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Evidence—Scientific Evidence: Standard of Review Raises Questions of Fit. *General Electric Co. v. Joiner*, 118 S. Ct. 512 (1997).

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EVIDENCE—SCIENTIFIC EVIDENCE: STANDARD OF REVIEW RAISES QUESTIONS OF FIT. *GENERAL ELECTRIC CO. v. JOINER*, 118 S. Ct. 512 (1997).

I. INTRODUCTION

Expert witnesses have long been called upon to testify as to issues of fact that lie outside the range of common knowledge. The maxim “cuique in sua arte credendum,” everyone is to be believed in his own art, has historically been cited as the basis for this practice.¹

In *General Electric Co. v. Joiner*,² the United States Supreme Court considered whether the Eleventh Circuit Court of Appeals applied the proper standard of review in reversing a trial court’s decision to exclude certain expert testimony.³ The Court held that abuse of discretion is the proper standard for an appellate court to apply in reviewing a trial court’s evidentiary ruling,⁴ concluding that the trial court did not abuse its discretion in excluding the plaintiff’s expert testimony.⁵

The Court’s previous consideration of scientific evidence in *Daubert v. Merrill Dow Pharmaceuticals*⁶ defined the trial court’s gate-keeping role in screening evidence for scientific validity, but it failed to establish a clear standard for appellate courts reviewing these determinations.⁷

This casenote discusses the standard of review applied to the admissibility of scientific evidence prior to and in light of *General Electric Co. v. Joiner*. Following a discussion of the facts, the note addresses the appellate review of evidentiary rulings both prior to and following the adoption of the Federal Rules of Evidence. Next, it reviews the Court’s reasoning and, finally, considers the addition of *Joiner* to this framework and the impact of the decision on future litigation.

II. FACTS

In 1973, Robert Joiner went to work as an electrician for the Water & Light Department of the City of Thomasville, Georgia.⁸ As a part of his duties, he worked with the city’s electrical transformers.⁹ These transformers used a

1. See generally *Winans v. New York & Erie R.R. Co.*, 62 U.S. (21 How.) 88 (1858).

2. 118 S. Ct. 512 (1997).

3. See *id.* at 515.

4. See *id.* The Court announced its ruling in an eight to one decision with Justice Stevens concurring in part and dissenting in part. See *id.*

5. See *id.*

6. 509 U.S. 579 (1993).

7. See David G. Savage, *Judge’s Gatekeeper Role Expanded*, 84 A.B.A.J. 41 (1998).

8. See *General Electric v. Joiner*, 118 S. Ct. 512, 515 (1997).

9. See *id.* at 515-16.

mineral oil based dielectric fluid¹⁰ as a coolant.¹¹ In order to make repairs, Joiner had to reach into this fluid with his hands and arms, sometimes splashing small amounts into his eyes and mouth.¹² In 1983, after Joiner had been working with this fluid for nearly ten years, the city discovered that one in five of the transformers was contaminated with polychlorinated biphenyls (PCBs).¹³ Congress banned the production and sale of PCBs in 1978, fearing that they presented a hazard to human health.¹⁴

Joiner was diagnosed with small cell lung cancer in 1991, at the age of thirty-seven.¹⁵ He had been a cigarette smoker at one time but had quit ten years before his diagnosis.¹⁶ Both of Joiner's parents were smokers, and there was a history of lung cancer in his family.¹⁷

Joiner filed suit against General Electric Company, a manufacturer of transformers with PCBs, in state court in Georgia.¹⁸ The suit alleged that Joiner's exposure to PCBs promoted his cancer, causing it to develop years earlier than it might have otherwise, if at all.¹⁹ The defendants removed the case to federal court in the Northern District of Georgia.²⁰

In district court, the defendants moved for summary judgment on the grounds that there was no admissible scientific evidence that PCBs promoted Joiner's cancer and that there was no evidence that Joiner was exposed to significant amounts of PCBs.²¹ In response to the first ground, Joiner presented the testimony of two expert witnesses, who testified that PCBs alone could promote cancer and that Joiner's exposure to PCBs was likely responsible for his development of lung cancer.²² Dr. Arnold Schecter stated that he believed it was more likely than not that cigarette smoking and exposure to PCBs caused

10. A dielectric is an insulator that is highly resistant to electrical current. See BERNARD GROB, BASIC ELECTRONICS 219 (4th ed. 1977).

11. See *Joiner*, 118 S. Ct. at 515-16.

12. See *Joiner v. General Electric*, 78 F.3d 524, 528 (11th Cir. 1996).

13. See *id.* PCBs were developed in order to make the dielectric fluid fire resistant. See *Joiner v. General Electric*, 864 F. Supp. 1310, 1312 (N.D. Ga. 1994), *rev'd*, 78 F.3d 524 (11th Cir. 1996), *rev'd*, 118 S. Ct. 512 (1997).

14. See Act of Oct. 11, 1976, Pub. L. No. 94-469, 90 Stat. 2020 (codified as 15 U.S.C. § 2605 (1994)). Congress viewed PCBs as "presenting an unreasonable risk of injury to health or the environment." 15 U.S.C. § 2605(a) (1994).

