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Neil Vidmar

Shari Seidman Diamond

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JURIES AND EXPERT EVIDENCE*

Neil Vidmar[†] & Shari Seidman Diamond^{††}

I. FROM THE NINETEENTH TO THE TWENTY-FIRST CENTURY

In Albany County, New York, in 1853, John Hendrickson was accused of poisoning his wife, Maria, with aconitine, also known as wolfbane.¹ The circumstantial evidence was pretty damning. Their marriage was very rocky and Maria was planning to return to live with her mother. Hendrickson had numerous liaisons with other women and had seriously assaulted one of them. Witnesses testified to his unsavory character. In hindsight, the earlier death of their infant son appeared suspicious. Albany druggists tentatively identified the defendant as a purchaser of aconitine and testified that he had inquired about prussic acid, another poison. Other evidence contradicted Hendrickson's claim that he woke in the middle of the night to find Maria dead.

The circumstantial evidence, however, was probably insufficient to convict, and a medical expert for the prosecution provided key evidence. James H. Salisbury was only twenty-

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† Ph.D.; Russell M. Robinson II Professor of Law and Professor of Psychology, Duke University.

†† Ph.D.; J.D.; Professor of Law and Psychology, Northwestern University; Senior Research Fellow, American Bar Foundation.

¹ This case is described and analyzed in detail in JAMES C. MOHR, *DOCTORS AND THE LAW: MEDICAL JURISPRUDENCE IN NINETEENTH-CENTURY AMERICA* 122-139 (1993). This synopsis of the case and quotations are taken from Mohr's more lengthy account.

eight years old, but he held a medical degree and had a medical practice. He had previously testified in two trials. Perhaps most important of all, he had conducted research on aconitine. Salisbury testified that the deceased's intestines contained that poison. Salisbury was providing novel scientific evidence since prior research on aconitine and similar substances had been unable to detect it once it had entered body tissues. Two other medical experts, including one John Swineburn, also gave evidence consistent with poisoning. Defense experts disputed the findings but for several reasons they were poor witnesses.

In closing arguments to the jury a lead member of the prosecution team drew attention to the fact that many prominent members of the Albany medical profession had attended the trial as observers, but none had come forward to refute the prosecution witnesses, thus strongly implying that the findings were generally accepted by the medical community. Hendrickson was convicted.

The publicity generated by the trial led to a major examination of the trial's evidence by the medical and scientific community throughout the United States and Europe. In scientific articles in the *Boston Medical and Surgical Journal*, the *American Journal of the Medical Sciences*, and elsewhere, an overwhelming majority of the scientific community concluded that Salisbury's failure to preserve the key evidence was unforgivable, that his methodology was flawed, that there were alternative explanations for his findings, and that his conclusions were inconsistent with or contradicted by research findings of other authors. In short, the evidence lacked scientific reliability.

Charles A. Lee, a prominent and influential professor of pathology, reviewed the trial transcript and drew attention to the "confident and positive" demeanor of Salisbury and Swineburn as witnesses.² Lee asserted that it was probable that their testimony had a greater influence on the jury than "the more careful and judicious testimony . . . of men of age, professional skill and enlarged experience" who had testified

² JAMES C. MOHR, DOCTORS AND THE LAW 134 (1993) (quoting Charles A. Lee, *Review of Barnes and Hevenor, Trial of John Hendrikson, Jr., for the Murder of His Wife by Poisoning, at Bethlehem, Albany County, New York, Mar. 6, 1853*, 8 AM. J. OF MED. SCIS. 176 (1854)).

for the defense.³ In the final line of his article in the *American Journal of Medical Sciences*, Lee concluded that the Hendrickson case “makes us question, at times, whether the boasted right and privilege of trial by jury, be, indeed, a blessing or a curse.”⁴

The Hendrickson case raises some interesting points about juries and experts. The overwhelming scientific majority opinion about the state of knowledge of aconitine was generated by litigation. The scientific majority opinion⁵ developed *after* the jury’s verdict was rendered, and courts of appeal were not willing to revisit the issue: Hendrickson was hanged in 1854. The experts propounding the novel scientific evidence were accused of professional careerism. The expert evidence, while probably central in this case, was situated in the midst of other evidence bearing on the defendant’s guilt. The jury was accused of relying on superficial characteristics of the expert witnesses rather than on the substance of the evidence.

The Hendrickson case was the major toxicology trial of the nineteenth century, but it was far from unique in raising questions about the competence, gullibility, and irresponsibility of juries faced with expert evidence. Kenneth DeVille’s study of medical malpractice in the nineteenth century provides a number of examples of juries being accused of not understanding expert evidence.⁶ After a German laborer in Buffalo was awarded \$600, one commentator stated:

Evidence of a single man, contradicting all surgical experience, and evidently based on an egregious error in diagnosis, outweighed the opinions of older and better surgeons, and subjected a poor, hardworking and intelligent practitioner to a judgment and costs heavy enough to sweep away the greater portion of the small earnings of many years.⁷

³ *Id.*

⁴ *Id.*

⁵ Opinion was not unanimous. A professor of forensic medicine at the Royal College of Surgeons in Dublin, Ireland offered an opinion that the post-mortem results were consistent with four reports of aconite (the crucial chemical in aconitine) poisoning that had come to his attention.

⁶ See generally KENNETH A. DEVILLE, *MEDICAL MALPRACTICE IN NINETEENTH-CENTURY AMERICA: ORIGINS AND LEGACY* (1990).

⁷ *Id.* at 28.

In an 1847 editorial in the *Boston Medical and Surgical Journal*, another commentator decried the “glorious uncertainty of legal justice and medical testimony” and asserted that conflicting medical testimony “bewildered” lay juries.⁸ We will return to the *Hendrickson* case later in this Article, but let us move forward approximately a century and a half to contemporary debate about juries and experts.

In his widely read books on the tort system, author Peter Huber offered charges, backed by anecdote, that “junk science,” is currently offered to incompetent juries who make superficial judgments about experts, and whose intellectual inadequacies are compounded by juries’ alleged natural sympathies for plaintiffs over defendants.⁹ Similarly, in her angry book about the tort system arising out of her personal involvement with breast implant litigation, Marcia Angell asserted that in tort cases verdicts by judges:

[W]ould almost certainly be sounder than those made by juries, because judges are educated to be dispassionate and to evaluate evidence. Many tort cases involve expert witnesses, who speak to fairly technical matters. To evaluate whether a product has caused a disease is difficult for nearly anyone. For a jury it is especially difficult, because its members usually have no competence in the area. They are often left to make judgments largely on the basis of the emotional appeals of the lawyers and their expert witnesses.¹⁰

The *Daubert* trilogy of Supreme Court cases¹¹ on admissibility of scientific evidence has also brought forth many negative assertions about how juries evaluate expert evidence. Amicus briefs filed on behalf of the defendant in *Kumho Tire v. Carmichael*, for example, made numerous appeals to the authority of case law,¹² trial manuals, and popular authors in

⁸ *Id.* at 540.

⁹ See generally PETER W. HUBER, *GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM* (1991); PETER W. HUBER, *LIABILITY: THE LEGAL REVOLUTION AND ITS CONSEQUENCES* (1988).

¹⁰ MARCIA ANGELL, *SCIENCE ON TRIAL: THE CLASH OF MEDICAL EVIDENCE AND THE LAW IN THE BREAST IMPLANT CASE* 204 (1996).

¹¹ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993); see also *Kumho Tire Co. Ltd. v. Carmichael*, 526 U.S. 137 (1999); *General Elec. Co. v. Joiner*, 522 U.S. 136 (1997).

¹² See, e.g., *U.S. v. Amaral*, 488 F.2d 1148, 1152 (9th Cir. 1973) (asserting that juries are unduly prejudiced, confused, or misled by expert testimony “because of its aura of special reliability and trustworthiness”).

asserting the need for a judicial gate keeping role.¹³ Consider a partial sample of these assertions:

[G]atekeeping serves an important check on the jury's inclination to give great (and sometimes undue) deference to expert testimony¹⁴

[A]mong the difficulties that Judge Hand noted were that an expert frequently ends up "confusing" the jury and effectively "take[s] the jury's place if they believe him. . . ."¹⁵

[J]urors often "abdicate their fact-finding obligation" and simply "adopt" the expert's opinion. . . .¹⁶

But "because experts often deal with esoteric matters of great complexity," jurors frequently are incapable of "critically evaluating the bases of an expert's testimony" and too often give "unquestioning deference to expert opinion."¹⁷

[Because of the "aura of infallibility"] "even when jurors have a basis for questioning the expert's reliability [they] may be disinclined to do so."¹⁸

In *Daubert* and its progeny, the Supreme Court relied on interpretations of the rules of evidence that mandate a judicial gate-keeping role. In *Daubert* the Court did comment on the respondent's concern that "befuddled juries are confounded by absurd and irrational pseudoscientific assertions" and countered that "[i]n this regard respondent seems to us to be overly pessimistic about the capabilities of the jury and the adversary system generally."¹⁹ Nevertheless, the Court, by stressing the judge's role as gatekeeper, appears implicitly to have assumed that the judge should protect the jury. In 1999 *Allison v. McGhan Med. Corp.*, a federal court in

¹³ See Neil Vidmar et al., *Amicus Brief: Kumho Tire v. Carmichael*, reprinted in 24 LAW & HUM. BEHAV. 387 (2000).

¹⁴ See generally Petitioner's Brief, *Kumho Tire Co. Ltd. v. Carmichael*, 526 U.S. 137 (1999); see also Vidmar, *supra* note 13, at 389.

¹⁵ Vidmar, *supra* note 13, at 389

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

¹⁹ *Daubert*, 509 U.S. at 595-96.

the Eleventh Circuit deciding a silicone implant case captured the likely unstated assumptions underlying the *Daubert* rulings:

While meticulous *Daubert* inquiries may bring judges under criticism for donning white coats and making determinations that are outside their field of expertise, the Supreme Court has obviously deemed this less objectionable than dumping a barrage of questionable scientific evidence on a jury, who would 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.²⁰

Thus, juries are alleged to be intellectually incompetent to understand much expert evidence, to rely on superficial characteristics of the experts in judging their testimony, to abdicate their responsibility to evaluate the testimony, and to be confused by a battle of experts.

It is important to observe at this juncture that over the past half century some forms of expert evidence may have increased in complexity and may be even more complex in the future.²¹ Not all of this expert evidence is scientific or medical evidence. Fraud cases concerning international transfers of financial documents may entail expert evidence involving many complicated arcana. Moreover, expert evidence is sometimes enmeshed in other trial complexities that are procedural in nature, such as joinder of cases in mass tort actions. Furthermore, the adversary process that permits each party to select its own experts often creates the impression that expert opinion is evenly divided on an issue when in fact the experts called by one side represent only a tiny minority of

²⁰ Allison v. McGhan Med. Corp., 184 F.3d 1300, 1310 (11th Cir. 1999). Note that it is also possible that the Supreme Court's decisions reflect a desire to reduce case dockets and make litigation more efficient because judicial gate-keeping can eliminate cases at early stages in the litigation process and streamline those that remain. Of course, this hypothesis is not incompatible with a belief that we need safeguards from jury incompetence and irresponsibility.

²¹ See Joel Cecil et al., *Citizen Comprehension of Difficult Issues : Lessons From Civil Jury Trials*, 40 AM. U. L. REV. 727, 733-36 (1991); Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113, 1179-84 (1991) (hereinafter *Gross, Expert Evidence*); Robert D. Myers et al., *Complex Scientific Evidence and the Jury*, 83 JUDICATURE 150, 152 (1999); Samuel R. Gross, *Data on the Use of Expert Witnesses in California Civil Trials* (1990) (Unpublished paper on file with the authors and quoted with permission of the author).

professionals holding such opinions.²² Finally, forms of evidence concerning what has been called “social framework” testimony, on topics such as battered woman, rape trauma, or child sex abuse accommodation syndrome, appeared infrequently in trials—or not at all—as little as two decades ago, but are now common. These developments have raised serious concerns about whether jurors are unduly influenced by the experts who proffer this testimony.

What is equally clear, however, is the fact that most of the legal debate on how juries respond to experts, as the *Kumho* case amicus briefs demonstrate, is based on assertions and opinions rather than any systematic empirical base. Yet, over the past twenty-five years social scientists have studied the influence of experts on juror and jury behavior through post-trial interviews with jurors, other forms of case study methodology, and experimental simulations intended to isolate factors that bear on jurors’ decision-making processes. The types of expert evidence examined in this body of literature are diverse, and so are the contexts in which the evidence was conveyed to the jurors.

The purpose of this Article is to examine what social scientists have learned about how jurors handle expert testimony. We begin in Part II by considering what the legal system expects of jurors and what psychological research suggests about laypersons’ capacities and tendencies with regard to these expectations. In Part III, we analyze what jurors tell researchers in surveys and interviews about how they react to experts. Part IV examines the findings from simulation experiments designed to assess juror reactions to various forms of expert testimony. To put the evaluation of jury reactions to expert evidence in context, Part V examines how judges handle similarly challenging evidence. Finally, Part VI considers the strengths and weaknesses of the jury as an evaluator of expert testimony, along with current efforts to improve the quality of the jury’s decisions about experts.

²² Michael J. Saks, *Do We Really Know Anything About the Behavior of the Tort Litigation System—and Why Not?*, 140 U. PA. L. REV. 1147, 1239 (1992).

II. WHAT DOES THE LEGAL SYSTEM EXPECT JURORS TO DO WITH EXPERT TESTIMONY?

A. *Jury Instructions*

Expert witnesses are permitted to offer scientific, technical, and other specialized information that will assist the trier of fact.²³ Unlike ordinary fact witnesses, experts are permitted to offer reports about behavior not involving the parties in the case at hand, to give opinions, and to derive their testimony from methods used by professionals in the expert's field.²⁴ As a result, jury instructions often provide additional directions on how to evaluate and weigh expert testimony. These instructions reveal how the legal system expects jurors (and judges) to deal with the testimony of experts. Consider some examples from the instructions that jurors are given, beginning first with instructions for witnesses in general.

The federal pattern civil jury instructions are as follows:

You, as jurors, are the sole judges of the credibility of the witnesses and the weight their testimony deserves.

You should carefully scrutinize all the testimony given, the circumstances under which each witness has testified, and every matter in evidence which tends to show whether a witness is worthy of belief. Consider each witness's intelligence, motive and state of mind, and demeanor and manner while on the stand. Consider the witness's ability to observe the matters as to which he has testified, and whether he impresses you as having an accurate recollection of these matters. Consider also any relation each witness may bear to either side of the case; the manner in which each witness might be affected by the verdict; and the extent to which, if at all, each witness is either supported or contradicted by other evidence in the case. . . .

In Arizona civil courts the pattern jury instructions for witnesses in general are as follows:

²³ FED. R. EVID. 702.

²⁴ FED. R. EVID. 703.

In deciding the facts of this case, you should consider what testimony to accept, and what to reject. You may accept everything a witness says, or part of it, or none of it.

