ *Id.* at 7 (medical specialists included orthopedic surgeons, psychiatrists, rheumatologists, and neurologists).

²¹⁰ *Id.* at 15 (data were obtained from twenty-six tribunal members; eighteen members (69%) stated they were very satisfied with the use of concurrent evidence in the particular case being evaluated, and the remaining eight members (31%) stated they were satisfied).

hearing or trial process.²¹¹ Further, judges said that the hot tub allowed experts to provide opinions based on facts introduced into evidence rather than on notes taken months earlier in consulting rooms, which facilitated comparisons of the experts’ evidence.²¹² Judges also lauded the objectivity and quality of the experts’ testimony, which expedited the process of writing and handing down decisions.²¹³ Overall, the judges thought the process simplified technical matters and distilled the issues.²¹⁴

The experts reported that concurrent evidence presentations allowed them to expand on their opinions, whereas in traditional proceedings they are confined to narrow “yes/no” responses.²¹⁵ Those who participated in these sessions reported that they liked the experience, citing the fact that it allowed them to communicate their opinions directly to the judge and attorneys, and reduced the likelihood that attorneys would misrepresent their opinions.²¹⁶

The New South Wales Law Reform Commission issued a report on the experience of the Land and Environment Court of New South Wales that had formally integrated concurrent evidence presentations into its proceedings.²¹⁷ It concluded that “the giving of concurrent evidence has very significant potential advantages. Especially where there are more than two relevant experts, the process can save time, [minimizing] the time spent on preliminaries and allowing the key points to be quickly identified and discussed.”²¹⁸ It also concluded “that rules of court should facilitate the taking of concurrent expert evidence.”²¹⁹ Even prior to the AAT’s study, the Australian Law Reform Commission recommended that “[p]rocedures to adduce expert evidence in a panel format should be encouraged whenever appropriate.”²²⁰

V. PRACTICAL MATTERS

To our knowledge, hot tubbing has never been used in a jury trial in Australia or elsewhere.²²¹ In many respects, it is contrary to the partisan nature of adversarial

²¹¹ *Id.*

²¹² *Id.*

²¹³ *Id.* at 16.

²¹⁴ *Id.*

²¹⁵ *Id.*

²¹⁶ See N.S.W. LAW REFORM COMMISSION, REPORT 109: EXPERT WITNESSES 97 (2005), <https://perma.cc/MDS6-L7AC>.

²¹⁷ See *id.* at 100.

²¹⁸ *Id.* at 98.

²¹⁹ *Id.* at 100.

²²⁰ AUSTRALIAN LAW REFORM COMMISSION, MANAGING JUSTICE: A REVIEW OF THE FEDERAL CIVIL JUSTICE SYSTEM 40 (2000), <https://perma.cc/TG8Z-CAW9>.

²²¹ See Emmerig et al., *supra* note 167; Yarnall, *supra* note 15, at 335–36.

trial procedures in jury trials.²²² Therefore, various procedural and practical hurdles would need to be surmounted before it could realistically become a feature in the courtroom.²²³ Obviously, as a first step, both sides would need to agree to use the procedure, and their trial strategies, including the particular expert witnesses they enlist, may need to change.

Assuming the parties agree to employ the hot tub, then various issues concerning trial management await the presiding judge. Jurors would need to be instructed, early in the trial, about the novel manner in which expert testimony is being presented because the procedure runs counter to their expectations of partisanship. Mechanisms would need to be in place to ensure that experts refrain from talking exclusively to each other and “above” their audience by using jargon and concepts understood only by professionals. Whether and how jurors would question expert witnesses, as is permitted in both criminal and civil trials in some jurisdictions in the U.S., would need to be addressed, particularly if the experts testify together.²²⁴ If these and other necessary modifications can be made, then experts’ explanations of complex principles in a discussion-like forum could aid jurors in resolving the parties’ disagreements.

VI. CONCLUSION

Others have speculated about the forums in which the hot tub offers advantages over traditional expert testimony presentations.²²⁵ These include bench trials and pretrial hearings and depositions.²²⁶ Arguably, the list could also include mediations, settlement conferences, and administrative hearings. We believe that concurrent evidence presentation could eventually play a pivotal role in jury trials involving scientific or technical issues as well.

There are several reasons for our optimism. First, judges gave largely positive assessments of the concurrent evidence presentations they experienced.²²⁷ Second,

²²² For example, partisan experts do not confer in pretrial conferences or attempt to discern areas of common ground prior to appearing in court. To the contrary, parties strive to guard their trial strategies, including when possible, details of the evidence they anticipate expert witnesses will provide.

²²³ See Yarnall, *supra* note 15, at 335–40.

²²⁴ See *id.* at 336. Yarnall suggests that because management of juror questions would impose an additional burden on the court and reduce any efficiency provided by the hot tub approach, the procedure is impractical for jury trials: “[T]here is simply not enough room in the hot tub for the entire jury.” *Id.* at 337. But judges already have an obligation to manage juror questioning in jurisdictions that permit it, and the hot tub has the potential to reduce, rather than augment, confusion stemming from adversarial vantage points. So hot tubbing may promote efficiency in dealing with this aspect of jury trials. See *generally id.*

²²⁵ See *id.* at 338–39.

²²⁶ See *id.* at 337.

²²⁷ See *supra* Part IV.C.

because jurors have less education, knowledge, and sophistication with complex issues than judges, they have more to gain from the reduced partisanship associated with the hot tub approach. Third, jurors have particular difficulty understanding and using probabilistic evidence commonly associated with scientific expert testimony.²²⁸ Thus, procedures that reduce the amount of information conveyed by experts, the complexity of their theories, and the uncertainty associated with all scientific disciplines, should enhance jurors' decision-making.

In short, if hot tubbing can enhance judges' understanding of complex issues, it may have a greater benefit for lay jurors. Although the hot tub approach is probably not appropriate or necessary for all trials involving expert witnesses, it could be invaluable in certain circumstances, particularly in trials that are lengthy, complex, or especially contentious. It is our hope that a bold judge somewhere in the U.S. will give hot tubbing a try, and that the experience will be a positive one. If so, we encourage judges to incorporate hot tubbing into jury trials in the U.S. and elsewhere. As the hot tub approach becomes more common, data on its strengths and weaknesses will emerge, allowing for a better understanding of its potential to aid factfinders in civil and criminal cases.

²²⁸ See *supra* Part III.B.