15. See *Joiner*, 118 S. Ct. at 516.

16. See *Joiner*, 864 F. Supp. at 1312. Joiner smoked as much as a pack of cigarettes per day for approximately eight years. See *id.*

17. See *id.*

18. See *id.* at 1314.

19. See *Joiner*, 118 S. Ct. at 516. The suit also alleged exposure to furan and dioxin derivatives of PCBs. See *id.*

20. See *id.*

21. See *Joiner*, 78 F.3d at 528.

22. See *Joiner*, 118 S. Ct. at 516.

Joiner's cancer.²³ Dr. Daniel Teitelbaum testified that Joiner's exposure to PCBs was a significant factor in his subsequent development of small cell lung cancer.²⁴ The experts based their opinions on toxicological animal studies and epidemiological studies.²⁵

The animal studies involved direct injections of PCBs into infant mice in concentrations many times higher than that to which Joiner had been exposed.²⁶ The cancers the mice developed were of a different type than Joiner had developed.²⁷ Further, no studies demonstrated the promotion of cancer in any species other than mice.²⁸

The four epidemiological studies involved manufacturing employees who had been exposed to PCBs in the course of their work.²⁹ In Italy, ex-workers from a capacitor plant showed a higher than expected death rate from lung cancer, but the study concluded that there were no grounds for associating lung cancer deaths and exposure in the plant.³⁰ In Illinois, workers at Monsanto's PCB production plant also showed a higher than expected rate of lung cancer death, yet the study concluded that the increase was not statistically significant³¹ and did not suggest a link between the increased death rates and

23. *See id.* at 518. Arnold Schecter, M.D., M.P.H., is a tenured medical professor and works full time doing research on the toxic effects of PCBs, furans and dioxins. *See* Brief for Respondent at 10, *General Electric Co. v. Joiner*, 118 S. Ct. 512 (1997) (No. 96-188). He has published over 100 peer-reviewed papers on this subject. *See id.* Schecter has also served as a consultant to the EPA, the U.S. Public Health Service, the National Academy of Sciences, and the World Health Organization with respect to their study of PCBs, furans and dioxins. *See id.* at 10-11. Schecter conducts a practice focused upon persons involved in litigation, particularly claims about PCBs. *See* Brief for Petitioner at 4-5, *General Electric Co. v. Joiner*, 118 S. Ct. 512 (1997) (No. 96-188).

24. *See Joiner*, 118 S. Ct. at 518. Dr. Teitelbaum, co-founder of both the American Academy of Clinical Toxicology and the American Board of Medical Toxicology, teaches a variety of graduate-level courses in occupational and environmental toxicology and the epidemiology of toxic diseases and has published more than forty articles on these subjects. *See* Brief for Respondent at 17, *Joiner* (No. 96-188). Dr. Teitelbaum described himself as a practicing toxicologist but admitted in his testimony that he testifies as many as 40 times per year and spends a minority of his time on unspecified patient care. *See* Brief for Petitioner at 37, *Joiner* (No. 96-188).

25. *See Joiner*, 118 S. Ct. at 518. Epidemiological studies examine patterns of disease incidence in human populations. *See generally* AMERICAN MEDICAL ASSOCIATION ENCYCLOPEDIA OF MEDICINE 411 (Charles B. Clayman, MD ed., Random House 1989).

26. Joiner had been exposed to a fluid containing between zero and 500 parts per million PCBs. *See Joiner*, 118 S. Ct. at 518.

27. *See id.* The mice developed alveologenic adenomas while Joiner had developed small-cell carcinomas. *See id.*

28. *See Joiner*, 864 F. Supp. 1324.

29. *See Joiner*, 118 S. Ct. at 518-19.

30. *See id.*

31. Statistical significance relates to the probability of achieving similar results purely by chance. *See* DAVID H. VOELKER & PETER Z. ORTON, STATISTICS 163 (1993).

exposure to PCBs.³² In Norway, workers at a cable manufacturing plant who had been exposed to mineral oil did show a statistically significant increase in lung cancer deaths, but there was no mention of PCBs.³³ In Japan, a PCB-exposed group showed a statistically significant increase in lung cancer deaths, but the group had also been exposed to numerous other potential carcinogens.³⁴

The defendants countered that none of these studies could support the experts' opinions and moved for summary judgment.³⁵ The district court agreed and granted the motion, ruling that while there was a genuine issue of material fact as to whether Joiner had been exposed to PCBs, Joiner had failed to demonstrate that there was a causal link between exposure to PCBs and lung cancer.³⁶ The court believed that the testimony of Joiner's experts did not rise above the witness' mere belief or speculation³⁷ and held that there was no genuine issue of material fact as to whether Joiner had been exposed to furans or dioxins.³⁸

The Eleventh Circuit Court of Appeals reversed, holding that the Federal Rules of Evidence governing expert testimony favor admissibility.³⁹ Citing this preference, the court stated that it applied a stringent standard of review⁴⁰ to the trial court's exclusion and concluded that the district court should limit its role to determining the "legal reliability"⁴¹ of expert testimony, leaving the jury to

32. See *Joiner*, 118 S. Ct. at 519.

33. See *id.* at 519.

34. See *id.*

35. See *id.* at 518-19. The four studies the Court cited involved PCB exposure varying in character and degree. See *id.* Two of the four failed to produce statistically significant evidence that there was any link between exposure to PCBs and increased incidence of cancer. See *id.* A third simply made no mention of PCBs. See *id.* The fourth produced statistically significant results but failed to isolate PCBs as the cause among several carcinogens to which the workers were exposed. See *id.*

36. See *Joiner*, 118 S. Ct. at 516.

37. See *Joiner*, 864 F. Supp. at 1326. This is an application of the standard outlined in *Daubert v. Merrill Dow Pharmaceuticals*, where the court stated that scientific knowledge as presented by an expert witness implies something more than "subjective belief or unsupported speculation." See *Daubert*, 509 U.S. at 590.