In evaluating testimony, you should use the tests for truthfulness that people use in determining matters of importance in everyday life, including such facts as: the witness's ability to see or hear or know the things the witness testified to; the quality of the witness's memory; the witness's manner while testifying; whether the witness had any motive, bias, or prejudice; whether the witness was contradicted by anything the witness said or wrote before trial, or by other evidence; and the reasonableness of the witness's testimony when considered in the light of the other evidence.

Consider all of the evidence in the light of reason, common sense, and experience.²⁵

Both of these examples illustrate that legal instructions direct jurors to consider both the basis for the ordinary witness' knowledge and the trustworthiness of ordinary witnesses. Thus, they refer both to the witness's exposure to the facts about which he or she is testifying and to potential motive, interest, and bias that may affect the willingness of the witness to testify accurately about what he or she knows (i.e., how trustworthy the witness is). More ambiguously, the federal instruction mentions intelligence, presumably because it may affect the witness's knowledge base. It also mentions manner of testifying, because non-verbal cues are believed to assist the juror in gauging the extent to which the witness knows what he or she is talking about and whether the witness is accurately reporting what is known. Of course, we know that behavioral cues such as the witness's apparent confidence can be powerful, but highly unreliable, criteria in determining accuracy.²⁶ Although these instructions

²⁵ ARIZONA STATE BAR, REVISED ARIZONA JURY INSTRUCTIONS (CIVIL) 6 (3d ed. (1997) [hereinafter ARIZONA JURY INSTRUCTIONS]).

²⁶ See ELIZABETH F. LOFTUS, EYEWITNESS TESTIMONY 19, 100-01, 177 (1996); Gary Wells et al., *How do People Infer the Accuracy of Eyewitness Memory? Studies of Performance and a Meta-Memory Analysis*, in EVALUATING WITNESS EVIDENCE 41 (Sally Lloyd-Bostock ed., 1983); Gary Wells et al., *Accuracy, Confidence and Juror Perceptions in Eyewitness Identification*, 64 J. OF APPLIED PSYCHOL. 440 (1979). For the unreliable relation between expert opinion and confidence, see generally STEPHEN CECI & MAGGIE BRUCK, *JEOPARDY IN THE COURTROOM: A SCIENTIFIC ANALYSIS OF CHILDREN'S TESTIMONY* (1995); Robyn Dawes et al., *Clinical versus Actuarial Judgment* 243 SCI. 1668 (1989); K.A. Deffenbacher, *Eyewitness Accuracy and Confidence: Can We Infer Anything About Their Relationship?*, 4 LAW & HUM. BEHAV. 243 (1980); Benjamin Kleinmuntz, *Why We Use Our Heads Instead of Formulas:*

omit a specific reference to the confidence of a witness, the reference to demeanor and manner certainly would encompass apparent confidence.

For expert witnesses, there are additional elaborations. The federal instructions state:

The rules of evidence ordinarily do not permit witnesses to testify as to their own opinions or their own conclusions about issues in the case. An exception to this rule exists as to those witnesses who are described as "expert witnesses." An "expert witness" is someone who, by education or by experience, may have become knowledgeable in some technical, scientific, or very specialized area. If such knowledge or experience may be of assistance to you in understanding some of the evidence or in determining a fact, an "expert witness" in that area may state an opinion as to relevant and material matters in which he or she claims to be an expert.

You should consider each expert opinion received in evidence in this case and give it such weight as you may think it deserves. You should consider the testimony of expert witnesses just as you consider other evidence in this case. If you should decide that the opinion of an expert witness is not based upon sufficient education or experience, or if you should conclude that the reasons given in support of the opinion are not sound, or if you should conclude that the opinion is outweighed by other evidence [including that of other "expert witnesses"], you may disregard the opinion in part or in its entirety.

As I have told you several times, you—the jury—are the sole judges of the facts in this case.²⁷

In Arizona, the instructions for experts are as follows:

A witness qualified as an expert by education or experience may state opinions on matters in that witness's field of expertise, and may also state reasons for those opinions.

Expert opinion testimony should be judged just as any other testimony. You are not bound by it. You may accept it or reject it, in whole or in part, and you should give it as much weight as you think it deserves, considering the witness's qualifications and experience, the reasons given for the opinions, and all the other evidence in the case.²⁸

Toward an Integrative Approach, 107 PSYCHOL. BULL. 296 (1990); Steven Penrod & Brian Cutler, *Witness Confidence and Witness Accuracy: Assessing Their Forensic Relation*, 1 PSYCHOL. PUB. POL'Y, & L. 817 (1995).

²⁷ Edward J. Devitt et al., FEDERAL JURY PRACTICE AND INSTRUCTIONS (CIVIL) § 72.08 (4th ed. 1997).

²⁸ ARIZONA JURY INSTRUCTIONS, *supra* note 25, at 7.

Both the Arizona and the federal instructions point to the credentials of the expert witness as an appropriate source of information for the jurors to use in evaluating the witness's testimony. The Arizona instruction explicitly tells jurors to weigh the expert's testimony "considering the witness's qualifications and experience" along with the reasons given for the opinion, and the other evidence in the case.²⁹ The federal criminal jury instructions (which mirror the earlier civil jury instructions) tell the jurors that the court is permitting the expert to offer opinions because the court has determined that the expert witness possesses special knowledge by virtue of education or experience. The jurors then are told that they can disregard the expert's opinion and are explicitly invited to do so if they decide that the expert has insufficient education or experience.³⁰

It is not surprising that education and experience figure prominently in jury instructions. Judges use them to decide whether to permit an expert to testify.³¹ Decision makers of all kinds rely on such cues in deciding whether or not to accept advice from a particular source. A prospective patient would be wise to learn about the educational and professional background of a surgeon one was thinking of employing to remove her appendix.

At the same time, we expect the trier of fact to arrive at a decision that is not the result of mere deference to an expert.³² The ambiguity in the judgment situation, as in the instructions, is how much weight should be given to the credentials of the expert.

The trial itself invites jurors to pay substantial attention to the education and experience of the expert. Direct examination typically begins with a recitation of the accomplishments of the expert witness, and the impressive resume often follows the jurors into the jury room. In short, jurors (and judges) are instructed to evaluate all aspects of an expert witness's testimony, including his or her credentials.

²⁹ *Id.*

³⁰ See Devitt et al., *supra* note 27 and accompanying text.

³¹ FED. R. EVID. 702.

³² See Ronald J. Allen & Joseph S. Miller, *The Common Law Theory of Experts: Deference or Education*, 87 Nw. U. L. REV. 1131, 1135-37 (1993).

B. *Special Features of the Trial as an Arena for Persuasion and Decision Making*

In considering the jury's response to experts we need also to consider that the common law jury trial (the "trial"), with its adversary procedure, has certain special features that have important consequences for decision making. These features have been discussed in detail in many writings,³³ but a summary of the unique features is necessary to put the debate over juries and experts into context. The trial involves opposing parties who each, through the presentation of testimony and other evidence, attempt to persuade the trier that their version of events about a civil or criminal matter is correct. Thus, the trial may be viewed as an arena for persuasion, but one with very serious consequences. A defendant's life or liberty will be affected by the decision or, in civil cases, the decision will determine if one party receives compensation for an alleged injury, sometimes an injury involving a claim for very large sums of compensatory or punitive damages. From the very beginning of the trial, the judge's instructions to the jury and the lawyers' opening statements emphasize the serious consequences. The gravity of the decision is reinforced throughout the trial by the procedures and formal atmosphere of the courtroom. At the end of the trial the closing statements of the contending parties and the judge's final instructions remind the jury of the responsibility that is in their hands.

Unlike many other decision makers who can actively solicit information, jurors are dependent on the opposing parties to provide the information necessary for their decision. Jurors are specifically instructed that they are not to do any investigation themselves and to base their decision solely on the evidence at trial. They are also provided with legal instructions about the applicable law and the standards for their decision, such as the balance of probabilities or proof beyond reasonable doubt. Moreover, the information provided for the decision primarily involves a one-way presentation of testimony with jurors not allowed to ask questions either for

³³ See generally MIRJAN R. DAMASKA, *EVIDENCE RULES ADRIFT* (1997); MIRJAN R. DAMASKA, *THE FACES OF JUSTICE AND STATE AUTHORITY: A COMPARATIVE APPROACH TO THE LEGAL PROCESS* (1986).

clarification or to probe unaddressed issues.³⁴ Furthermore, the adversary system prescribes a particular order of presentation with one side presenting all of its evidence on all issues before the opposing side has an opportunity to present an alternative interpretation of the dispute.

The trial setting is primarily oral in nature. While documents or physical evidence often play an important role at trial, the meaning of this evidence is interpreted orally by witnesses who have special knowledge of the matters. The witnesses' testimony frequently involves content that is beyond the knowledge and experience of laypersons. It may also involve new ways of looking at knowledge that may strongly conflict with "common sense" knowledge³⁵ about such matters as the manner in which police investigations are carried out, insanity, diminished capacity, sexual abuse, or eyewitness reliability.³⁶

The experts who appear at trial are selected for their positions and assumed loyalty to the party that calls them. The adversary system, therefore, may result in one side presenting experts who offer opinions that only a small minority of persons in their field would endorse.³⁷ These experts may have an ideological commitment to a position or loyalty to the party that calls them that may cause the experts to present their opinions in a biased way.³⁸

The adversary system relies on the opposing side to cross-examine and deconstruct the testimony of the expert to expose its weakness or irrelevance to the dispute.³⁹ Then, the first party is allowed to re-examine its experts to rehabilitate

³⁴ There are exceptions to these rules, as discussed in Part VI.

³⁵ See generally NORMAN FINKEL, COMMONSENSE JUSTICE: JUROR'S NOTIONS OF THE LAW (1995); see also Jason Schklar & Shari Diamond, *Juror Reactions to DNA Evidence: Errors and Expectancies*, 23 LAW & HUM. BEHAV. 159, 180-81 (1999).

³⁶ See discussion of social framework evidence *infra* Part IV.

³⁷ See JOSEPH SANDERS, BENEDICTIN ON TRIAL: A STUDY OF MASS TORT LITIGATION 91 (1998); see generally MARK A. CHESLER ET AL., SOCIAL SCIENCE IN COURT: MOBILIZING EXPERTS IN THE SCHOOL DESEGREGATION CASES (1988); Simon & Zusman, *The Effect of Contextual Factors on Psychiatrists' Perception of Illness: A Case Study*, 24 J. HEALTH & BEHAV. 186 (1983).

³⁸ MARK A. CHESLER ET AL., *supra* note 34; Naomi Wolf, *Social Science and the Courts: the Detroit Schools Case*, 42 THE PUB. INT. 102, 104 (1976); see generally Gross, *Expert Evidence*, *supra* note 21.

³⁹ SHEILA JASANOFF, SCIENCE AT THE BAR: LAW SCIENCE AND TECHNOLOGY IN AMERICA ch. 3 (1995).

them. When the opposing party begins its evidence presentation, it may call its own experts in an effort to refute the other party's experts. The end result of the adversary process is often conflicting testimony from experts—the "battle of experts"—that requires the jury to decide which experts to believe.

While some special features of the trial present potentially confusing information for the jury, other features offer potentially off-setting assistance. Because the trial is adversarial in nature, the jury will typically become aware that there are at least two alternative interpretations of the evidence. The process of cross-examination may not only expose weaknesses in an expert's position—the give and take of examination and cross-examination may result in substantial repetition of points that educate the jurors about the essential issues, even if the subject matter was originally unfamiliar to them. Finally, because the jurors must reach a unanimous decision, or at least a super-majority decision, through the process of deliberation, conditions are created for pooling of insight, knowledge, and perspective on the experts, providing for a group decision that may be more accurate than the average decision of individual jurors or a simple combination of their verdict choices.

The above summary of the trial process may be familiar, but the effect of these elements is usually overlooked or ignored in charges and counter-charges about the competence of juries to understand expert evidence. Of course, the ultimate effect of these opposing elements on the performance of the jury is an empirical question, but the answer may not be a simple one. As the evidence in this Article will show, under some conditions juries competently deal with expert evidence, and under other conditions their performance is less than optimal.

C. *The Relevance of Psychological Research for Juror Understanding, Persuasion, and Decision Making*

At core, the legal expectations for jurors involve a number of psychological assumptions. Jurors must be motivated to utilize the expert evidence. They must be capable

of understanding the substance of the evidence. They should draw upon their own life experiences both in evaluating the reasonableness of the expert's opinion and in assessing its internal consistency. In evaluating the evidence they should give attention to characteristics of the expert that bear on the expert's credentials, reliability, and truthfulness, but they should not give undue weight to the credentials. They must consider using the evidence in their decision making only if it is judged by them to be reliable, and they must not automatically defer to the expert's opinion, but must instead judge it for reasonableness, and place that opinion in the context of other evidence. It is further assumed that all of these factors will be a result of jury deliberation, not simple mathematical pooling of individual opinions.

Ultimately, we must assess jury behavior with respect to these issues in the specific setting in which jurors operate. Nevertheless, there are bodies of general psychological research that inform us about the potential abilities of jurors to understand and process expert evidence. A brief review of this research will prove useful in interpreting specific research on juries.

First is a body of research that assesses laypersons' abilities to understand statistical and methodological reasoning. Statistical and methodological reasoning are at the heart of much scientific and medical testimony and many other forms of expert evidence. If, for example, a layperson is incapable of understanding problems such as statistical representativeness, confounded variables, and conditional probabilities, then he or she will not be able to grasp the reasoning behind an expert opinion, even if it is clearly explained and examined during direct and cross-examination of the expert witness.

Research into these reasoning skills has shown that in reacting to everyday life problems, people correctly use inferential reasoning skills, but that they have difficulty applying them to new domains that are unfamiliar to them.⁴⁰

⁴⁰ See generally RULES FOR REASONING (Richard E. Nisbett ed., 1993); Richard E. Nisbett et al., *Teaching Reasoning*, 238 SCI. 625 (1987); see also Darrin R. Lehman et al., *The Effects of Graduate Training on Reasoning: Formal Discipline and Thinking About Everyday-Life Events*, 43 AM. PSYCHOL. 431, 432 (1988).

Thus, the work of social psychologist Harold Kelley has shown that in making attributions about interpersonal behaviors, ordinary people understand and use, on a daily basis, concepts of necessariness and sufficiency in assessing causality. Kelley has also shown that ordinary people possess different cognitive schemas for checking forms of evidence bearing on causality.⁴¹ Other research has shown that when presented with a concrete task such as one involving sales receipts, laypersons correctly use rules of conditional probability, but when faced with an abstract problem of conditional probability that has the same formal logical structure as the sales receipt problem, their performance is very poor. In short, there is no transfer; reasoning appears to be what psychologists call "domain specific."

