
The *Daubert* Revolution and the Birth of Modernity: Managing Scientific Evidence in the Age of Science

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This Essay is based on the transcript of my opening remarks at the University of California, Davis Law Review's Symposium *The Daubert Hearing — From All the Critical Perspectives*. It has been revised substantially to make it appropriate for publication. However, I have endeavored to retain the spirit of my original remarks so that it matches the tone of the rest of this issue, which is presented in transcript form.

I was honored to have been asked to provide the introduction to this exciting and important Symposium issue. In his more than generous introduction of me, Professor Edward Imwinkelried noted my standing in the field. However, I must say at the start that it is extremely daunting to be heralded as any sort of expert in this area by Professor Imwinkelried since he is the leading expert on scientific evidence in the country. Therefore, I wish to express my appreciation and great respect for Professor Imwinkelried's invitation to contribute to this Symposium and, indeed, his guidance throughout my career. I would also like to express my special appreciation and regard for the editors of the UC Davis Law Review. Their support and their patience have been invaluable and I am deeply grateful for all of their assistance. Finally, I am grateful to Shayna Lewis for her valuable editing and research assistance.

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INTRODUCTION

June 28, 2013 marks the twentieth anniversary of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*¹ I am a fan and have been one since it was decided.² Although the impact of *Daubert* on trial court practice has been heartily debated, I firmly believe that the decision was revolutionary, though many of its far-reaching effects have yet to be felt.³ But that is the nature of revolutions: they cannot be fully measured when in the midst of them, nor can their future consequences be predicted with precision. When asked about the French Revolution in 1973, Zhou Enlai reputedly stated that it remained “too early to say.”⁴ This Essay, then, stands as something of an ongoing assessment. Twenty years of experience with *Daubert* gives

¹ 509 U.S. 579 (1993).

² Indeed, I advocated the basic approach the Court adopted in *Daubert* in an article published four years prior to that decision. See David L. Faigman, *To Have and Have Not: Assessing the Value of Social Science to the Law as Science and Policy*, 38 EMORY L.J. 1005, 1009-10 (1989) (“The legal relevance of social science findings should depend on their scientific strength, that is, on the ability of social scientists to answer validly the questions posed to them.”). But, alas, the idea of basing the admissibility of scientific evidence on scientific merit (as opposed to its general acceptance in the pertinent field) was promulgated by others before me, most notably including another participant in this Symposium, Bert Black. See Bert Black, *A Unified Theory of Scientific Evidence*, 56 FORDHAM L. REV. 595, 599 (1988) (proposing “a theoretical framework based on distinguishing two aspects of relevancy: (1) the *validity* of the reasoning leading to a conclusion, and (2) the *reliability* of the conclusion”) (emphasis in original); see also Andre Moenssens, *Admissibility of Scientific Evidence — An Alternative to the Frye Rule*, 25 WM. & MARY L. REV. 545, 567-74 (1984) (proposing a process by which scientific evidence would be evaluated on the basis of its “reliability for a specific purpose”).

³ Thirteen years ago I had the opportunity to write on the occasion of *Daubert*’s seventh anniversary and there described it as a revolutionary event. See David L. Faigman, *The Law’s Scientific Revolution: Reflections and Ruminations on the Law’s Use of Experts in Year Seven of the Revolution*, 57 WASH. & LEE L. REV. 661, 661 (2000). That revolution has been more chaotic and has taken longer to solidify than I expected. I suspect that in ten years, on the occasion of *Daubert*’s thirtieth anniversary, I will still be at least somewhat dissatisfied with what progress has been made. But I look forward to writing on that occasion as well. It’s worth noting, finally, that others have also described *Daubert* as constituting a paradigm shift or, in other words, revolutionary. See Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification*, 309 SCIENCE 892, 892 n.9 (2005).

⁴ There is considerable debate regarding whether this oft-quoted wisdom is an accurate depiction of Zhou Enlai’s response to the question of the French Revolution’s legacy. Rather than referring to the Revolution of 1789, which gives the quotation so much resonance, some have suggested that the former premier was referring to the student revolts of 1968, making the observation rather less profound. See Richard McGregor, *Zhou’s cryptic caution lost in translation*, FIN. TIMES, June 10, 2011, <http://www.ft.com/intl/cms/s/0/74916db6-938d-11e0-922e-00144feab49a.html#axzz2AWSChjFi>.

us much to consider and some outlines of the *Daubert* revolution can, at least, be identified, while others remain inchoate.

Use of the revolutionary metaphor, however, creates a certain ambiguity, especially in the context of scientific evidence. There are at least two different archetypes of “revolutions” that might be meant by the metaphor in this context. The most obvious, perhaps, is the scientific revolution, which largely was sparked in the sixteenth century, gained traction in the seventeenth and eighteenth centuries, and continues to hold sway today.⁵ Although the scientific revolution changed much in society, it was first and foremost an intellectual revolution. The second kind of revolution, suggested by the allusion to the French Revolution above, is a social or political revolution. While these two kinds of revolutions are both very real, they are also fairly distinct. The scientific revolution was an intellectual revolution that resulted in a fundamental change in reasoning — that is, in gathering information about the world in which we live. Although the scientific revolution had political consequences, political change was not its driving premise. In contrast, political revolutions — such as the French Revolution — are driven by the desire for social change, though they, too, are likely to be accompanied by fundamental changes in reasoning or perspective. It might be said, then, that whereas political revolutions have social change as their driving premises and changed ideas as a consequence, intellectual revolutions have changed ideas as their driving premises and social change as a consequence.