38. See *Joiner*, 864 F. Supp. at 1326.

39. See *Joiner*, 78 F.3d at 529.

40. See *id.* See also Andrew I. Gavil, *After Daubert: Discerning the Increasingly Fine Line Between the Admissibility and Sufficiency of Expert Testimony in Antitrust Litigation*, 65 ANTITRUST L. J. 663, 705-06 (1997).

41. Reliability is a term of art used in science and statistics to refer to the reproducibility of results. See generally KENNETH R. FOSTER and PETER W. HUBER, *JUDGING SCIENCE* 111 (1997). A reliable scientific test can be repeated under similar circumstances and produce similar results. See *id.* Even if the results are consistently wrong, the test is still considered reliable, though perhaps not scientifically valid. See *id.* Legal reliability, however, requires more. See *id.* Legal reliability refers to scientific validity as that level of reliability as outlined by *Daubert*. See *Daubert*, 509 U.S. at 589-90. "The trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable." *Id.*

decide upon the validity of that testimony.⁴² Joiner construed this to mean that the Eleventh Circuit had applied the abuse of discretion standard and that the trial court had abused its discretion by focusing on the experts' conclusions rather than the methodology that the experts had used in reaching that conclusion.⁴³ The defendants' decision to challenge Joiner's case through a summary judgment motion instead of challenging the admissibility of the expert testimony directly through a motion *in limine* led the trial court, and thus the Eleventh Circuit, into the predicament of having to review a summary judgment decision based upon admissibility rationale.⁴⁴

The United States Supreme Court granted certiorari⁴⁵ to determine the standard an appellate court should apply in reviewing a trial court's decision to admit or exclude expert testimony. The Court reversed the Eleventh Circuit, concluding that abuse of discretion is the proper standard of review and that the trial court did not abuse its discretion in this case.⁴⁶

III. BACKGROUND

This section will review the early cases involving the admission of expert testimony for historical perspective. Then the modern standards will be considered beginning with *Frye v. United States*,⁴⁷ moving on to the adoption of the Federal Rules of Evidence and ending with *Daubert v. Merrell Dow Pharmaceuticals*.⁴⁸

A. Early Cases

In *Winans v. New York & Erie R.R. Co.*,⁴⁹ one of the earliest cases on expert evidence, the United States Supreme Court ruled that the parties could use the testimony of experts in the field to explain questions of science or terms of art.⁵⁰ The Court recognized, however, that the number of differing expert opinions could be endless and thus concluded that a trial court could properly exclude their testimony if it so desired.⁵¹ To justify this conclusion, the Court cited the amount of time "wasted" in cross-examination testing the skill and

42. See *Joiner*, 118 S. Ct. at 517.

43. See *id.*

44. See Gavil, *supra* note 40, at 706.

45. See *General Electric Co. v. Joiner*, 117 S. Ct. 1243 (1997).

46. See *Joiner*, 118 S. Ct. at 519.

47. 293 F. 1013 (D.C. Cir. 1923).

48. 509 U.S. 579 (1993).

49. 62 U.S. (21 How.) 88 (1858).

50. See *id.* at 101.

51. See *id.*

knowledge of such experts, as well as the possibility for jury confusion on the very question the expert was to clarify.⁵² The following year, the Court decided *Ogden v. Parsons*,⁵³ reviewing a trial court's reliance on expert testimony.⁵⁴ Without announcing which standard it was applying, the Court simply concluded that the lower court had not erred by allowing the experts to testify.⁵⁵ In 1878, the Court decided *Spring v. Edgar*,⁵⁶ recognizing that exclusion or admission of evidence is within the trial court's discretion and that an appeals court should not overturn these determinations unless the ruling is "manifestly erroneous."⁵⁷

Collectively, these early cases acknowledge the usefulness of expert opinion evidence, while recognizing that experts are likely to be in conflict.⁵⁸ To balance the necessity of expert testimony against possible abuses of opinion evidence,⁵⁹ the trial court must possess discretion over the admission or exclusion of such testimony.⁶⁰ The fear that juries can be confused by cross-examination as to the actual level of scientific controversy attached to a particular issue is perhaps the most obvious abuse.⁶¹ Also, the Third Circuit implied in *In Re Paoli R.R. Yard Litigation* that judges might be prompted to use their discretion over expert testimony to ensure that cases they perceive as non-meritorious never reach a jury.⁶²

B. *Frye v. United States*⁶³

Frye marks the birth of modern standards for determining the admissibility of scientific evidence.⁶⁴ Echoing the earlier cases,⁶⁵ the *Frye* court conceded

52. *See id.*

53. 64 U.S. (23 How.) 167 (1859).

54. *See id.* at 170. Experts were called upon to testify as to what constituted a full cargo for a ship that the plaintiff had chartered to carry a "full cargo of general merchandise." *See id.* at 168. The court noted that "what was a full cargo for this ship to carry with safety . . . could [not] be settled by any rule of law or mathematical computation . . ." thus the court necessarily had to rely upon the opinions of the experts. *See id.* at 170.

55. *See id.*

56. 99 U.S. 645 (1878).

57. *See id.* at 658. The Court does indicate, however, that it is for the jury to decide how much weight to give the proffered testimony. *See id.*

58. *See Ogden*, 64 U.S. (23 How.) at 170.

59. *See* Margaret A. Berger, *Eliminating General Causation: Notes Towards a New Theory of Justice and Toxic Torts*, 97 COLUM. L. REV. 2117, 2129 n.55 (1997).

60. *See Spring*, 99 U.S. at 658.

61. *See* Berger, *supra* note 59, at 2129 n.55.

62. *See In re Paoli R.R. Yard Litig.*, 35 F.3d 717, 749 (3d Cir. 1994).