Yet there is also evidence that the reasoning skills that facilitate performance across situations can be taught. One study compared the statistical reasoning skills of students entering post-graduate training in the fields of psychology, medicine, chemistry, and law with their statistical reasoning skills two years later.⁴² The authors' hypothesis was that because the fields of psychology and medicine are primarily probabilistic disciplines, while chemistry and law are not, the exposure to two years of graduate training would improve the ability of psychology and medical students to solve statistical problems, but this improvement would not occur to the same degree in the other two disciplines.⁴³ Psychology and medical students showed large improvements in their ability to solve problems in statistical and methodological reasoning.⁴⁴ Psychology, medical, and law training increased students' reasoning about conditional logic.⁴⁵ Chemistry training had no effect on any of the types of reasoning that were studied.⁴⁶

Most important for the purposes of this Article, research by Richard Nisbett and colleagues has found that even relatively brief training sessions can improve the ability

⁴¹ Harold Kelly, *The Process of Causal Attribution*, 28 AM. PSYCHOL. 107 (1973).

⁴² See Lehman et al., *supra* note 40, at 434.

⁴³ See Lehman et al., *supra* note 40, at 434.

⁴⁴ See Lehman et al., *supra* note 40, at 437.

⁴⁵ See Lehman et al., *supra* note 40, at 438.

⁴⁶ See Lehman et al., *supra* note 40, at 440.

of laypeople to reason about common life problems.⁴⁷ Indeed, even the logical reasoning of seventh grade children can be improved by simple training sessions.⁴⁸ Among other findings in this body of research literature, Patricia Cheng and Keith Holyoak found that providing an explicit purpose for a rule that would otherwise seem arbitrary can improve reasoning performance.⁴⁹ They also found that brief instruction using semantically meaningful examples improved performance more than intensive training sessions devoted to abstract conditional rules.⁵⁰ In summarizing an extensive body of research literature Nisbett and his colleagues concluded:

[P]eople do make use of inferential rules and these rules can be readily taught. In fact, rules that are extensions of naturally induced ones can be taught by quite abstract means. . . . [T]he types of rules that people use naturally and can be taught most easily are a family of pragmatic inferential rule systems that people induce in the context of solving recurrent everyday problems.⁵¹

The empirical question posed by this research is whether, or perhaps when, the trial process provides jurors with the cognitive tools to assess expert evidence in terms of their life experience.

A second body of research indicates that people use cognitive devices called *social schemas* to organize information about the world around them.⁵² Nancy Pennington and Reid Hastie have used these insights about social schemas to develop a theory of jury decision making that they call the "Story Model."⁵³ In short, the Story Model asserts that jurors do not approach the trial with a blank slate.⁵⁴ Rather, they utilize

⁴⁷ See Nisbett et al., *supra* note 40.

⁴⁸ Richard Herrnstein et al., *Teaching Thinking Skills*, 41 AM. PSYCHOL. 1279 (1986).

⁴⁹ Patricia Cheng & Keith Holyoak, *Pragmatic Reasoning Schemas*, 17 COGNITIVE PSYCHOL. 391 (1985).

⁵⁰ Patricia Cheng et al., *Pragmatic Versus Syntactic Approaches to Deductive Reasoning*, 18 COGNITIVE PSYCHOL. 293 (1986).

⁵¹ Richard E. Nisbett et al., *Teaching Reasoning*, in RULES FOR REASONING 297-98 (Richard Nisbett ed., 1993).

⁵² Eliot Smith, *Mental Representation and Memory*, in THE HANDBOOK OF SOCIAL PSYCHOLOGY vol. 1, at 391 (Daniel Gilbert et al. eds., 1998).

⁵³ Nancy Pennington & Reid Hastie, *A Cognitive Theory of Juror Decision Making: The Story Model*, 13 CARDOZO L. REV. 519, 520 (1991).

⁵⁴ *Id.* at 523.

their past experience to filter and understand the various pieces of evidence as the evidence is presented and to develop alternative interpretations, or "stories," about the events that led to the dispute now on trial.⁵⁵ These alternative stories are then weighed against one another to determine which one is most consistent and logical. The preferred story is then considered under the instructions about the law provided by the trial judge.⁵⁶ The Story Model is widely accepted as a general description of how jurors process information and reach their decisions. It has many implications that bear on juror decision making, but for our present purposes, the important point is that the various parts of trial evidence including the testimony of experts are not viewed in isolation instead they are integrated into "stories" derived from pre-existing cognitive frameworks and from the other trial evidence, including the testimony of plaintiffs, defendants, and other witnesses.

A third body of research has investigated the processes underlying attitude change and decision making in settings involving persuasion attempts.⁵⁷ This research indicates that two basic types of cognitive processes are used to integrate information, central processing and peripheral processing.⁵⁸ When people engage in central or systematic processing, they carefully scrutinize the message and examine the quality of the arguments that are being made.⁵⁹ When they engage in peripheral or heuristic processing of persuasive messages, they take mental short cuts. Rather than attending to the quality of arguments, they may, for example, make their decision based

⁵⁵ *Id.* at 523-24.

⁵⁶ *Id.* at 530-31.

⁵⁷ See generally Alice Eagly & Shelly Chaiken, *Attitude Structure and Function*, in 1 THE HANDBOOK OF SOCIAL PSYCHOL. 269 (Daniel Gilbert et al. eds., 1998); Richard Petty & Duane Wegener, *Attitude Change: Multiple Roles for Persuasion Variables*, in 1 THE HANDBOOK OF SOCIAL PSYCHOL. 323 (Daniel Gilbert et al. eds., 1998); Shelly Chaiken, *Heuristic Versus Systematic Information Processing and the Use of Source Versus Message Cues in Persuasion*, 39 J. PERSONALITY & SOC. PSYCHOL. 752 (1980); Shelly Chaiken & Duriaraj Maheswaran, *Heuristic Processing Can Bias Systematic Processing: Effects of Source Credibility, Argument Ambiguity, and Task Importance on Attitude Judgment*, 66 J. PERSONALITY & SOC. PSYCHOL. 460 (1994).

⁵⁸ Chaiken and her colleagues prefer to refer to systematic versus heuristic processing, in contrast to central versus peripheral processing.

⁵⁹ See generally sources cited *supra* note 57.

upon the length of the message, the relative number of arguments for one side or another, or the prestige or purported expertise of the source. The claim that juries defer to the credentials of the expert, rather than scrutinizing the quality of the testimony, is, in psychological terms, a claim that jurors engage in peripheral rather than central processing. Research on persuasion indicates that central processing takes place when people are strongly motivated to understand the message and have the intellectual ability to grasp the arguments. When they are unmotivated or unable to process the message, they take cognitive shortcuts and rely on peripheral cues. Thus, this body of research would suggest that if two experts provide testimony of equal quality, but one expert is perceived to be of higher prestige than the other, the higher prestige person would tend to prevail in persuasiveness. Similarly, this research would suggest that the more difficult the testimony, the greater the likelihood that jurors would revert to peripheral cues.

These findings from psychological research must be qualified by the fact that they have been derived in settings quite different from the settings in which juries make their decisions. The trial setting places great emphasis on the importance of the verdict for people's lives. Unlike the persuasion settings—in which most of this research has been carried out—the adversarial system includes opening arguments by both sides, prescribed orders of presentation, cross-examination, judicial admonitions, the presence of other evidence bearing on the verdict, and the opportunity to deliberate. Thus, it presents a very different persuasion setting and raises questions about the extent to which we can generalize to the legal context. Additionally, as noted above, judicial instructions specifically inform jurors that peripheral cues such as credentials are to be considered along with the central cues bearing on the content of the testimony. Nevertheless, this body of psychological theory and research on individual decision makers provides a framework that is helpful in analyzing jury responses to expert testimony.

III. WHAT JURORS TELL US ABOUT THEIR PERCEPTIONS OF EXPERTS AND THEIR DECISION-MAKING PROCESSES

Neil Vidmar conducted interviews with jurors who had just finished serving on juries that had decided medical malpractice cases.⁶⁰ The cases involved surgery for urinary incontinence, a brain damaged baby, a woman who died from a ruptured bowel, a woman who became blind and alleged a failure to make a timely diagnosis and a death involving an allergic reaction to a contrast dye. All involved expert testimony about causation and all involved battles of experts. In three out of the five cases the verdicts favored the defendants.

At least some of the jurors in each of the first four cases had a basic grasp of the main medical issues and recognized the basic points of disagreement between the opposing experts.⁶¹ In the rectal incontinence case, for example, there was a basic disagreement between experts about "urge" versus "stress" incontinence and how cystometrograms should be read.⁶² Another issue involved nerve blockage and surgery involving a sacral rhizotomy. The experts on both sides supplemented their oral testimony with numerous charts and graphs.⁶³ The views of leading jurors coincided with notes taken during the trial by Vidmar and several law students. These jurors ascribed their understanding of the issues to clear and repetitive tutoring by the trial witnesses.⁶⁴ The brain damaged baby case involved a number of claims, but the central claim was misdating the due date for delivery and actions not taken as a result of that misdating.⁶⁵ It was known that the baby was in a footling-breech position and in danger of hypoxia due to strangulation of the umbilical cord during delivery.⁶⁶ The defense presented two obstetricians, a neonatologist and three

⁶⁰ NEIL VIDMAR, *MEDICAL MALPRACTICE AND THE AMERICAN JURY* ch. 12 (1995).

⁶¹ *Id.* at 142-43, 150-51.

⁶² *Id.* at 129-30.

⁶³ *Id.*

⁶⁴ *Id.* at 131.

⁶⁵ VIDMAR, *supra* note 60, at 134.

⁶⁶ *Id.* at 133-34.

other physicians who testified about the standard of care.⁶⁷ The plaintiff then called a pediatric neurologist as a rebuttal witness.⁶⁸ In post-trial interviews, many of the jurors demonstrated a good understanding of the trial issues, such as diagnosis of delivery by gauging fundal height and by cervical dilation.

The ruptured bowel case involved many doctors and nurses. Although the jurors considered the testimony of the plaintiff witnesses, they characterized the main witnesses as "hired guns."⁶⁹ The blindness case also involved complicated and conflicting medical testimony. The jurors subsequently admitted that the testimony was challenging to them and that the lawyers had not done a good job in presenting matters clearly for them.⁷⁰ Nevertheless, in comparison to the plaintiffs' experts who were viewed as presenting straightforward answers, the jurors were skeptical about the truthfulness of some of the defense experts' testimony, and believed that their very particular and technical answers were evasive.⁷¹ The jurors were also aware that one defense witness was originally scheduled to be called as a plaintiff witness but reversed himself, and that other defense witnesses were colleagues of the defendants.⁷² Nevertheless, in this case the jurors found one defendant not liable, while assessing liability against another defendant.⁷³ The CT Scan case was very complicated, with procedural issues and conflicting expert testimony from qualified experts on both sides. The critical issues in the case were not whether a reaction to contrast dyes killed the patient but rather who did what when and who was responsible.⁷⁴ For legal reasons the plaintiff's pleadings in the case were unorthodox.

None of the five malpractice cases allows an unequivocal answer as to whether the jury reached the "correct" result, but each does show that the jurors were not

⁶⁷ *Id.* at 135-36.

⁶⁸ *Id.* at 136.

⁶⁹ *Id.* at 141.

⁷⁰ VIDMAR, *supra* note 60, at 150.

⁷¹ *Id.*

⁷² *Id.* at 145.

⁷³ *Id.* at 142.

⁷⁴ *Id.* at 152-53.

passive in evaluating the experts or their testimony. Indeed, one of the findings from the interviews of jurors was that they clearly understood the adversary system.⁷⁵ They identified basic disagreements between the experts. They considered absence of evidence and incompleteness of testimony. They scrutinized possible motives behind each expert's testimony such as money and the possibility that an expert was giving testimony to support a fellow physician. They had a basically solid understanding of burdens of proof and where the expert testimony fit into assessing that burden. Most importantly, the jurors in each case evaluated the testimony in the context of other trial evidence. In each of the five cases, the expert testimony was only one part of the evidence. There were critical issues of when and what human actions had been taken. In the urinary incontinence case, a central question was whether the plaintiff had been informed of the risks of the surgery,⁷⁶ and in the injured baby case, the issue involved actions not taken by the pediatrician.⁷⁷ The ruptured bowel case and the blindness case involved the timing of actions by medical personnel.⁷⁸ The CT Scan death case involved questions of the timing of medical personnel actions and hospital rules about supervision of technical assistants.⁷⁹

⁷⁵ VIDMAR, *supra* note 60, at 171-72.

⁷⁶ *Id.* at 128.

⁷⁷ *Id.* at 134.

⁷⁸ *Id.* at 138, 146-47.

⁷⁹ See Steve Cohen, *Malpractice: Behind a \$26-Million Award to a Boy Injured in Surgery*, NEW YORK, Oct. 1, 1990, at 41, reprinted in VIDMAR, *supra* note 60, at 95. *Melis v. Kutin* was another medical malpractice case. It involved a brain-injured boy that resulted in a \$26 million plaintiff verdict. This report also showed a jury that was not passive in evaluating the testimony of the experts. Like many other malpractice cases, issues of expert testimony were interwoven with issues of when certain actions were taken and who took them, subject matter regarding accuracy and truthfulness that have long been considered strengths of the jury system. The trial judge reviewed the evidence and supported the jury's verdict on all but one of the liability issues. See *Id.* at chs. 9-10. Each element of the damage award, also a subject of expert testimony, was also reviewed and parts of the award were set aside or reduced as not consistent with the evidence. *Melis v. Kutin*, N.Y.L.J., Oct. 10, 1990, at 21 (N.Y. Sup. Ct. Oct. 1990).

In another study, Sanja Ivkovich and Valerie Hans⁸⁰ conducted tape-recorded interviews with fifty-five jurors who served in civil trials that included medical malpractice, workplace injury, product liability, asbestos, and a motor vehicle accident.⁸¹ The number of experts averaged more than four for each case and the majority were physicians.⁸² Rather than uncritically accepting expert opinion, most jurors appeared aware that the experts were called as part of the adversarial process and from the outset of the trial expressed reservations about them.⁸³ The interviews led Ivkovich and Hans to conclude that jurors tended to evaluate experts on the basis of credentials, motives, general impressions, and the content and presentation of their testimony.⁸⁴ However, the importance accorded these factors varied from juror to juror, expert to expert, and case to case. The jurors offered their views on what constituted good and bad witnesses. Good witnesses were described as good teachers with sound credentials and acceptable motives for offering their testimony.⁸⁵ The jurors' judgments of what made a bad witness garnered less agreement among the jurors who were interviewed. Ivkovich and Hans found that jurors did not ignore or uncritically accept the testimony of experts and further concluded:

[W]hen jurors are faced with the difficult task of evaluating evidence that is outside their common knowledge, they rely on sensible techniques: assessing the completeness and consistency of the testimony and evaluating it against their knowledge of related factors. For especially complex topics, the jury relies on its members who possess greater familiarity with the subject matter of the expert testimony.⁸⁶

⁸⁰ Sanja Ivkovich & Valerie Hans, *Jurors and Experts*, 16 *ADVOCATE: THE MAGAZINE FOR DELAWARE TRIAL LAWYERS* 17, 20 (1994) [hereinafter Ivkovich & Hans, *Jurors and Experts*]; Sanja Ivkovich & Valerie Hans, *Jurors' Evaluation of Expert Testimony: Judging the Messenger and the Message* (2000) (unpublished paper on file with author).