63. 293 F. 1013 (D.C. Cir. 1923).

64. *See* Merlyn W. Clark, *The Impact of Daubert on the Admissibility of Expert Opinion*, 39 ADVOC. (IDAHO) 10 (1996).

65. *See Spring*, 99 U.S. at 657. *See also supra*, the discussion of these cases in the Section

that expert testimony by witnesses skilled in a particular field was admissible as to questions beyond common experience or knowledge.⁶⁶ The court limited admissibility by declaring that the scientific principles from which experts gather their opinions must be “generally accepted” within the field.⁶⁷ Although courts disagree as to the precise meaning of general acceptance, it is generally agreed that unanimous consensus is not necessary; but instead, most formulations seem to envision that acceptance within the scientific community be significant either in number or expertise.⁶⁸

Frye stood as the dominant standard in the federal courts until the adoption of the Federal Rules of Evidence in 1975, though *Frye*'s replacement was not fully recognized until the Court incorporated it into the *Daubert* standard in 1993.⁶⁹ Many criticized the *Frye* standard as being too restrictive on a trial court's discretion to exclude a flood of low value or “junk” science⁷⁰ arguing that some discretion is necessary to prevent the jury from being “awed” by expert evidence.⁷¹ This reflects what Judge Posner referred to as scientific rhetoric's deceitful potential.⁷²

C. The Federal Rules of Evidence

The 1975 adoption of the Federal Rules of Evidence, in particular Rule 702,⁷³ called into question the continued application of the *Frye* standard by making no mention of its “general acceptance” standard.⁷⁴ The Supreme Court, however, did not address this concern until it decided *Daubert* in 1993.⁷⁵

III A.

66. See *Frye*, 293 F. at 1014.

67. See *id.*

68. See generally Adina Schwartz, A “Dogma of Empiricism” Revisited: *Daubert v. Merrell Dow Pharmaceuticals, Inc. and the Need to Resurrect the Philosophical Insight of Frye v. United States*, 10 HARV. J.L. & TECH. 149 (1997).

69. See Clark, *supra* note 64, at 10.

70. See Clark, *supra* note 64, at 10. *But cf.* Schwartz, *supra* note 68, at 149 (asserting that *Frye* is consistent with the “social character of human knowledge” by recognizing that, philosophically at least, there is no standpoint from outside of science from which anyone can weigh the scientific merit of proffered scientific testimony).

71. See Schwartz, *supra* note 68, at 149.

72. See R.A. POSNER, OVERCOMING LAW 525 (1995).

73. FED. R. EVID. 702 “If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.” *Id.*

74. See *id.*

75. See generally *Daubert*, 509 U.S. at 579.

Rule 702 establishes a three-part test for the admissibility of expert testimony.⁷⁶ First, the subject of the proffered testimony must be knowledge of a scientific, technical, or other specialized character.⁷⁷ Second, the testimony must assist the fact finder in understanding the evidence or determining a fact in question.⁷⁸ Finally, the witness must be qualified as an expert by either knowledge, skill, experience, training, or education.⁷⁹ The rule also allows, but does not require, the expert to testify in the form of an opinion.⁸⁰ Courts recognized and applied the second and third parts of this test for many years, leaving the first element, the knowledge test, unrefined until *Daubert*.⁸¹

Rule 403,⁸² often considered in conjunction with Rule 702, requires that probative value of the evidence be weighed against such issues as jury confusion, prejudice, undue delay, or cumulative presentation of evidence.⁸³ This reflects the second prong of the Rule 702 test of admissibility but also establishes an independent level of review when an expert gives an opinion that borders on a legal conclusion.⁸⁴

D. *Daubert v. Merrell Dow Pharmaceuticals Co.*

In 1993, the Supreme Court granted certiorari to *Daubert* to decide the proper standard for admitting expert testimony.⁸⁵ First, the Court expressly held that the adoption of the Federal Rules of Evidence superseded the *Frye* general acceptance standard and that there was no indication that the Rules were intended to incorporate the *Frye* standard.⁸⁶ The Court then moved on to consider the limits the Rules themselves imposed upon admissibility, focusing on the first prong of the Rule 702 test.⁸⁷

76. See Lee Loevinger, *Commentary on Evidentiary Framework*, 36 JURIMETRICS J. 149, 153 (1996).

77. See *id.*

78. See *id.*

79. See *id.*

80. See *id.*

81. See *id.* (citing *Beins v. United States*, 695 F.2d 591, 608-10 (D.C. Cir. 1982); and *United States v. Stevens*, 978 F.2d 565, 569 (10th Cir. 1992)).

82. FED. R. EVID. 403 "Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence." *Id.*

83. See *id.*

84. See Loevinger, *supra* note 76, at 154.

85. See *Daubert*, 509 U.S. at 585-87. The Court cited sharp division between the circuits as its basis for granting certiorari. See *id.* at 585.

86. See *id.* See also FED. R. EVID. 702.

87. See *Daubert*, 509 U.S. at 589.

The Court established that a trial court's "gatekeeping" function extends both to the legal reliability of the scientific method employed, and to the showing that the method was properly applied to, or fit, the circumstances of the case.⁸⁸ Chief Justice Rehnquist concurred with the majority that the Federal Rules of Evidence superseded the *Frye* standard, but dissented from the Court's ruling with respect to scientific validity, complaining that the ruling would oblige federal judges to become "amateur scientists."⁸⁹

The reliability arm of the *Daubert* test provided that scientific knowledge must be more than the subjective belief or speculation of the expert.⁹⁰ This necessarily leads to a focus on the methodology underlying the expert's opinion.⁹¹

The Court went on to explain that, under Rule 702, expert testimony must be sufficiently tied to the facts of the case to aid the trier of fact in resolving a factual dispute.⁹² Triers of fact must consider the fit between the supporting data or study and the sufficiency of the showing that the method the expert applied in reaching a conclusion was proper.⁹³

While establishing a criterion for the admissibility of scientific evidence, *Daubert* did not address the standard of review appeals courts should apply in reviewing these determinations.⁹⁴ This left the question of whether an appellate court is to view the situation as one of admissibility or sufficiency, because the two are not reviewed according to the same standard.⁹⁵ Questions of admissibility are generally reviewed for an abuse of discretion where questions of sufficiency, arising under a motion for summary judgment and motions for judgment as a matter of law, are reviewed de novo.⁹⁶

IV. REASONING

Chief Justice Rehnquist, who had dissented in *Daubert v. Merrell Dow Pharmaceuticals*,⁹⁷ presented the Court's decision in *General Electric Co. v.*

88. See Clark, *supra* note 64, at 12.

89. See *Daubert*, 509 U.S. at 601 (Rehnquist, J., concurring in part and dissenting in part).

90. See *id.* at 590.

91. See Schwartz, *supra* note 68, at 157. "Francois Jacob described the scientific method as 'a constant dialogue between imagination and experiment that allows one to form an increasingly fine-grained conception of what is called reality.'" Loevinger, *supra* note 76, at 156 (quoting FRANCOIS JACOB, *THE STATUE WITHIN: AN AUTOBIOGRAPHY* 225 (Franklin Philip trans., 1988)).

92. See Clark, *supra* note 64, at 11.

93. See Clark, *supra* note 64, at 12.

94. See *Daubert*, 509 U.S. 597.

95. See Gavil, *supra* note 40, at 699.

96. See Gavil, *supra* note 40, at 699.

97. 509 U.S. 579, 598 (1993).

*Joiner*⁹⁸ in two stages.⁹⁹ First, the Court decided that the appropriate standard of review to be applied when considering a district court's admission or exclusion of scientific evidence is the abuse of discretion standard.¹⁰⁰ Second, the Court applied this standard to the facts at hand and concluded that the trial court did not abuse its discretion in this case by excluding Joiner's expert testimony.¹⁰¹ Joiner argued that the appeals court had applied the correct standard in deciding that the trial court had erred in focusing on the experts' conclusions rather than the underlying methodology they had used to reach these conclusions.¹⁰² Finally, the Court remanded the case to the district court to decide whether Joiner had been exposed to furans and dioxins¹⁰³ and whether the testimony of Joiner's experts would then be admissible.¹⁰⁴

General Electric argued that the Eleventh Circuit had erred in applying a "particularly stringent"¹⁰⁵ standard of review to the trial court's exclusion of Joiner's experts, because the traditional abuse of discretion review was proper.¹⁰⁶ Joiner did not dispute that abuse of discretion was the proper standard; instead, he suggested that the court of appeals had indeed applied this standard.¹⁰⁷ He explained that the use of the phrase "particularly stringent" merely indicated that the court would devote more resources to considering district court decisions that were outcome-determinative.¹⁰⁸

A. Choosing the Appropriate Standard

The Supreme Court agreed that abuse of discretion is the proper standard of review for a district court's evidentiary rulings,¹⁰⁹ overturning the Eleventh

98. 118 S. Ct. 512 (1997).

99. *See id.* at 515.

100. *See id.* at 517.

101. *See id.* at 517-18.

102. *See id.* at 518.

103. *See id.* at 519. This was necessary because the Eleventh Circuit had reversed the district court's finding that there was no genuine issue of material fact as to whether Joiner had been exposed to furans and dioxins. *See id.* Joiner subsequently did not raise this issue on appeal, thus the Supreme Court allowed the reversal to stand. *See id.*

104. *See Joiner*, 118 S. Ct. at 519.

105. *See Joiner v. General Electric Co.*, 78 F.3d at 529. The Eleventh Circuit reasoned that the Federal Rules of Evidence's preference for admissibility justified this heightened review. *See id.*

106. *See Joiner*, 118 S. Ct. at 517.

107. *See id.*

108. *See id.* The lower court's decision was outcome determinative in that it came out of a motion for summary judgment instead of a direct challenge on admissibility through a motion in limine. *See Gavil*, *supra* note 40, at 705-06 and accompanying text.

109. *See Joiner*, 118 S. Ct. at 517.

Circuit's suggestion that the Court's holding in *Daubert*¹¹⁰ had altered this rule in the context of the admissibility of scientific evidence.¹¹¹ The Supreme Court explained that *Daubert* did nothing to alter the traditional standard of evidentiary review.¹¹² Rather *Daubert* simply held that the Federal Rules of Evidence had displaced the *Frye v. United States*¹¹³ standard of "general acceptance"¹¹⁴ and left open the question of how these determinations are to be reviewed upon appeal.¹¹⁵ *Daubert* emphasized the trial court's role as gatekeeper¹¹⁶ in screening expert testimony; but under *Joiner*, an appeals court may not categorically distinguish between rulings that allow expert testimony and rulings that exclude it.¹¹⁷ Abuse of discretion review applies in either case.¹¹⁸ The Court also rejected *Joiner*'s contention that, because the exclusion in this case was outcome-determinative, a more stringent standard of review applied.¹¹⁹ Questions of admissibility of evidence are issues of fact and, therefore, are reviewable under the abuse of discretion standard.¹²⁰

B. Application of the Standard to the Facts

The majority applied this abuse of discretion standard to *Joiner*'s facts. *Joiner*'s theory of the case rested upon the assertion that his exposure to PCBs promoted his developing lung cancer.¹²¹ He supported this assertion with the

110. See *Daubert*, 509 U.S. at 597.

111. See *Joiner*, 78 F.3d at 530.

112. See *Joiner*, 118 S. Ct. at 517. *Daubert* did not address the standard of appellate review for evidentiary rulings. See *id.*

113. 293 F. 1013 (D.C. Cir. 1923).