⁸¹ Ivkovich & Hans, *Jurors and Experts*, *supra* note 80, at 18-19.

⁸² Ivkovich & Hans, *Jurors and Experts*, *supra* note 80, at 19.

⁸³ Ivkovich & Hans, *Jurors and Experts*, *supra* note 80, at 55.

⁸⁴ Ivkovich & Hans, *Jurors and Experts*, *supra* note 80, at 18.

⁸⁵ Ivkovich & Hans, *Jurors and Experts*, *supra* note 80, at 56.

⁸⁶ Ivkovich & Hans, *Jurors and Experts*, *supra* note 80, at 20.

In a series of studies, Daniel Shuman and his colleagues surveyed jurors in Dallas, Baltimore, Seattle, and Tucson regarding how jurors assessed experts.⁸⁷ Based on the survey responses, Shuman and his colleagues found that rather than relying on superficial characteristics such as appearance or personality,⁸⁸ or merely deferring to the expert's conclusions, jurors tried to evaluate experts on the basis of their professionalism, their impartiality, and the logic of the testimony.⁸⁹ In a summary statement of their findings, Shuman and colleagues concluded as follows:

We did not find evidence of a "white coat syndrome" in which jurors mechanistically deferred to certain experts because of their field of expertise. Instead we found jurors far more skeptical and demanding in their assessments.

Jurors made expert-specific decisions based on a sensible set of considerations—the expert's qualifications, reasoning, factual familiarity and impartiality. Our data do not lend support to the critics who paint jurors as gullible, naive or thoughtless persons who resort to irrational decision-making strategies that rely on superficial considerations.⁹⁰

Systematic research on the responses of jurors to expert evidence in criminal juries has been lacking. However, a recent and very important study of criminal juries in New Zealand undertaken for the New Zealand Law Reform Commission provides data that appear generally consistent with that derived from American civil juries. The study involved extensive interviews with jurors from forty-eight New Zealand criminal trials that took place in 1998, eighteen in the

⁸⁷ See generally Anthony Champagne et al., *An Empirical Examination of the Use of Expert Witnesses in American Courts*, 31 JURIMETRICS J. 375 (1991); Daniel Shuman et al., *Assessing the Believability of Expert Witnesses: Science in the Jury Box*, 37 JURIMETRICS J. 23 (1996); Daniel Shuman et al., *An Empirical Examination of the Use of Expert Witnesses in the Courts—Part Two: A Three City Study*, 34 JURIMETRICS J. 193 (1994).

⁸⁸ A simulation study by R.L. Tanton, *Jury Preconceptions and Their Effect on Expert Scientific Testimony*, 24 J. FORENSIC SCI. 681-91 (1979), concluded that factors such as whether the expert was or was not wearing glasses, clothing style and hair style affected a sample of subjects' views of who was a "more knowledgeable" expert. This study has severe methodological limitations that need not be analyzed here.

⁸⁹ See Shuman et al., *supra* note 87.

⁹⁰ Daniel Shuman & Anthony Champagne, *Removing the People from the Legal Process: the Rhetoric and Research on Judicial Selection and Juries*, 3 PSYCHOL. PUB. POL'Y & L. 242, 242-58 (1997).

High Court, and thirty in district courts.⁹¹ The trial durations ranged from one half day to eighteen days; twenty-one of the trials lasted more than three days. The offenses charged included murder, rape, robbery, wounding, drugs, kidnapping, burglary, and fraud. There were nine fraud trials in the sample, chosen specifically because they were deemed to be complex trials. Expert evidence in some form was introduced in nineteen of the forty-eight trials in the study. The testimony involved such matters as fingerprint identification, drug dealing practices, psychiatric and psychological states of mind, accounting practices, and metallurgy.

In thirteen of the trials the jurors stated that they had no difficulty with the technical nature of the evidence. In many of the nineteen cases, however, the jurors complained that the evidence was not adequately explained and contained excessive jargon and undue technical detail. In five of the six trials where the evidence presented problems for some of the jurors, the New Zealand researchers could not decide whether the problem should be ascribed to the defects in the nature and presentation of the evidence or the jurors' inability to absorb and comprehend it. They did note that in most instances the comprehension problem was reported by, at most, three of the twelve jurors, and in some of these instances initial confusion was clarified by a subsequent expert or clarified by the other jurors during deliberations.

In one of the nineteen cases, the expert's qualifications may have unduly impressed at least some of the jurors and caused them to accept his evidence uncritically. One of the jurors commented: "When the defence read out his qualifications, you accept that he's very experienced and that he should have a reasonable grasp of what he's talking about." Another juror said that the witness was such a professional person that she believed his testimony because "[i]t gave me the impression he was a quite highly educated man and he knew what he was talking about."⁹²

⁹¹ WARREN YOUNG ET AL., JURIES SURVEY—REPORT OF FINDINGS (New Zealand Law Commission 1999).

⁹² *Id.* at 98.

Nevertheless, in most of the cases the jurors paid close attention to the content of the evidence, even while sometimes criticizing the expert as arrogant or "self-inflated." Additionally, the jurors used the evidence when they deemed it helpful. In one case, for example, the testimony of a psychologist helped the jury make up their minds. In another case, testimony about correspondence between fibers found on the victim's clothing and fibers of a jersey owned by the accused convinced the jurors of a conclusive link between the victim and the accused. In other cases, however, the jury concluded that the expert testimony lacked credibility and they rejected it.

In contrast to the conclusions in the above research studies, some case studies involving complex cases have yielded less positive conclusions. Molly Selvin and Larry Picus⁹³ interviewed jurors who had decided an asbestos case involving four plaintiffs.⁹⁴ The jurors awarded a total of \$3.9 million to the four plaintiffs and levied \$4 million in punitive damages against the defendant Johns-Manville.⁹⁵ To prove their claim of liability, the plaintiffs had to prove that the defendants had marketed their products without an adequate warning and also prove that each had developed asbestosis.⁹⁶ The plaintiffs presented two doctors who affirmed asbestosis, and the defense tendered two doctors who concluded that the plaintiffs did not have the disease.⁹⁷

Selvin and Picus concluded that the jurors, ignoring or not understanding epidemiological evidence, did not understand that not everyone exposed to asbestos will develop a disease and believed that every one of the plaintiffs would become as sick as the sickest plaintiff.⁹⁸ As Richard Lempert has pointed out, their beliefs were not irrational responses, but rather reasonable inferences by the jurors that the attorneys and their experts failed to address in presenting the case.⁹⁹

⁹³ MOLLY SELVIN & LARRY PICUS, *THE RAND CORPORATION, INSTITUTE FOR CIVIL JUSTICE, THE DEBATE OVER JURY PERFORMANCE* (1987).

⁹⁴ *Newman v. Johns-Mansville*, No. M-79-124-CAU (E.D. Tex. 1984).

⁹⁵ SELVIN & PICUS, *supra* note 93, at 22.

⁹⁶ *Id.* at 14, 19.

⁹⁷ *Id.* at 14-16.

⁹⁸ *Id.* at 24.

⁹⁹ Richard Lempert, *Civil Juries and Complex Cases: Taking Stock After Twelve Years*, in *VERDICT: ASSESSING THE CIVIL JURY 181* (Robert Litan ed., 1993).

Selvin and Picus concluded that the jurors “seemed to have formed opinions as to the merits of a witness’s testimony or an attorney’s argument based not only on the substance of the testimony or evidence presented but also on their perception of that individual’s characteristics, personality and behavior.”¹⁰⁰ For instance, they asserted that the jurors “were generally skeptical if not negatively disposed toward many of the medical experts . . . [.]” and “tended to evaluate the credibility of these witnesses in large part on their personal characteristics rather than on the information they presented.”¹⁰¹

A study by an American Bar Association committee of four complex cases included one case relating to trade secrets.¹⁰² Even though two members of the jury were engineers and helped the other jurors understand the evidence, one of the engineer jurors reported that he and the other engineer felt inundated with the technical information.¹⁰³ The other jurors were even more confused.

Joseph Sanders interviewed four jurors who decided *Merrell Dow Pharmaceuticals v. Havner*,¹⁰⁴ a Bendectin case that involved four kinds of scientific data bearing on causation of birth defects.¹⁰⁵ Sanders’ interviews focused on jurors’ beliefs about the relative importance of types of evidence and the jurors’ evaluation of the experts who presented that evidence. He also asked the jurors to estimate the weight of scientific opinion as to whether the drug Bendectin could have caused fetal malformations. Sanders concluded that the jurors had somewhat contradictory views of the experts.¹⁰⁶ On the one hand, they had a difficult time distinguishing between experts and thus tended to discount all testimony as a product of “hired guns.”¹⁰⁷ On the other hand, they did have views about the

¹⁰⁰ SELVIN & PICUS, *supra* note 93, at ix.

¹⁰¹ *Id.* at 27.

¹⁰² SPECIAL COMMITTEE ON JURY COMPREHENSION OF THE AMERICAN BAR ASSOCIATION SECTION ON LITIGATION (Special Committee 1998).

¹⁰³ This case raises the interesting question of whether a judge could understand the case, unless that judge had more training in engineering than the two jurors with B.S. degrees in engineering.

¹⁰⁴ 907 S.W.2d 535 (Tex. App. 1994), *rev'd*, 953 S.W.2d 706 (Tex. 1997).

¹⁰⁵ Joseph Sanders, *The Jury Deliberation in a Complex Case: Havner v. Merrell Dow Pharmaceuticals*, 16 JUST. SYS. J. 45, 52-53 (1993).

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

relative effectiveness of the experts. Additionally, the jurors over-estimated the percentage of scientists who believed that Bendectin was a teratogen.¹⁰⁸ They made no distinction between proof of general causation (did Bendectin cause any birth defects?) and proof of specific causation (was the relationship between exposure and injury sufficiently strong that it was possible to conclude that Bendectin caused plaintiff Havner's defect?). Considering *Havner* and other Bendectin cases, Sanders' general conclusion was that "in cases involving complex scientific evidence juries have a difficult time reaching the truth."¹⁰⁹

These jury interview studies, including those by Selvin and Picus and Sanders, do reach some common conclusions. The studies indicate that, at least from juror reports, there is little evidence that juries take their task lightly. All of the reports strongly suggested that jurors were motivated to take the task seriously. They understood the nature of the adversary system and the consequent bias in testimony that can come from the motivations of experts. Most of the studies indicated that the juries attempted to evaluate the testimony on its merits. The Selvin and Picus study suggested that jurors placed improper emphasis on characteristics of witnesses, but Selvin and Picus were the only researchers to draw this conclusion.

The difficulty with post-trial interviews is that questions can be raised about the accuracy of jurors' reports. The interviews also do not indicate whether the reports of jury confusion were projections of their own confusion onto the other jury members. Similar observations can be made with respect to the extent to which the reports over- or underestimate the influence of expert qualifications, rather than the processing of the content of the experts' testimony. Moreover, unless an independent source is available that can provide a baseline for what a rational response to the evidence would have been, it is difficult to evaluate how well or how poorly the

¹⁰⁸ *Id.*

¹⁰⁹ SANDERS, *supra* note 37, at 193.

jurors handled the evidence that was presented at trial. Experimental research can assist in understanding the psychology of how jurors process information as opposed to how they report that they have processed it.

IV. FINDINGS FROM EXPERIMENTAL RESEARCH STUDIES

A. *Statistical Information and Peripheral Versus Central Processing*

The Bendectin and asbestos trials in the civil justice system and criminal trials involving DNA fingerprints have received the most publicity in judicial and scholarly writings, but they are a reminder that important and frequent expert testimony involves probability theories. Thus, blood typing, hair fiber, material fiber or paint matches, and gun bullet ballistics, to take common examples, all involve at least an implicit estimate of the likelihood that entity A is or is not associated with entity B. Conclusions in the field of epidemiology, which attempts to study causation of diseases like asbestosis, cancer, or birth defects, is heavily dependent upon statistical associations between exposures to certain environmental or chemical agents and the development of human diseases. The probabilities involve calculations testing whether the associations can be explained by random error or by some other causal factor. Complex expert testimony of this type raises two important and interrelated psychological questions. Can jurors comprehend testimony involving statistical inferences when faced with such testimony? Are they prone to rely on peripheral rather than central processing of the testimony?

A relatively small but important body of research has shown that mock jurors are not very competent in utilizing probability estimates when they are presented in the form of abstract evidence bearing on guilt or liability.¹¹⁰ The jurors

¹¹⁰ David L. Faigman & A.J. Baglioni, Jr., *Bayes' Theorem in the Trial Process: Instructing Jurors on the Value of Statistical Evidence*, 12 LAW & HUM. BEHAV. 1, 15-16 (1988); Jane Goodman, *Jurors' Comprehension and Assessment of Probabilistic Evidence*, 16 AM. J. TRIAL ADVOC. 361 (1992); Brian C. Smith et al., *Jurors' Use of*

either gave the evidence more weight than it deserved or not enough weight.¹¹¹ Gary Wells conducted a series of experiments that presented college students with different forms of information bearing on the likelihood that a bus belonging to a particular company was responsible for killing a dog.¹¹² The participants in the experiments were able to draw appropriate probability inferences, but they did not exhibit very good reasoning skills in translating those probabilities into verdicts. Wells concluded that rather than reasoning from the evidence to consider whether the dog was killed by a bus belonging to the particular bus company, many persons focused on the possibility of reaching an incorrect decision in holding the bus company liable and how they could justify their decision if it turned out to be wrong. Wells gave the same tasks to a sample of judges and found that they performed no better than the other participants in his experiments. We will return to this latter finding in Section V.

DNA evidence is generally presented to jurors with probability information specifying the likelihood that an obtained match is due to chance. Jonathan Koehler and his colleagues¹¹³ showed that mock jurors were likely to give less than optimal weight to the possibility of a laboratory error when it was accompanied by a low random match probability.¹¹⁴ In a follow-up experiment, Jason Schklar and Shari Seidman Diamond¹¹⁵ found that the mock jurors in the study inappropriately gave less weight to the evidence than was warranted. This was partly because the jurors did not understand how to combine probabilities of error in the match and errors in the laboratory, and partly because prior beliefs about the possible corruption of the original samples as they passed through police and prosecutor's hands may have

Probabilistic Evidence, 20 LAW & HUM. BEHAV. 49, 79 (1996); William C. Thompson, *Are Juries Competent to Evaluate Statistical Evidence?*, 52 LAW & CONTEMP. PROBS. 9 (1989).

¹¹¹ See generally sources cited *supra* note 110.

¹¹² Gary Wells, *Naked Statistical Evidence of Liability: Is Subjective Probability Enough?*, 62 J. PERSONALITY & SOC. PSYCHOL. 739 (1992).

¹¹³ Jonathan Koehler et al., *The Random Match Probability in DNA Evidence: Irrelevant and Prejudicial?*, 37 JURIMETRICS J. 425 (1995).

¹¹⁴ *Id.*

¹¹⁵ Jason Schklar, & Shari Seidman Diamond, *Juror Reactions to DNA Evidence: Errors and Expectancies*, 23 LAW & HUM. BEHAV. 159, 178, 180 (1999).

influenced their decisions even though this possibility was not raised during the experiment.¹¹⁶ Some of the jurors raised alternative explanations for the match, such as if an identical twin had perpetrated the rape or that sex had been consensual.¹¹⁷

Schklar and Diamond strongly cautioned that their experiment was only an exploratory study using college students who did not deliberate and that the experiment (like Koehler's) lacked the rich context of a real trial, including cross-examination.¹¹⁸ Nevertheless, the experiment raised two issues relevant to understanding juror responses to experts. It is consistent with the other studies indicating juror difficulties in properly utilizing probability estimates. In addition, it demonstrates the extent to which prior expectations and social schemas held by jurors may influence the interpretation and weight that jurors give to expert evidence. One possible explanation of the jurors' focus on the possible contamination in the chain of evidence handling is that the widely publicized trial of O.J. Simpson, with its charges of contaminated blood samples and the defense theory about an alternative killer, stimulated jurors to consider such alternative explanations.

Lynne ForsterLee and her colleagues conducted an experiment in which jury-eligible adults viewed a videotaped trial simulation that lasted slightly over two and a half hours.¹¹⁹ The trial involved a claim that a company caused health problems for the plaintiffs by dumping a dangerous chemical in their drinking water.¹²⁰ However, the four plaintiffs differed in the degree of their illness, presenting the jurors with an important task of distinguishing between plaintiffs in setting compensatory damage awards.¹²¹ Prior research by these authors had found that the technicality of the language used by experts had an important influence on whether jurors were able to differentiate between more or less deserving

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ Lynne ForsterLee et al., *The Bottom Line: The Effect of Written Expert Witness Statements on Juror Verdicts and Information Processing*, 24 *LAW & HUM. BEHAV.* 259, 261-62 (2000).

¹²⁰ *Id.* at 263.

¹²¹ *Id.* at 263-64.

plaintiffs in the compensation stage of a trial: the more technical, the less jurors were likely to differentiate.¹²²

An immunologist and a psychologist were key witnesses for the plaintiff and were subject to cross-examination in the trial simulation.¹²³ Some of the jurors were given written summaries of the expert witnesses' testimony before they saw that witness testify while others were given summaries only after the testimony.¹²⁴ A control group of jurors received no summaries of the experts' testimony.¹²⁵ Compared to jurors in the control condition, jurors who received written summaries were more likely to make clear distinctions between the differentially worthy plaintiffs and recall more trial-relevant information.¹²⁶ The effects were more pronounced in the jurors who received the summaries of expert testimony in advance of the expert testimony.¹²⁷ ForsterLee and her colleagues concluded that the written summaries assisted jurors in developing cognitive schemas that were then used in interpreting the complex expert testimony.¹²⁸ In short, the written summaries assisted the jurors in understanding the evidence. Although the summaries did contain information bearing on the witnesses' current positions and credentials, the greater recall of technical information and differentiation of verdicts suggests that the jurors engaged in central rather than peripheral processing of the testimony.

An earlier study by Irwin Horowitz and Kenneth Bordens used a similar version of the trial simulation conducted by ForsterLee and her colleagues.¹²⁹ The main purpose of the research did not focus on experts per se, but nevertheless expert testimony about causation was central in the trial.¹³⁰ Horowitz and Bordens concluded from their analyses that "[j]uries . . . used the totality of the evidence to

¹²² Irwin Horowitz et al., *Effects of Trial Complexity on Decision Making*, 81 J. APP. PSYCHOL. 757, 757-68 (1996).

¹²³ ForsterLee et al., *supra* note 119, at 263.

¹²⁴ *Id.* at 264.

¹²⁵ *Id.*

¹²⁶ *Id.* at 266-67.

¹²⁷ *Id.*

¹²⁸ ForsterLee et al, *supra* note 119, at 268-69.

¹²⁹ Irwin A. Horowitz & Kenneth S. Bordens, *An Experimental Investigation of Procedural Issues in Complex Tort Trials*, 14 LAW & HUM. BEHAV. 269, 273 (1990).

¹³⁰ *Id.* at 274.

decide all issues, especially general causation, which contained the most ambiguous testimony."¹³¹ This conclusion also seems consistent with jurors using central processing to evaluate trial evidence.

Shari Diamond and Jonathan Casper explored the impact of complexity in a richly detailed simulation experiment that also sheds light on how jurors process difficult testimony.¹³² Jurors, who participated in the research during their jury service, watched a videotaped antitrust trial, including opening statements, direct and cross-examination, closing arguments, and instructions.¹³³ During the trial, they heard damage estimates from opposing experts.¹³⁴ One expert presented an estimate of damages based on the performance of a similar company that was not affected by the alleged price-fixing agreement, a so-called yardstick model.¹³⁵ The opposing expert presented a regression model that used past performance to project what costs would have been in the absence of the price-fixing agreement.¹³⁶ Half of the jurors heard the yardstick expert testify for the plaintiff and the statistical expert testify for the defense.¹³⁷ The other half heard the statistical expert testify for the plaintiff and the yardstick expert for the defense. The jurors showed generally good comprehension of the testimony by both experts, but the abstract statistical testimony was somewhat more difficult for them than the more concrete yardstick evidence.¹³⁸

Neither expert overwhelmed the jurors.¹³⁹ Although the statistical expert was perceived as more expert than the yardstick expert, the yardstick expert was viewed as clearer.¹⁴⁰ Perceived clarity and expertise were both significant predictors of persuasiveness, so that the two attributes appeared to cancel

¹³¹ *Id.* at 269.

¹³² Shari Seidman Diamond & Jonathan D. Casper, *Blindfolding the Jury to Verdict Consequences: Damages, Experts and the Civil Jury*, 26 LAW & SOC'Y REV. 513 (1992).

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ *Id.*

¹³⁶ *Id.*

¹³⁷ Diamond & Casper, *supra* note 132.

¹³⁸ *Id.*

¹³⁹ *Id.*

¹⁴⁰ *Id.*

one another out. As a consequence, the two experts did not differ in their influence on the jurors' verdict preferences.¹⁴¹

A series of studies by Joel Cooper and his colleagues appears at first blush to be inconsistent with the Horowitz,¹⁴² Forsterlee,¹⁴³ and Diamond and Casper findings. Cooper and his colleagues¹⁴⁴ created a one hour videotaped trial with two witnesses, the plaintiff's expert and the defendant's expert.¹⁴⁵ They varied the educational credentials and complexity of the technical language used by the plaintiff's expert who was testifying that PCBs were the cause of the plaintiff's cancer in a toxic tort case.¹⁴⁶ When the highly credentialed plaintiff's expert used linguistically complex language, he was more influential than when he either used simple language or had only moderate credentials or both.¹⁴⁷

Cooper and his colleagues use peripheral processing to explain the persuasiveness of the witness who had impressive credentials and used complex language. According to the study, jurors turned to the peripheral cue of credentials when they were faced with the complex language of the plaintiff's expert in order to enable them to easily determine whether to accept his testimony.¹⁴⁸ Although it is clear that the respondents who had to evaluate the complex evidence did appear to make use of credentials in their evaluation, it is not clear whether a shift from central to peripheral processing explains the result. On Cooper and colleagues' test of juror comprehension of the testimony, jurors in all four experimental conditions indicated good comprehension, and the scores did not differ across conditions.¹⁴⁹ Thus, while it is possible that the test was relatively easy, these results do indicate that the jurors generally understood the gist of the testimony even when it was presented in complex language. The strong and consistent performance on comprehension is important because it

¹⁴¹ *Id.* at 542-44.

¹⁴² Horowitz et al., *supra* note 122.

¹⁴³ ForsterLee et al., *supra* note 119.

¹⁴⁴ Joel Cooper et al., *Complex Scientific Testimony: How Do Jurors Make Decisions?*, 20 LAW & HUM. BEHAV. 379 (1996).

¹⁴⁵ Diamond & Casper, *supra* note 132.

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ *Id.*

¹⁴⁹ *Id.*

suggests that the jurors: (1) centrally processed the expert's testimony, and (2) did not avoid cognitive work by relying simply on the more impressive educational and professional background of the highly credentialed expert.

In a follow-up set of three studies, Cooper and Isaac Neuhaus pursued other potential indicators of peripheral processing by jurors faced with complex expert testimony.¹⁵⁰ Using the same case, this time in the form of a short audiotape of the testimony, these authors investigated the impact of a substantial rate of pay on the persuasiveness of the expert.¹⁵¹ The first study showed that a highly credentialed expert who was paid a substantial rate (\$4800 per day) had less influence on jurors than either a less credentialed expert or one with a substantially lower rate of pay (\$75 per day) or both.¹⁵² The combination of strong credentials and a substantial expert fee apparently signaled to jurors that the expert's motives might not be entirely pure.¹⁵³ Post-experimental interviews suggested that jurors were more likely to believe that the highly paid and credentialed expert was employed frequently in that capacity, and thus was a professional witness or "hired gun."¹⁵⁴ Ratings of the honesty of the "hired gun" witness were dramatically below those for the expert in the other conditions.¹⁵⁵

A second experiment varied the rate of pay and the witness experience independently. Again, the highly paid witness was less persuasive, but only when the witness also had a substantial history of testifying.¹⁵⁶ Cooper and Neuhaus' interpretation of these two studies, in which the witness spoke using technical language, is that the complex speech made the jurors more susceptible to peripheral processing as a way to

¹⁵⁰ Joel Cooper & Isaac Neuhaus, *The "Hired Gun" Effect: Assessing the Effect of Pay, Frequency of Testifying and Credentials on the Perception of Expert Testimony*, 24 LAW & HUM. BEHAV. 149 (2000).

¹⁵¹ *Id.*

¹⁵² *Id.*

¹⁵³ *Id.*

¹⁵⁴ *Id.*

¹⁵⁵ Cooper & Neuhaus, *supra* note 150.

¹⁵⁶ *Id.*

avoid the cognitive work that a central processing strategy would require.¹⁵⁷ Unfortunately, no comprehension measures were taken that might have supported the claim that the jurors were not engaging in central processing.

Finally, in a third study, Cooper and Neuhaus varied the expert's rate of pay in a more modest range: \$750 per hour, \$350 per hour, and \$100 per hour (with the opposing expert always at \$350 per hour) and also varied the complexity of the expert's language, with all plaintiffs experts both experienced (fourteenth time testifying) and with high credentials.¹⁵⁸ Again, the expert who used highly complex language and was paid the top rate was significantly less persuasive than the experts in the remaining conditions.¹⁵⁹ The expert in this condition was also seen as by far the least honest.¹⁶⁰

Cooper and Neuhaus explain the results as support for the shift to peripheral processing in the face of cognitively challenging testimony, producing a drop in persuasiveness when the high pay level cued them that the expert was a less trustworthy source.¹⁶¹ Again, whether a shift to peripheral processing occurred is somewhat ambiguous because no measure of comprehension was taken. A competing explanation is that the jurors centrally processed the testimony, but rejected it when the expert's motives were suspect and his presentation suggested that he might be trying to obfuscate. In short, despite Cooper and his colleagues' conclusions that jurors shift away from central processing to peripheral processing of information when faced with complex expert testimony, closer examination of the studies does not support this conclusion.

An experiment by Margaret Kovera and her colleagues was intended to test jurors' reasoning skills about the scientific validity of expert evidence.¹⁶² Subjects in their experiment viewed a two and a half hour videotape of a simulated trial

¹⁵⁷ *Id.*

¹⁵⁸ *Id.*

¹⁵⁹ *Id.*

¹⁶⁰ Cooper & Neuhaus, *supra* note 150.

¹⁶¹ *Id.*

¹⁶² 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. APP. PSYCHOL. 362 (1999).

involving a lawsuit in which the plaintiff alleged gender discrimination due to a hostile work environment. The trial simulation contained evidence about sexually suggestive photographs in the work place, testimony from the plaintiff that she was the target of unwelcome sexual advances, and testimony from the defendants. For jurors in a control condition the trial contained no expert testimony. For other jurors, however, an expert described research on factors that increase the likelihood of sexual harassment in a workplace and how a sexualized environment can lead to gender discrimination. The experiment contained different versions of the expert testimony. Some jurors heard that the research had been published in a peer-reviewed journal and was cited in major psychology texts while others heard that it had been submitted but not yet published and had not been cited in texts. In addition, the "ecological validity" of the research was varied so that some jurors learned that the subjects in the research were college students or instead that they were blue collar employees in a company similar to the defendant company. Third, the "construct validity" of the experiment was varied, with some of the jurors learning that only a single measure of sexual harassment was used while others learned that the expert had used multiple measures that triangulated on the construct of sexual harassment. Finally, the degree of cross-examination of the expert was manipulated. In some versions the cross-examination was not scientifically informed, that is, it centered on such factors as whether the expert could predict whether a man will be affected by sexually suggestive ads and whether the expert was qualified to make a legal determination about whether sexual harassment had occurred. In contrast, a scientifically informed cross-examination condition called attention to methodological features of the study such as whether the subjects were college students or real employees and whether the ratings of sexual harassment had validity.

The effects of the expert testimony in the Kovera¹⁶³ experiment were more pronounced for male as opposed to female jurors, possibly because women found the expert evidence redundant with their own experience and attitudes.

¹⁶³ See Kovera et al., *supra* note 162.

The research did find that jurors relied on certain cues as they evaluated the expert evidence. The expert's research was judged to be more trustworthy if it had been published. The expert was judged to be more credible in conditions when her subjects were similar to actual blue collar workers. However, the jurors appeared to lack sensitivity to some important factors that bore on the ability of the expert to draw conclusions from the data that were collected.

Extrapolating from the Kovera conclusions may be unwarranted, however, because the experiment did not contain conditions in which the defendants called their own expert to attempt to refute the plaintiff's expert, as would be likely in a real trial. Some research evidence indicates that an opposing expert is more effective in causing jurors to attend closely to testimony than cross-examination alone.¹⁶⁴ Equally important, the assumption of Kovera and her colleagues appears to have been that jurors should not have given attention to the expert's qualifications, an assumption that is contrary to the instructions that jurors are given in actual trials.