114. *Frye* held that the underlying scientific discovery or observation from which an expert's testimony is deduced must be generally accepted in the relevant field of study. See *id.* at 1014.

115. See *Joiner*, 118 S. Ct. at 517 (citing FED R. EVID. 702).

116. See *Daubert*, 509 U.S. at 600 (Rehnquist, C.J., concurring in part and dissenting in part). The majority did not disagree with the Chief Justice's assessment, but preferred to root the trial court's authority to screen scientific testimony firmly in Federal Rule of Evidence 702. See *id.* at 590.

117. See *Joiner*, 118 S. Ct. at 517.

118. See *id.* The Court cited two cases for this proposition: *Beech Aircraft v. Rainey*, 488 U.S. 153 (1988) (applying abuse of discretion review to a lower court's decision to exclude evidence); and *United States v. Abel*, 469 U.S. 45 (1984) (applying abuse of discretion review to a lower court's decision to admit evidence).

119. See *id.*

120. See *id.* Where the issues were dependent upon an interpretation of a federal rule of evidence, the review would be de novo. See *Joiner*, 78 F.3d at 529.

121. See *Joiner*, 118 S. Ct. at 518.

affidavits of two expert witnesses¹²² who testified that his exposure to the materials in question contributed to his cancer.¹²³

The experts supported their conclusions with animal and epidemiological studies.¹²⁴ The trial court found persuasive the absence of studies demonstrating the promotion of cancer in any species other than mice.¹²⁵ The Eleventh Circuit reversed, reasoning that the trial court's role as gatekeeper extends only to whether the formulation of the expert's opinion was methodologically sound and not to whether the supporting study is in itself legally reliable.¹²⁶ The Supreme Court disagreed, finding the results of the studies to be so dissimilar to Joiner's facts that it was not an abuse of discretion for the trial court to reject the experts' opinions.¹²⁷

The four epidemiological studies involved manufacturing employees who had been exposed to PCBs in the course of their work.¹²⁸ The trial court found these studies unresponsive of the experts' conclusions because they either lacked a statistically significant result or did not isolate PCBs as the sole potential cause of a positive result.¹²⁹ The Eleventh Circuit rejected this reasoning, stating that the trial court's focus should have been on the underlying methodology the expert used in reaching a conclusion and not on the correctness of that conclusion.¹³⁰

The Supreme Court's analysis of these studies focused on methodology, but the Court admitted that conclusions and methodology are not entirely distinct from one another.¹³¹ Applying the abuse of discretion standard, the Court concluded that it was within the trial court's discretion to analyze the "fit" between the underlying data and the opinion proffered.¹³²

122. Dr. Arnold Schecter and Dr. Daniel Teitelbaum were the plaintiff's experts. *See id.*

123. *See id.* at 518.

124. *See id.* *See also supra* Section II for a discussion of the details of these studies and their conclusions.

125. *See Joiner*, 864 F. Supp. at 1324.

126. *See Joiner*, 78 F.3d at 532.

127. *See Joiner*, 118 S. Ct. at 518-19.

128. *See id.* *See also supra* Section II for a discussion of the details of these studies and their conclusions.

129. *See Joiner*, 864 F. Supp. at 1326. Applying *Daubert*, the trial court noted that under Rule 702, the subject of an expert's testimony must be scientific knowledge. *See id.* The court went on to conclude that the "knowledge" claimed by the experts did not rise above subjective belief or unsupported speculation. *See id.*

130. *See Joiner*, 78 F.3d at 533. The court stated that a trial court should satisfy itself as to the legal reliability of an expert's testimony and leave the jury to decide upon its correctness. *See id.*

131. *See Joiner*, 118 S. Ct. at 519.

132. *See id.* The court explained that a district court is not required to admit opinion testimony that is connected to the case only by the *ipse dixit* of the expert. *See id.*

Although *Joiner* argued that a trial court's mere disagreement with an expert's conclusion is not a proper basis for exclusion, the majority disagreed.¹³³ Instead, it found that a district court may properly conclude that the analytic distance between the expert's opinion and the data upon which he bases that opinion is simply too great a span.¹³⁴ Thus, the district court did not abuse its discretion in excluding the scientific evidence in this case.¹³⁵

The Supreme Court remanded the case to the district court to decide whether *Joiner* had been exposed to furans and dioxins, and then to decide whether the testimony of *Joiner*'s experts would be admissible.¹³⁶

C. Minority Opinions

In a concurring opinion, Justice Breyer joined with the majority in upholding the trial court's role as gatekeeper as described in *Daubert*.¹³⁷ He alone maintained that judges are not scientists, and therefore lack the capability to make determinations concerning scientific validity.¹³⁸ Taking note of growing complexities in scientific data and litigation, he suggested that courts make greater use of their authority to appoint experts to serve on behalf of the court to aid in the pursuit of truth when science is the issue.¹³⁹

Justice Stevens concurred with the majority in holding abuse of discretion as the proper standard of review, but he dissented from the Court's application of that standard to the facts of this case.¹⁴⁰ He also expressed reservation as to whether the Court's application was consistent with Federal Rule of Evidence 702 as interpreted in *Daubert* which suggests that a trial court is to merely question an expert's methodology, not his conclusions.¹⁴¹

133. *See id.*

134. *See id.*

135. *See id.* Arguably, the studies proffered could not support the conclusion that PCBs promote cancer in humans at all, much less a person in *Joiner*'s situation. *See id.*

136. *See id.* at 517.