B. *Expert Evidence That May Be In Conflict With
Common Sense Justice*

Norman Finkel has drawn attention to the fact that some legal concepts, such as the insanity defense and self defense, are often at variance with socio-cultural understandings of mental states.¹⁶⁵ A number of experiments on the insanity defense strongly suggest that while jurors may use expert evidence to evaluate insanity, their prior beliefs may override or modify their interpretation of that evidence. In a series of experiments involving testimony about the insanity defense, Rita James Simon found that judicial instructions under the *M'Naughten* rule or under the *Durham* test produced no differences in verdicts.¹⁶⁶ In examining her data, Simon

¹⁶⁴ See generally BRIAN L. CUTLER & STEVEN D. PENROD, MISTAKEN IDENTIFICATION: THE EYEWITNESS, PSYCHOLOGY, AND THE LAW (1995); see also Brian L. Cutler et al., *Expert Testimony and Jury Decision Making: an Empirical Analysis*, 7 BEHAV. SCI. & L. 215, 215-25 (1989).

¹⁶⁵ See generally FINKEL, *supra* note 35.

¹⁶⁶ RITA JAMES SIMON, THE JURY AND THE DEFENSE OF INSANITY 183-201 (1967).

concluded that while jurors do consider the judicial instruction of the judge and the expert, they nevertheless construe the evidence to comport with their intuitive or "common sense" beliefs about what is insane and what is not.

Solomon Fulero and Finkel conducted an experiment that varied the relation that the expert testimony bore to the defendant's insanity claim.¹⁶⁷ In some conditions the testimony was only diagnostic, in others the testimony was directed toward the penultimate issue of insanity, and in others it was addressed directly to the ultimate issue bearing on the verdict.¹⁶⁸ The experiment also varied whether experts testified for the defense, the prosecution, both sides, or as neutrals.¹⁶⁹ The striking finding was that the form of testimony had no effect on verdict patterns.¹⁷⁰ The data indicated that a likely explanation of the result is that the jurors interpreted the testimony in light of their prior beliefs about insanity, causing them to infer things about the expert's testimony that were consistent with their prior beliefs.¹⁷¹

Phoebe Ellsworth and her colleagues presented jury-eligible adults with summaries of murder cases involving an insanity defense.¹⁷² Two of the cases involved a psychiatrist testifying for the defendant about an organic disorder, either mental retardation or psychomotor epilepsy, and the remaining two cases involved diagnoses of schizophrenia, a disease that undoubtedly has organic elements but ones which are harder to identify.¹⁷³ The study found that the testimony about the two organic disease cases tended to be accepted by the jurors but that persons who favored the death penalty were less likely to accept the testimony involving schizophrenia.¹⁷⁴

Caton Roberts and Golding also conducted experiments that provided student and non-student samples of subjects with cases involving expert testimony on insanity and

¹⁶⁷ Solomon M. Fulero & Norman J. Finkel, *Barring Ultimate Issue Testimony: An "Insane" Rule?*, 15 LAW & HUM. BEHAV. 495, 497 (1991).

¹⁶⁸ *Id.* at 500-01.

¹⁶⁹ *Id.*

¹⁷⁰ *Id.* at 504.

¹⁷¹ *Id.* at 505.

¹⁷² Phoebe C. Ellsworth et al., *The Death-Qualified Jury and the Defense of Insanity*, 8 LAW & HUM. BEHAV. 81 (1984).

¹⁷³ *Id.* at 86-87.

¹⁷⁴ *Id.* at 88-89.

versions of judicial instructions involving verdict choices of "not guilty by reason of insanity" and "guilty but mentally ill."¹⁷⁵ The experiments also varied the degree of planning that the defendant used in committing the crime. Testimony on insanity was less likely to be accepted for crimes that showed the accused engaged in planning activities before the acts were carried out. However, Roberts and Golding also concluded that differences between persons in their moral and social cognitions were as important as evidence and legal instructions in affecting willingness to accept insanity defenses.

There are many other experimental studies that are consistent with the theme of jurors using "common sense" notions to judge expert evidence and judicial instructions.¹⁷⁶ However, Finkel's program of research in this area is the most complete.¹⁷⁷ His findings over many experiments show that evidence about a defendant's insanity is interpreted in the light of jurors' own social-cognitive schemata of what constitutes insane behavior.¹⁷⁸

C. *Social Framework Evidence*

In 1973 in *United States v. Amaral*,¹⁷⁹ a federal appeals court asserted that jurors may be unduly prejudiced, confused or misled by expert testimony because of "its aura of special reliability."¹⁸⁰ The expert testimony that was rejected involved a psychologist called to testify about the potential unreliability of eyewitnesses to a bank robbery.¹⁸¹ While psychiatrists and psychologists have long testified about states of mind on the

¹⁷⁵ Caton Roberts & Stephen Golding, *The Social Construction of Criminal Responsibility and Insanity*, 15 LAW & HUM. BEHAV. 349 (1991).

¹⁷⁶ See, e.g., Caton Roberts et al., *Verdict Selection Processes in Insanity Cases: Juror Construals and the Effects of Guilty But Mentally Ill Instructions*, 17 LAW & HUM. BEHAV. 261 (1993);

¹⁷⁷ See generally FINKEL, *supra* note 35.

¹⁷⁸ Commonsense notions in other areas (e.g., a convicted murderer is likely to be violent in the future) can also have a powerful influence on jurors' reactions to expert testimony (e.g., a willingness to accept the prediction that the defendant is certain to kill again). Shari Seidman Diamond et al., *Juror Reactions to Attorneys at Trial*, 87 J. CRIM. L. & CRIMINOLOGY 17 (1996).

¹⁷⁹ 488 F.2d 1148, 1152 (9th Cir. 1973).

¹⁸⁰ *Id.* at 1152.

¹⁸¹ *Id.* at 1153.

issues of insanity or diminished capacity, beginning around the middle of the 1970s some courts began to allow psychologists and other social scientists to give testimony about matters involving what has been labeled "social framework" evidence.¹⁸² Today such evidence is admitted in many criminal and civil trials, although not without controversy and concern.¹⁸³ Social framework evidence includes not only the subject of eyewitness reliability but also battered woman syndrome, rape trauma syndrome, child sex abuse syndrome, and a host of post-trauma stress disorders, as well as reactions to discrimination or harassment in work settings.¹⁸⁴

Social framework testimony is different from testimony in which a psychiatrist examines a defendant's mental state.¹⁸⁵ The testimony is based on findings from general research. None of the subjects in the studies have any connection to the parties in the trial. Rather, the expert is testifying about findings that are only similar to the issues in the case. The rationale for allowing the testimony is that jurors may hold beliefs or stereotypes about eyewitness confidence, rape, or domestic violence victims that are inaccurate. Research shows, for example, that some jurors (and judges) believe that there is a high correlation between eyewitness confidence and accuracy, that actual rape victims are hysterical immediately afterward, or that battered women could leave the relationship if they wanted to.

Nevertheless, some courts and scholars have raised legitimate concerns about such testimony. Many assert that such testimony is more prejudicial than probative. That is, it will cause the jurors to defer to the expert entirely, or at least

¹⁸² See John Monahan & Laurens Walker, *Social Authority: Obtaining, Evaluating, and Establishing Social Science in Law*, 134 U. PA. L. REV. 477, 488 (1986) [hereinafter Monahan & Walker, *Social Authority*]; Laurens Walker & John Monahan, *Social Frameworks: A New Use of Social Science in Law*, 73 VA. L. REV. 559, 559 (1987) [hereinafter Walker & Monahan, *Social Frameworks*].

¹⁸³ Daniel W. Shuman & Bruce D. Sales, *The Impact of Daubert and its Progeny on the Admissibility of Behavioral and Social Science Evidence*, 5 PSYCHOL. PUB. POL'Y & L. 3, 4-5 (1999); see generally DAVID FAIGMAN ET AL., MODERN SCIENTIFIC EVIDENCE chs. 8-13 (1997).

¹⁸⁴ See Jane Goodman & Robert T. Croyle, *Social Framework Testimony in Employment Discrimination Cases*, 7 BEHAV. SCI. & L. 227, 227-28 (1989); see generally FAIGMAN ET AL., *supra* note 183.

¹⁸⁵ Monahan & Walker, *Social Authority*, *supra* note 182; Walker & Monahan, *Social Frameworks*, *supra* note 182.

give the opinion too much weight, ignore other evidence that may be contrary, and improperly conclude that the eyewitness is unreliable, that the rape victim's story is true, or that the woman unquestionably believed that her life was in danger. Additionally, in domestic violence cases concern has been raised that the testimony will shift the jury's attention to the character of the abuser rather than the legally proper state of mind of the defendant. Some critics have further asserted that allowing one party to introduce such evidence will require allowing the other party to call counter-experts and that the resulting "battle of experts" will entirely confuse the jury and distract it from other trial evidence. Jury researchers have produced a fairly sizeable number of experiments intended to shed light on the impact of social framework testimony on jurors and juries. Some articles in this body of research have investigated the effects of factors that are often raised in the debate about juries and experts.

Harmon Hosch reviewed three articles by different researchers who studied the effects of expert evidence on judgments about eyewitness reliability.¹⁸⁶ Some of the experiments involved individual jurors while others involved deliberation. The subjects and trial materials differed substantially among the studies, but they were similar in that each study compared reactions to a crucial eyewitness with or without testimony from an expert. Despite differences in the way the studies were conducted, similar results were produced. Testimony from an expert about research on eyewitness reliability generated reductions in the jurors' beliefs about the accuracy of the eyewitness.¹⁸⁷ When jurors deliberated on the evidence, mock jurors spent significantly longer times discussing the eyewitness and other trial evidence in conditions involving expert evidence than in those without expert evidence.¹⁸⁸

¹⁸⁶ Harmon N. Hosch, *A Comparison of Three Studies of the Influence of Expert Testimony on Jurors*, 4 *LAW & HUM. BEHAV.* 297, 297 (1980).

¹⁸⁷ *Id.* at 299.

¹⁸⁸ *Id.* at 300.

Nearly a decade later, Brian Cutler and his colleagues¹⁸⁹ conducted an experiment involving a realistic videotaped criminal trial that included crucial and disputed eyewitness evidence. As in the earlier studies, a critical part of the research involved whether an expert did or did not testify about eyewitness reliability. The expert testimony sensitized jurors to variables related to the physical conditions under which the eyewitness viewed the event.¹⁹⁰ While jurors who were exposed to the expert testimony gave less weight to witness confidence, they gave more weight to witnessing and identification conditions. The expert testimony did not cause them to be generally more skeptical of eyewitness testimony.¹⁹¹

Nancy Brekke and Eugene Borgida conducted three studies to explore how students used expert evidence about group base rates in a simulated trial involving an acquaintance rape.¹⁹² The subjects rendered individual responses and deliberated to a verdict in groups containing up to eight members.¹⁹³ During the trial, a psychiatrist testified that rates of false accusations of rape are low, that rape is highly under-reported, that a large proportion of rapes are acquaintance rapes rather than stranger rapes, that rape is a crime of violence, and that research indicates that to avoid additional physical harm it is often better for a woman to submit rather than resist.¹⁹⁴ A body of psychological research with students, professional persons (including judges), and non-professional adults has shown that in making judgments, people tend to underutilize information on base rates in their decision making in deference to anecdotes and similar information.¹⁹⁵ When the testimony occurred early, as opposed to later, in the trial, and when the information was illustrated concretely by having the psychiatrist respond to a hypothetical example, the jurors were

¹⁸⁹ See generally Brian L. Cutler et al., *The Eyewitness, the Expert Psychologist, and the Jury*, 13 LAW & HUM. BEHAV. 311 (1989).

¹⁹⁰ *Id.* at 323-25.

¹⁹¹ *Id.* at 327-28.

¹⁹² See generally Nancy Brekke & Eugene Borgida, *Expert Psychological Testimony in Rape Trials: A Social-Cognitive Analysis*, 55 J. PERSONALITY & SOC. PSYCHOL. 372 (1988).

¹⁹³ *Id.* at 373.

¹⁹⁴ *Id.* at 374.

¹⁹⁵ Michael J. Saks & Robert F. Kidd, *Human Information Processing and Adjudication: Trial By Heuristics*, 15 LAW & SOC'Y REV. 123, 129-30, 137 (1980-81).

more likely to use the information from the expert to interpret case facts.¹⁹⁶

The third study assessed how the evidence was used in group deliberations. Brekke and Borgida discovered that although the juries hardly discussed the expert testimony *per se* in the deliberations, it had an effect on interpretations of other evidence.¹⁹⁷ Thus, for example, in juries that were not exposed to the expert evidence, the issue of victim resistance was a dominant theme during deliberation.¹⁹⁸ It was not a dominant theme in the juries exposed to expert testimony.¹⁹⁹ It is noteworthy that expert testimony had no impact on the way that the defendant was discussed or on the amount of time he was discussed. Brekke and Borgida concluded that their data showed that "jurors do not seem to automatically accept and apply the testimony of an expert witness."²⁰⁰

Brekke and her students conducted another experiment, except that this time the subjects were 540 non-student jurors who watched a videotaped rape trial and deliberated to reach a verdict.²⁰¹ A number of features were studied in the experiment, but an important factor involved whether the experts were appointed by the court or called by the contending parties. A control set of jurors did not hear the expert testimony.²⁰² Analysis of the deliberations revealed that the jurors responded quite negatively to the adversarial battle of experts but regarded the non-adversarial testimony no more favorably than adversarial testimony. However, the results also indicated that the jurors gave far greater scrutiny to the expert testimony when it was presented in an adversarial format, compared to when it was conveyed by a court-appointed expert.²⁰³ The data suggested that the battle of

¹⁹⁶ Brekke & Borgida, *supra* note 192, at 375.

¹⁹⁷ *Id.* at 382.

¹⁹⁸ *Id.*

¹⁹⁹ *Id.*

²⁰⁰ *Id.* at 383.

²⁰¹ Nancy J. Brekke et al., *Of Juries and Court-Appointed Experts: The Impact of Nonadversarial versus Adversarial Expert Testimony*, 15 *LAW & HUM. BEHAV.* 451, 457-58 (1991).

²⁰² *Id.* at 468.

²⁰³ *Id.* at 470.

experts, albeit evoking negative evaluations, produced better juror scrutiny of what the experts had to say.²⁰⁴

Margaret Kovera and her colleagues investigated the effects of syndrome evidence concerning child sex abuse.²⁰⁵ The expert evidence was presented in one of three forms: a probabilistic match of the victim with typical characteristics of sex abuse victims, an opinion of the child's credibility based on case history, or an evaluation of the child using anatomically detailed dolls. The jurors were less influenced by probabilistic testimony in comparison to the other two forms.²⁰⁶ The research also varied the strength of the cross examination of the expert, but it had minimal effects on the jury.²⁰⁷ These findings appear consistent with the other studies indicating that concrete evidence is more persuasive than abstract probability evidence.

The effect of expert testimony about battered women has been investigated in a series of studies by Regina Schuller.²⁰⁸ In one study, mock juries listened to an audio-taped trial involving a woman who was charged with killing her spouse but pleaded self-defense. Some of the juries heard one of two versions of expert testimony about battered women research findings while juries in a control condition heard the evidence without expert testimony.²⁰⁹ Compared to the control condition, the effect of the expert evidence was a moderate shift from a second-degree murder verdict toward a verdict of the lesser offense of manslaughter rather than to not guilty.²¹⁰ Analysis of the taped jury deliberations indicated that the expert evidence caused the jurors to attend more carefully to testimony from the defendant involving her claim that she was abused, that she feared for her life, and that she experienced a

²⁰⁴ *Id.* at 469.

²⁰⁵ Margaret B. Kovera et al., *Expert Testimony in Child Sexual Abuse Cases: Effects of Expert Evidence Type and Cross-Examination*, 18 *LAW & HUM. BEHAV.* 653, 659 (1994).

²⁰⁶ *Id.* at 653.

²⁰⁷ *Id.* at 665.

²⁰⁸ See Regina A. Schuller, *The Impact of Battered Woman Syndrome Evidence on Jury Decision Processes*, 16 *LAW & HUM. BEHAV.* 597, 600-14 (1992); Regina A. Schuller & Janice Cripps, *Expert Evidence Pertaining to Battered Women: The Impact of Gender of Expert and Timing of Testimony*, 22 *LAW & HUM. BEHAV.* 17, 17-31 (1998); see also Neil Vidmar & Regina A. Schuller, *Juries and Expert Evidence: Social Framework Testimony*, 52 *LAW & CONTEMP. PROBS.* 133, 152-54 (1989).

²⁰⁹ Schuller, *supra* note 208, at 609-14.

²¹⁰ Schuller, *supra* note 208, at 615.

loss of control over her actions.²¹¹ The juries devoted very little deliberation time to explicit consideration of the expert testimony except when points of contention arose between jurors. On those occasions jurors used the expert testimony to back up contentions favorable to the defendant.²¹² Expert testimony caused the jurors to center on the defendant's testimony but, compared to the no expert condition, that testimony had no effect on the discussion of other evidence.²¹³

In a systematic review of research on these various forms of social framework evidence, Vidmar and Schuller concluded that jurors used social framework testimony by incorporating the information into their decision-making processes.²¹⁴ However, the jurors were not seduced by it. They critically evaluated the information and did not accord it an unwarranted aura of trustworthiness and reliability or allow the expert's opinion to substitute for their own judgment.²¹⁵ In addition, the accumulated data from the studies showed only a very modest spillover effect on the way the jurors evaluated other evidence in the case, including judgments about the credibility or character of other witnesses.²¹⁶

D. *Experimental Research: A Summary*

In most respects, the experimental research related to juries and experts produces conclusions consistent with the studies involving juror interviews. Although jurors have greater difficulty with probabilistic and statistical evidence, there is little evidence that they are simply impressed by jargon and awed by experts' credentials to the point that they are overwhelmed by and uncritical of the testimony. Nor is there evidence that they simply ignore complex expert testimony. Although jurors struggle and are occasionally misled, they generally make reasonable use of complex material, utilizing the expert testimony when it is presented in

²¹¹ Schuller, *supra* note 208, at 613-14.

²¹² Schuller, *supra* note 208, at 612.

²¹³ Schuller, *supra* note 208, at 612.

²¹⁴ Vidmar & Schuller, *supra* note 208, at 171.

²¹⁵ Vidmar & Schuller, *supra* note 208, at 173.

²¹⁶ Vidmar & Schuller, *supra* note 208, at 174.

a form that they can use. Their struggles suggest that there is room for improvement in the way that complex material is presented, and that advocates and experts who fail to address this need may, as a result, fail to persuade jurors that the testimony they are offering should be accepted.

V. THE ISSUE OF JUDGES VERSUS JURIES

Implicitly in the *Daubert* line of cases and explicitly in *Allison v. McGhan*²¹⁷ and in Marcia Angell's book on the breast implant cases, there is an assumption that judges have the skills to understand and interpret expert evidence, or at least they have better skills than twelve or six laypersons who compose juries. Similarly, Joseph Sanders' careful research on the Bendectin cases suggests that juries were confused in a way that perhaps judges would not have been. Although it is not possible to prove that the assumption made by these commentators is wrong, there is good reason to at least call it into question.

Let us return to the *Hendrickson* aconitine poisoning case for a matter that we intentionally left out of the story: Professor Lee's condemnation of the jury system for being unreasonably influenced by superficial characteristics of the experts who testified about aconitine for the prosecution. Lee ignored the high probability that if the trial had been conducted by the judge alone, the outcome would likely have been the same. As described by James Mohr, who researched the *Hendrickson* case:

In his unusually lengthy remarks at the sentencing, Judge Marvin underlined his belief that "science advances—as it unfolds to the student the great storehouse of knowledge, and lets man penetrate into the very arcana of nature." In *Hendrickson's* case, Marvin asserted, science had made another advance, for it was science that detected a previously undetectable poison and it was science that "unerringly" pointed *Hendrickson* out as the guilty individual. He hoped that the trial would have a salutary effect on public opinion and cut down on the number of murders. "In this day of light" no one

²¹⁷ 184 F.3d 1300 (11th Cir. 1999).

could commit murder "without leaving the evidence of guilt." The practitioners and processes of medical jurisprudence would find them out.²¹⁸

A strikingly similar failure to consider how judges might have decided some of the breast implant cases is also evident in Marcia Angell's condemnation of the jury in *Science on Trial*.²¹⁹ In her epilogue to chapter six on "Science in the Courtroom," Angell quoted from Judge Proctor Hug, who presided over a three judge appeals court panel in *Hopkins v. Dow Corning Corporation*.²²⁰ "Dow's conduct in exposing thousands of women to a painful and debilitating disease, and the evidence that Dow gained financially from its conduct, may properly be considered in imposing an award of punitive damages."²²¹ Indeed, in Angell's own description of the case, the panel accepted the testimony of all three expert witnesses who testified on behalf of the plaintiff.²²² Angell's analysis ignores the fact that the presiding judges in some of the silicone breast implant trials entered judgments approving the jury verdict.²²³

In contrast to the above empirically unsupported assertions about the inferiority of juries compared to judges, Sanders' interviews with the jurors in the *Havner* case involving Bendectin did strongly suggest that they were confused about the expert testimony. Nevertheless, his dissection of the *Havner* case also led him to conclude that the jurors' problems may have stemmed from the way that the evidence was presented, from poor instructions from the judge, from restrictions imposed by the rules of evidence, and from the adversary system itself, which influenced the way cases were litigated.²²⁴ In short, the problems that arose may not have been caused by intellectual inadequacies of the jurors. Additionally, his research on that case and other cases indicates that despite emerging evidence in the general scientific community that Bendectin was not a teratogen, some of the trial judges refused to grant summary judgment for the

²¹⁸ MOHR, *supra* note 1, at 131.

²¹⁹ See generally ANGELL, *supra* note 10.

²²⁰ 33 F.3d 1116 (9th Cir. 1994).

²²¹ ANGELL, *supra* note 10, at 111.

²²² *Id.* at 124.

²²³ We have not attempted a count of these cases.

²²⁴ SANDERS, *supra* note 37, at 108-16; Sanders, *supra* note 105, at 58.

defense²²⁵ and at least some apparently were in agreement with the jury verdict.²²⁶

Many judges and lawyers humorously assert that they went to law school because they did not have the brains to become doctors or scientists. This modest self-assessment should not detract from the fact that most judges are highly intelligent people who understand their chosen field of law very well, but the humor does perhaps contain more than a grain of truth with respect to understanding science. After all, in complicated fields like DNA, epidemiology, or chemistry, judges are also laypersons. A well-known case helps to illustrate this point.

*Wells v. Ortho Pharmaceutical Corporation*²²⁷ was a products liability case involving a plaintiff born with severe birth defects after her mother used a contraceptive spermicide known as Ortho-Gynol Contraceptive Jelly.²²⁸ The parties agreed to have the case tried by a single judge without a jury. After hearing all the evidence, the judge found for the plaintiff and awarded her \$5.1 million in damages. The judge explained his opinion in detail, including how he evaluated the evidence tendered by the experts for both sides. The judge stated:

[T]he Court considered each expert's background, training, experience and familiarity with the circumstances of this particular case; and the Court evaluated the rationality and internal consistency of each expert's testimony in light of all the evidence presented. The Court paid close attention to each expert's demeanor and tone. Perhaps most important, the Court did its best to ascertain the motives, biases, and interests that might have influenced each expert's opinion.²²⁹

He went on to state that he found the plaintiff's experts to be competent, credible, and directed to the specific circumstances of the case, whereas the testimony of the defendant's experts often indicated bias or inconsistency.²³⁰ The

²²⁵ SANDERS, *supra* note 37, at 143-74.

²²⁶ SANDERS, *supra* note 37, at 159, tbl. 16.

²²⁷ 788 F.2d 741 (11th Cir. 1986).

²²⁸ *Wells v. Ortho Pharmaceutical Corp.*, 615 F. Supp. 262 (N.D. Ga. 1985), *aff'd* and modified in part, 788 F.2d 741 (11th Cir. 1986), *cert denied* 479 U.S. 950 (1986).

²²⁹ *Id.* at 267.

²³⁰ *Id.*

judge concluded that one critical plaintiff expert exhibited "excellent" demeanor; demonstrated "a careful, methodological reasoning process"; and answered all questions "fairly and openly" and translated technical terms into "common understandable language."²³¹ In contrast, the judge asserted that one defense witness, despite having impressive credentials, was not a "credible witness" because of the "absolute terms" in which he expressed his opinions.²³² The judge also stated that the defense expert's opinions suggested an "unwarranted degree of confidence." Furthermore, that expert's "criticisms of plaintiffs attorneys and of expert witnesses who testify for plaintiffs in malformation lawsuits strongly suggest a distinct prejudice."²³³

Thus, the judge, as Samuel Gross has written, produced a clear, detailed, and carefully reasoned judgment—a model of what a judge is supposed to do.²³⁴ In the face of conflicting evidence, he relied upon the same legal instructions about consistency and demeanor that are given to juries. Unfortunately, he was dead wrong. At the time of the trial, the issue had been extensively examined by the medical profession and the U.S. Food and Drug Administration ("FDA"), yielding a conclusion that the spermicide did not cause birth defects.²³⁵ The judge actually knew about these conclusions, but discounted them because one of the defense experts had served as a consultant to the FDA panel of scientists that investigated the spermicide controversy.²³⁶

Wells' experiment, discussed earlier, which compared the ability of judges and jurors to make correct inferences from probability data, indicated that both groups performed poorly, and specifically indicated that judges were not superior to jurors.²³⁷ A series of case studies by a panel of the National Research Council also demonstrated that judges misinterpreted statistical information.²³⁸ Richard Lempert has

²³¹ *Id.* at 273.

²³² *Id.* at 291.

²³³ *Wells*, 615 F. Supp. at 291.

²³⁴ Gross, *Expert Evidence*, *supra* note 21.

²³⁵ Gross, *Expert Evidence*, *supra* note 21, at 279.

²³⁶ Gross, *Expert Evidence*, *supra* note 21, at 294.

²³⁷ *Wells*, *supra* note 112.

²³⁸ See generally THE EVOLVING ROLE OF STATISTICAL ASSESSMENTS AS EVIDENCE IN THE COURTS (Stephen E. Fienberg ed., 1989).

also conducted case studies of judges who got the data wrong.²³⁹ Similarly, against the background of evidence that laypersons are influenced by cognitive illusions that affect their decision making, Chris Guthrie and his colleagues have shown that judges are influenced by the same cognitive illusions: anchoring (making estimates based on irrelevant starting points), framing effects (treating gains and losses differently), hindsight bias (perceiving past events to have been more predictable than they actually were), representativeness (ignoring important background statistical information in favor of individuating information), and egocentric biases (overestimating one's own abilities).²⁴⁰

However, the most compelling data of all come from a recently completed study by Sophia Gatowski and her colleagues involving 400 state court trial judges from all fifty states who had dockets likely to include the types of evidence raised by *Daubert*.²⁴¹ A sampling frame was used to obtain a representative sample of these judges. A detailed survey was developed that consisted of two parts. The first part focused on the admissibility standards in the judge's state, the judge's perception of the appropriateness and value of the *Daubert* standards, a series of additional questions about perceptions of the functioning of the legal system, and the judge's definition of certain kinds of expert testimony as "scientific" or as "technical or otherwise specialized knowledge." The second part focused on the judge's level of experience with specific types of scientific evidence and the judge's general techniques for managing scientific evidence. The scientific evidence included the so-called "hard sciences" as well as psychological evidence. The surveys were conducted by telephone and in some instances partly by a mail-form of the instrument. The telephone interviews averaged fifty-five minutes in length.

²³⁹ Richard Lempert, *Befuddled Judges: Statistical Evidence in Title VII Cases, in Controversies In Civil Rights* (unpublished manuscript on file with authors).

²⁴⁰ Chris Guthrie et al., *Inside the Judicial Mind: Heuristics and Biases*, 86 CORNELL L. REV. 777 (2001).

²⁴¹ Sophia Gatowski et al., *Asking the Gatekeepers: Results of a National Survey of Judges on Judging Expert Evidence in a Post-Daubert World*, 25 LAW & HUM. BEHAV. 433 (2001).

An important part of the survey was directed toward assessing the judge's understanding of criteria enunciated in *Daubert*, specifically, testing and falsifiability, error rates, peer review and publication, and general acceptance of the scientific community. Interviewers asked the judges how they would apply a specific criterion. The judge was then asked to explain his or her understanding of each criterion. If the judge asked for a definition or clarification, the interviewer provided a scientifically correct definition of the criterion. The judges' responses were subsequently checked against pre-determined standards for accurate understanding.

The study found that the judges overwhelmingly endorsed the gate-keeping role for the judge regardless of whether their state followed *Daubert* or *Frye* guidelines. Few of the judges reported having experience with epidemiological evidence: seventy-three percent reported no experience at all. Two-thirds reported at least some experience with DNA evidence in their court, and eighty percent reported at least some experience with psychological evidence, with twenty-two percent reporting a great deal of experience. Sixty-three percent of the judges reported that they had received CLE training about the use of specific types of evidence, but fully ninety-six percent reported that they had not received instruction about general scientific methods and principles. Nevertheless, fifty-two percent of the judges said that their education had prepared them to deal with the range of scientific evidence that judges were likely to face, while the remainder said they felt inadequately prepared. These opinions about being prepared, however, need to be compared to how well the judges understood the scientific criteria enunciated in *Daubert*.