137. *See Joiner*, 118 S. Ct. at 520 (Breyer, J., concurring).

138. *See id.* (Breyer, J., concurring).

139. *See id.* (Breyer, J., concurring). He suggested that established scientific organizations could recommend reputable experts to the court to serve in this capacity. *See id.* (Breyer, J., concurring).

140. *See Joiner*, 118 S. Ct. at 521 (Stevens, J., concurring). Justice Stevens felt that this question had not been properly briefed. *See id.* (Stevens, J., concurring). For instance, *Joiner*'s experts relied on thirteen different studies as well as several reports from the World Health Organization. *See id.* (Stevens, J., concurring). Only one of these studies actually appeared in the record. *See id.* (Stevens, J., concurring).

141. *See id.* (Stevens, J., concurring). Federal Rule of Evidence 702 states that a witness "qualified as an expert" may testify in the form of "opinion or otherwise." FED. R. EVID. 702. *Daubert* interpreted this as meaning that scientific testimony must be both "relevant and reliable." *See Daubert*, 509 U.S. at 589.

Justice Stevens argued that the relevance arm of *Daubert's* test is easily applied.¹⁴² The experts' testimony is relevant only if there is a question of material fact as to whether Joiner had been exposed to PCBs or their derivatives.¹⁴³ The majority correctly, then, directed the district court to reexamine the admissibility of this evidence as it applied to Joiner's exposure to furans and dioxins.¹⁴⁴

Justice Stevens had more trouble with the Court's application of the reliability arm of the *Daubert* test.¹⁴⁵ He argued that the experts did not base their opinions on any one of the studies discussed by the court but instead based them upon the totality of all the relevant studies taken together.¹⁴⁶ In other words, the district court considered the studies individually, as did the majority, and concluded that none of them was sufficient to support the proffered testimony.¹⁴⁷ Conversely, the Eleventh Circuit determined that a so-called "weight of the evidence" methodology¹⁴⁸ was a scientifically acceptable means of drawing reliable conclusions.¹⁴⁹ The statements of Joiner's experts indicate that this is the methodology they used in order to produce their conclusions.¹⁵⁰ Justice Stevens also pointed out language in *Daubert* that advances the notion that the opportunity to debate such issues in open court is the proper means of attacking "shaky" scientific evidence.¹⁵¹ Thus, Justice Stevens concluded that it is not within a trial judge's discretion to exclude scientific testimony when it fits the facts of the case and is based upon reliable scientific methodology.¹⁵² Interpretations of fit, then, separate Justice Stevens from the majority.¹⁵³

142. See *Joiner*, 118 S. Ct. at 521 (Stevens, J., concurring) (citing *Daubert*, 509 U.S. at 589).

143. See *Joiner*, 118 S. Ct. at 522 (Stevens, J., concurring).

144. See *id.* (Stevens, J., concurring).

145. See *id.* (Stevens, J., concurring).

146. See *id.* (Stevens, J., concurring).

147. See *id.* (Stevens, J., concurring).

148. Dr. Teitelbaum described this method of decision making as a thought process. See *id.* (Stevens, J., concurring). The data collected from an epidemiological study is considered in relation to what the scientist already knows about the substance in question and the subject's exposure. See *id.* (Stevens, J., concurring). Dr. Teitelbaum then stated he simply "comes to a conclusion." See *id.* (Stevens, J., concurring).

149. See *Joiner*, 78 F.3d at 532.

150. See *Joiner*, 118 S. Ct. at 522.

151. See *id.* (Stevens, J., concurring) (citing *Daubert*, 509 U.S. at 596).

152. See *id.* (Stevens, J., concurring).

153. See *id.* (Stevens, J., concurring).

V. SIGNIFICANCE

With the decision of *General Electric v. Joiner*,¹⁵⁴ trial and appellate lawyers were hoping that the Court would better explain their duty under *Daubert* and perhaps lessen the burden of an extensive, and expensive, hearing on admissibility.¹⁵⁵ Instead, the Court provided a discussion that firmly establishes *Daubert's* gatekeeping role.¹⁵⁶ *Joiner*, at its most basic level, simply states that experts must explain their analysis sufficiently to overcome any questions of fit between data and conclusion.¹⁵⁷

Perhaps this decision affects lawyers and litigators most directly by increasing the amount of work that must go into preparing expert evidence, or at least not lessening it to pre-*Daubert* levels.¹⁵⁸ The trial court's greater discretion under the abuse of discretion standard enhances the importance of the battle over expert testimony at the trial level, and *Joiner* does nothing to alleviate this burden.¹⁵⁹ Litigators must be prepared to argue not only the substance of an expert's opinion, but that the methodology employed in reaching the conclusion was also legally reliable.¹⁶⁰

Whether the result in *Joiner* favors plaintiffs or defendants is open to debate. Business defendants have hailed the decision as a victory under the impression that it will now be more difficult for 'junk science' to be used in court.¹⁶¹ Plaintiff's lawyers respond that the burden on the defendants' in

154. 118 S. Ct. 512 (1997).