The first criterion listed by the *Daubert* court was falsifiability, that is, the ability of the expert's theory to be empirically tested against plausible alternative explanations. Eighty-eight percent of the judges asserted that falsifiability was a useful decision-making tool. Nevertheless, their answers in attempting to explain falsifiability revealed that *only four percent* of them could provide an explanation that involved a clear understanding of falsifiability. In fact, thirty-five percent of the judges gave answers that were unequivocally wrong. The second *Daubert* criterion was error rate, and ninety-one

percent indicated that error rate was a useful criterion. Yet, similar to the falsifiability findings, *only four percent* demonstrated a clear understanding of the concept, while eighty-six percent gave answers that can be classified at best as equivocal and ten percent gave an answer that was inaccurate. With respect to the utility of the peer review process, seventy-one percent of judges clearly understood that concept, but ten percent clearly did not. Finally, eighty-two percent of the respondents demonstrated a clear understanding of the general acceptance criterion. The ability of judges to answer these questions did not differ between those who resided in states that followed *Daubert* rules and those that followed *Frye* rules.

Falsifiability and error rates are often critical to understanding the processes underlying an expert's scientific opinion, but the Gatowski study raises important questions about the ability of judges to evaluate the validity of the expert's methodology. It may be that when the expert testifies in person and the methodology is placed in its specific context, the judges might be able to exhibit better understanding. Nevertheless, the findings of this important study appear generally consistent with the case studies and the Wells experiment. At minimum, they offer a challenge to assumptions about the competence of judges to judge science.

The data from the case studies and the Gatowski survey do not speak to the competence of jurors. It is highly improbable that a random sample of jurors could perform any better than the judges performed on the survey task. In fact, they might well perform much worse, especially on the criteria of peer review and general acceptance. On the other hand, if individual judges or groups of twelve or six deliberating jurors heard the same scientific evidence in the context of the specific trial, whether one set of respondents would be demonstrably superior to the other remains an unanswered empirical question. It is worth observing, however, that if some members of the juries had scientific or technical training, the odds of superior performance might be tipped in favor of the juries.

VI. SUMMARY AND CONCLUSION

It seems clear from this review that claims about jury incompetence and irresponsibility in assessing and considering the testimony of scientific experts are not supported by research findings. There is a consistent convergence in juror interview studies and experimental studies involving both civil and criminal juries. Jurors appear motivated to critically assess the content of the expert's testimony and weigh it in the context of the other trial evidence, as they are instructed to do. They appear to understand the nature of the adversary process, at least in the context of their specific trial. Even though many jurors may not have had prior exposure to the trial process, it appears that they develop an understanding from the give and take of examination and cross-examination and exposure to opposing experts. Indeed, rather than simply deferring automatically to experts, as critics have claimed, the trial process appears to make them aware of the fallibility of expert testimony. This is not to say that every juror is motivated and grasps the expert testimony, because the data seldom shed light on the thought processes of individual jurors, but the deliberation process appears to result in closer examination of diverging views and understandings—just as the legal system assumes it does.

Much comment has been made about juries giving attention to the credentials of experts, with the assertion that juries are behaving improperly when they do so. However, critics of juries have tended to ignore the instructions that jurors are given, namely, that credentials and experience are to be taken into account in evaluating the credibility of witnesses. Moreover, the experimental studies by Cooper and his associates²⁴² (that have claimed that jurors give inappropriate attention to credentials) turn out, upon closer examination, to have ignored these legal considerations. In fact, their studies contain findings that contradict their conclusions.

The findings that jurors evaluate expert testimony in the context of other evidence, and follow the judge's instruction to evaluate it in light of their own experience and common

²⁴² See generally Cooper et al., *supra* note 144; Cooper and Neuhaus, *supra* note 150.

sense, may have particularly important ramifications with respect to certain types of psychological and psychiatric testimony, particularly with respect to insanity defenses. On the one hand, the research findings suggest that while jurors may not ignore psychiatric testimony, they are especially prone to evaluate it in light of their common sense notions of insanity and criminal responsibility. It is possible that the strong societal values implicated in serious criminal trials make jurors especially prone to give heavy weight to their prior beliefs in evaluating psychological data. On the other hand, the research on social framework evidence does indicate that jurors are susceptible to having their prior beliefs modified, or at least to evaluating evidence differently than they would without expert testimony. Although more research needs to be conducted, the Schklar and Diamond findings²⁴³ about how laypersons incorporate prior beliefs and expectations in evaluating DNA evidence show reactions similar to the findings about the insanity defense.

With a few exceptions, the experimental literature has focused primarily on scientific, medical, or psychological evidence, as opposed to other forms of expert evidence, such as the technical evidence about tire failure analysis that was the specific issue in *Kumho*.²⁴⁴ More research on these other forms of testimony is needed. Some forms of technical (i.e., non-science) evidence may be more familiar to jurors than others, and we would expect that in the former instances, jurors will evaluate expert testimony differently than in the latter instances because they will have available and will utilize different cognitive tools in evaluating it.

Insofar as it can be assessed, there is no evidence that juries are incompetent to evaluate expert testimony. While some research on juries and on human reasoning in other settings suggests that laypersons have difficulty properly weighing abstract probabilities and other statistical evidence, the research by Nisbett and his colleagues²⁴⁵ provides an important clue as to why complicated expert evidence may not be as great a problem as some commentators have feared: the

²⁴³ See Schklar & Diamond, *supra* note 35.

²⁴⁴ 526 U.S. at 142-47.

²⁴⁵ Nisbett et al., *supra* note 51, at 297-98.

essence of the testimony can often be presented in concrete ways so that a layperson can grasp the essentials of the testimony. The medical malpractice case involving urinary incontinence described earlier²⁴⁶ involved complicated medical testimony, but from the very opening of evidence the jurors were tutored by the doctors and then exposed to cross-examination. Although some jurors described the repetition as boring, it was also clear that some members of the jury understood it.²⁴⁷ And these jurors took the lead in deliberations. Lawyers can and often do hire expert witnesses on the basis of their ability to communicate, and lawyers prepare witnesses with communication in mind.²⁴⁸

The findings discussed in this review also appear consistent with legal instructions and the story model of jury decision making.²⁴⁹ They indicate that jurors tend to integrate expert testimony in light of their prior "common sense" experience and in reaching a verdict weigh that evidence in the context of the other evidence. It bears repeating that despite the presence of expert testimony, in many cases that testimony is only one part of the evidence. A crucial part of the trial often hinges on the timing and actions of the involved parties: who did what when, and who is the most credible of opposing civilian and expert witnesses. These issues have often been obscured by simple claims about bewildered juries without taking into consideration the jury instructions and the totality of trial evidence.

Put in a broader context, these conclusions are consonant with other sources of data on jury performance. Several studies have asked trial judges to report what their verdict would have been on the issue of liability if they had decided the case in a bench trial.²⁵⁰ The studies showed high

²⁴⁶ See VIDMAR, *supra* note 60, at 127.

²⁴⁷ *Id.*

²⁴⁸ Joseph Sanders et al., *Trial Lawyer Perceptions of Expert Knowledge*, Paper presented at the Annual Meetings of the Law and Society Association, New Orleans, Louisiana, May 2000 (transcript on file with authors).

²⁴⁹ Pennington & Hastie, *supra* note 53, at 320-33.

²⁵⁰ Paula Hannaford et al., *Permitting Jury Discussions During Trial: Impact of the Arizona Reform*, 24 LAW & HUM. BEHAV. 359 (2000); Larry Heuer & Steven Penrod, *Trial Complexity: A Field Investigation of its Meaning and Effects*, 18 LAW & HUM. BEHAV. 29, 49 (1994); Harry Kalven, Jr., *The Dignity of the Civil Jury*, 50 VA. L. REV. 1055, 1063-65 (1964).

levels of agreement between judge and jury, even when the judge rated the trial evidence as difficult. Surveys of judges regarding their general opinion of the performance of juries also show high levels of agreement that juries are both diligent and competent.²⁵¹ Several other studies have compared confidential assessments of negligence made by physicians acting in a neutral capacity with the liability verdicts of juries that decided medical malpractice cases.²⁵² These studies showed high levels of agreement between the physicians and juries. All of the above studies and surveys were concerned with the final verdict and did not specifically consider experts per se. Nevertheless, experts would have proffered testimony in most of the trials. At the very least, these studies lend no support to the view that jury verdicts are led astray by expert testimony, and a more generous interpretation—and a reasonable one—is that juries reach the right decisions from the totality of evidence, including expert evidence.

The research on judges and their understanding of expert testimony is far more limited than that on juries. Nevertheless, the data that do exist raise questions about broad claims that judges would be superior to juries. As a group, judges do not appear to be particularly sophisticated in understanding probability statistics or scientific method. As the *Hendrickson* case and judicial decisions in mass tort trials, like the Bendectin cases, helped to demonstrate, trial judges and even appellate judges sometimes appear to arrive at the same decision as the jury in highly complicated cases. We do not take the position that the juries understood the expert evidence in these cases, but only raise the question about the superiority of the judge. In both the *Hendrickson* trial and the Bendectin cases that Sanders investigated, it must be remembered that the jury decisions appear clearly questionable only in the light of subsequent scientific investigation. In the Bendectin cases, judges allowed trials to

²⁵¹ See Neil Vidmar et al., *Amicus Brief: Kumho Tire v. Carmichael*, reprinted in 24 LAW & HUM. BEHAV. 387, 390-91 (2000).

²⁵² FRANK A. SLOAN ET AL., SUING FOR MEDICAL MALPRACTICE 92-122 (1993); Henry Farber & Michelle White, *Medical Malpractice: An Empirical Examination of the Litigation Process*, 22 RAND J. ECON. 199 (1991); Mark A. Taragin et al., *The Influence of Standard of Care and Severity of Injury on the Resolution of Medical Malpractice Claims*, 117 ANNALS OF INTERNAL MEDICINE 780 (1992).

go forward and allowed expert evidence to be tendered even after there were strong indications that Bendectin was not a teratogen. Indeed, Sanders was fully cognizant that the problem lay elsewhere. He concluded that in complicated cases, juries will have difficulty in separating good from bad science. But, he also wrote "marginal science is not the primary source of jury difficulties with complex scientific arguments. The heart of that problem lies not in the complexities of science but rather in the structures and process of adversarial adjudication that systematically disadvantage the cultural values of science."²⁵³ Sanders proposed modifying current procedures to include court-appointed experts and bifurcated and even polyfurcated trials.

Sanders' recommendations with respect to highly complicated expert testimony leads us to a final issue. Even though the data strongly suggest that in ordinary trials jurors competently deal with expert evidence, improvements in trial procedures could increase their performance potential. Some improvement can be made by lawyers in giving greater attention to preparing witnesses to provide more concrete, albeit necessarily accurate, analogues, models, and metaphors to assist laypersons in grasping complex concepts. In addition to the research of Nisbett and his colleagues, there is a collateral body of research addressed to improving jurors' understanding of legal instructions.²⁵⁴ That research shows that by giving closer attention to issues such as syntax and grammar, significant improvements in jury comprehension often result.

Then there are procedural modifications to the trial itself that can aid in jury comprehension and understanding. There are many possible innovations beyond the neutral experts and bifurcated trials suggested by Sanders. The study

²⁵³ SANDERS, *supra* note 37, at 211.

²⁵⁴ See generally AMIRAM ELWORK ET AL., MAKING JURY INSTRUCTIONS UNDERSTANDABLE (1982); Robert P. Charrow & Veda R. Charrow, *Making Legal Language Understandable: A Psycholinguistic Study of Jury Instructions*, 79 COLUM. L. REV. 1306 (1979); Shari Seidman Diamond & Judith N. Levi, *Improving Decisions on Death by Revising and Testing Jury Instructions*, 79 JUDICATURE 224 (1996); Joel D. Lieberman & Bruce D. Sales, *What Social Science Teaches Us About the Jury Instruction Process*, 3 PSYCHOL. PUB. POL'Y & L. 589 (1997); Laurence J. Severance & Elizabeth F. Loftus, *Improving the Ability of Jurors to Comprehend and Apply Criminal Jury Instructions*, 17 LAW & SOC'Y REV. 153 (1982-83).

by ForsterLee and her colleagues²⁵⁵ showed that a written synopsis of the expert's testimony, particularly when provided to jurors before the expert testified, enhanced their understanding.²⁵⁶ This finding is consistent with social schema research and the story model of jury behavior in that jurors are thus provided mental categories which help them assess the information more easily. Another suggested reform is having opposing experts testify back to back rather than following the traditional adversary system practice of each side presenting its case separately.²⁵⁷ This would allow the jurors to more easily see points of conflict and agreement. However, both written expert summaries and back to back testimony have limitations which will not allow their implementation in many trials.

Arizona has instituted a number of procedural reforms that include informing jurors that they may ask questions of witnesses by communicating them in writing to the judge and allowing jurors to discuss evidence at breaks and other times instead of being instructed to wait until deliberations begin.²⁵⁸ The rationale behind the reforms is that jurors do have questions and that being able to discuss the evidence as it occurs will aid in comprehension because it is fresh and in some instances it will assist the jurors in formulating questions to address to the witness.²⁵⁹ The present authors are just completing data collection in a study involving videotaping of actual jury deliberations in a project intended to assess the effects of these innovations in procedure.²⁶⁰ While we cannot, at

²⁵⁵ ForsterLee et al., *supra* note 119, at 267.

²⁵⁶ Although it is intended for another purpose, namely facilitation of pretrial disclosure, FED R. CIV. P. 26(B) requires a written report from an expert about the opinions he or she will express and the basis for the reasons. These reports could easily be modified to assist the jury.

²⁵⁷ JURY TRIAL INNOVATIONS (Thomas Munsterman et al. eds., 1997).

²⁵⁸ Hannaford et al., *supra* note 250; see generally Michael Dann, "Learning Lessons" and "Speaking Rights": Creating Educated and Democratic Juries, 68 IND. L. J. 1229 (1993); Harold Lee Schwab, *Innovative Trial Procedures for the Twenty-First Century*, 29 NYSBA TORTS, INS. & COMPENSATION L. SEC. J. 25, 30-31 (2000).

²⁵⁹ An objection to these reforms, especially question asking, is that they remove some control of the case from the lawyers and thus compromise adversary procedure. This is essentially true, although in earlier periods in both England and the United States, and well after the development of the jury as an independent fact finder, jurors were active participants in the trial. See, e.g., WORLD JURY SYSTEMS 13-18 (Neil Vidmar ed., 2000).

²⁶⁰ There have been other studies of the reforms by means of administering post-trial questionnaires to jurors. See generally Shari Seidman Diamond & Neil

this time, offer any conclusions about benefits or liabilities of the reforms, preliminary data analyses do show that jurors often do have questions about the testimony tendered by the experts who testify at trial. Many of their questions relate to the clarification of terminology, the procedures used by experts to arrive at their conclusions, potentially missing data, and the validity of the expert's inferences from the data. We hope eventually to be able to assess the effects of these questions on the quality of their understanding of the evidence. But even at this very early stage our data seem very consistent with the other findings reviewed in this article, namely, that jurors tend to be involved, active processors of expert evidence.

Still more needs to be learned about how jurors respond to various forms of expert evidence and about procedures that can enhance jury understanding of complicated evidence. Nevertheless, it is appropriate to close this review by once again stating our basic conclusion. Empirical data do not support a view that juries are passive, too-credulous, incompetent, and overawed by the mystique of the expert.