155. See Michael Hoenig, *A Review Standard for Admission of Scientific Evidence*, Jan. 12, 1998, N.Y.L.J. at 3. "Those who hoped *Joiner* would provide a bright-line road map for resolving most scientific expert disputes will be disappointed." *Id.*

156. See *id.*

157. See Lori Tripoli, *Get Your Experts in Order after Joiner*, Jan. 1998, PROD. LIAB. L. & STRATEGY at 1 (quoting Richard S. Lewis, a plaintiffs' attorney and a partner at Cohen, Milstein, Hausfeld & Toll in Washington, D.C.). An expert's analysis and testimony must explain to the court how the expert reached his conclusion, and this explanation must not span too great an analytic gap. See *id.*

158. See *id.* *Daubert* placed the admissibility of opinion evidence firmly into contention between the parties by overruling the long-standing *Frye* "general acceptance" standard. See *id.*

159. See Hoenig, *supra* note 155, at 3. "As before, but now punctuated more clearly, the expert admissibility question is a veritable 'life and death' litigation crossroads." Hoenig, *supra* note 155, at 3. See also Daniel D. Blinka, "Practical Inconvenience" or Conceptual Confusion: The Common-Law Genesis of Federal Rule 703, 20 AM. J. TRIAL ADVOC. 467 (1997) ("Staring at a cold record armed with only an abuse of discretion standard of review, appellate courts can be reluctant to second-guess trial judges with holdings that are extremely fact intensive and, thus, of limited precedential value.").

160. See *id.*

161. See Hoenig, *supra* note 155, at 3. "Business groups cheered the majority opinion as providing better balance in determining what sort of testimony can be admitted in cases involving scientific evidence." Hoenig, *supra* note 155, at 3.

preparing experts is equally enhanced.¹⁶² There will also be great importance attached to who is sitting on the bench, now for their scientific perspectives as well as their legal views.¹⁶³ This opens the door to questions of uniformity; similar cases may or may not go to the jury, depending upon the judge.¹⁶⁴

Joiner reminds judges that the Federal Rules of Evidence place limits upon the admissibility of scientific evidence.¹⁶⁵ The Court placed *Joiner* squarely on top of the *Daubert* framework by stressing that the legal reliability of expert conclusions must be considered along with the validity of their underlying methodology.¹⁶⁶ This full disclosure, allowing the trial court to use the evidence for the same purpose the expert did, lessens the risk that experts will decide for themselves what evidence jurors should hear by applying their own ill-defined standards.¹⁶⁷ Prospects on appeal will depend greatly upon the quality of the *Daubert* advocacy at trial.¹⁶⁸

Joiner also relays a message to scientists and other expert witnesses. Experts will likely be called upon to testify as to the merits of other experts.¹⁶⁹ This could result in increased costs for hearings to determine the admissibility of expert evidence.¹⁷⁰ In toxic or mass tort cases such as those concerning breast implants or Gulf War Syndrome, the pace of science might lag far behind the legal need for a remedy.¹⁷¹ Market pressures aggravate this problem

162. See Tripoli, *supra* note 157, at 1 (quoting Mark Behrens, an attorney at Washington D.C.'s Crowell & Moring).

163. See Mark A. Hofman, *Business Applauds 'Junk Science' Ruling*, Dec. 22, 1997, BUS. INS. at 1.

164. See Hofman, *supra* note 163, at 1. "It creates a system where the exact same cases will go to the jury in front of one judge and not to a jury in front of some other judges, which may save appellate courts some work but is hardly the best way to run the system if you're interested in uniformity of result." Hofman, *supra* note 163, at 1.

165. See Hoenig, *supra* note 155, at 3.

166. See Hoenig, *supra* note 155, at 3.

Sometimes, the conclusory leaps trial experts make from data purported to support them are too gigantic but get to the jury nonetheless because they are masked in scientific terms and formulae. The Court's language . . . invites judges to unmask such disguises and expose the analytical gaps. Obviously, counsel opposing the expert testimony must take the laboring oar on such challenges.

Hoenig, *supra* note 155, at 3.

167. *But cf.* Blinka, *supra* note 159 (arguing that this leaves no sensible stopping point in the trial court's inquiry, leading perhaps into a reliance on otherwise inadmissible information).

168. See Hoenig, *supra* note 155, at 3.

169. See Roman M. Silberfeld, *Daubert's Unintended Effect on the Scientific Community*, Feb. 1998, MED. LEGAL ASPECTS BREAST IMPLANTS at 1.

170. See *id.* "With peer review as the basis for the acceptance of an expert witness, over time, we could face chains of experts testifying to the merits of other experts. I predict that it won't be long before we see 'peer-group shopping' among plaintiffs and defendants." *Id.*

171. See *id.* "Redress of injury for harmful products cannot stand still for the completion of broad, double-blind studies that can take decades." *Id.* "[T]hat evidence of causation is lacking . . . does not mean a causal link does not exist." *Id.*

by providing little incentive for carrying out the type of research that might be legally necessary to afford a remedy.¹⁷² Testing is costly and time consuming and adds little to the marketability of a product.¹⁷³

With the decision in *Joiner*, the Supreme Court answered the call for clarification of *Daubert* by providing a standard of review for appellate courts considering trial court decisions to admit or exclude scientific evidence.¹⁷⁴ In the process, the Court also provided guidance for trial courts making these determinations by focusing on the fit between experts' testimony and the data from which they draw their conclusions.¹⁷⁵

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172. See Wendy E. Wagner, *Choosing Ignorance in the Manufacture of Toxic Products*, 82 CORNELL L. REV. 773, 784 (1997).

173. See *id.*

174. See *Joiner*, 118 S. Ct. at 515.

175. See Hofman, *supra* note 163, at 1. "The ball is now in the trial court's court." Hofman, *supra* note 163, at 1 (quoting Quentin Riegel, deputy general counsel of the National Association of Manufacturers).