Of course, the reality of revolutionary events is never as clean as the archetypes might suggest. There is much smoke and many mirrors in coming to understand any revolutionary event. So, too, is this true for the Court’s expert evidence jurisprudence. *Daubert* began as a relatively modest political revolution, but in the long-term is likely to be known for the intellectual transformation it imposed on the law. At least, that is the basic premise of this Essay. *Daubert* and its progeny are best understood as originally intended to give trial courts expanded managerial powers over expert testimony and, thus, the trial process more generally. By employing the scientific sensibilities necessary to effect this social transformation, however, the Court unleashed an intellectual revolution that overturned the “Ancien Régime.” *Daubert* thus began as a modest attempt to expand district

⁵ See JOHN HENRY, *THE SCIENTIFIC REVOLUTION AND THE ORIGINS OF MODERN SCIENCE* 1 (Palgrave Macmillan, 3d ed. 2008); STEVEN SHAPIN, *THE SCIENTIFIC REVOLUTION* 4-5 (The Univ. of Chicago Press, 2d ed. 1998).

courts' management of their dockets but ended up bringing scientific enlightenment to the law.

I. THE ANCIEN RÉGIME AND THE SCIENTIFIC REVOLUTION

Courts are obligated to employ some sort of standard for expert evidence and so the main struggle in this area is over what principle they should use to set that standard.⁶ Few believe that courts should admit all relevant expert testimony that an advocate or proponent proffers. In short, the fundamental question boils down to this: how should courts decide what expert testimony gets to the fact-finder and what expert testimony does not?⁷ One possibility is to survey experts in the field and ask them whether the basis for proffered expert opinion is valid. A second possibility is to charge judges with the responsibility to consider the methods and principles underlying proffered expert opinion and have them make the validity determination. These two possibilities represent the two fundamental methods by which courts have historically evaluated expert evidence. The first, concerning what the relevant expert field thinks of the proffered expertise, is credited to *Frye v. United States*.⁸ The second, which would have courts independently assess the premises supporting the proffered expertise, is credited to *Daubert*.

My focus in this Essay is on *Daubert*. But what *Daubert* is, and what it is not, can only be understood by looking at the cases and evidence rules that surround it. Rule 702 is the principal rule that controls expert evidence and was the ostensible focus of the *Daubert* decision. *Daubert*, however, generated not only a cottage industry for evidence scholars and volumes of judicial opinions on its meaning, but the Supreme Court revisited and refined its vision for experts two more times in the succeeding six years. Moreover, following what is now known as “the *Daubert* trilogy,” Rule 702 itself was amended in 2000

⁶ See generally DAVID L. FAIGMAN ET AL., *Admissibility of Scientific Evidence*, in MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY 3 (West Info. Pub. Grp. 2011-2012) (discussing how courts are obligated to employ some sort of standard for expert evidence and struggle over what principle should be used to set that standard).

⁷ See generally Edward J. Imwinkelried, *Trial Judges — Gatekeepers or Usurpers? Can the Trial Judge Critically Assess the Admissibility of Expert Testimony Without Invading the Jury's Province to Evaluate the Credibility and Weight of the Testimony?*, 84 MARQ. L. REV. 1, 7 (2000) (“The fundamental issue is the allocation of factfinding power between the trial judge and jury.”).

⁸ 293 F. 1013 (D.C. Cir. 1923).

to more fully reflect the *Daubert* regime.⁹ That year, the Supreme Court also offered important insights into its own view of *Daubert* in the lesser-known case of *Weisgram v. Marley*.¹⁰ Thus, twenty years after *Daubert*, there is much grist for the mill regarding the decision's import and importance including the Court's many pronouncements on the subject, the amended Rules of Evidence, scores of federal and state court interpretations, and a vast body of scholarly literature. *Frye*, of course, largely started it all and remains for many courts and commentators the touchstone, at least for scientific expert testimony. This section begins, therefore, with a relatively brief overview of *Frye* and then considers in somewhat greater detail the changes wrought by *Daubert*. If *Daubert* sparked a revolution, *Frye* represents the Ancien Régime.

A. *Frye's Ancien Régime*

The basic requirement of scientific evidence under *Frye* is that it have "gained general acceptance in the particular field in which it belongs."¹¹ Although *Frye* was decided in 1923, it did not achieve true notoriety until the 1970s, around the time that the Federal Rules of Evidence were promulgated.¹² In *Frye*, a 1923 District of Columbia

⁹ Rule 702 was amended in 2000 to embody the *Daubert* approach. See FED. R. EVID. 702 advisory committee's note (stating that Rule 702 was amended in response to *Daubert*, and many cases applying *Daubert*). The rule was then amended again in 2011 when it was restyled along with the other Federal Rules. See *id.* (stating the Rules of Evidence were restyled "to make them more easily understood and to make style and terminology consistent throughout the rules"). This "restyling" was not intended to change the meaning of the rule. See *id.* Rule 702 now provides as follows:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) the testimony is based on sufficient facts or data;
- (c) the testimony is the product of reliable principles and methods; and
- (d) the expert has reliably applied the principles and methods to the facts of the case.

¹⁰ 528 U.S. 540 (2000).

¹¹ *Frye*, 293 F. at 1014.

¹² See David L. Faigman et al., *Check Your Crystal Ball at the Courthouse Door, Please: Exploring the Past, Understanding the Present, and Worrying About the Future of Scientific Evidence*, 15 CARDOZO L. REV. 1799, 1808 n.25 (1994).

appellate decision, the defendant offered an expert to testify regarding the results of an early form of polygraph testing, the “systolic blood pressure deception test.” According to the expert, the test results supported James Alphonso Frye’s claim of innocence to a charge of murder.¹³ The court excluded the evidence. In the following often-quoted paragraph, the court set forth a new test for assessing the admissibility of scientific testimony, the so-called general acceptance test:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while the courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.¹⁴

The *Frye* test focuses courts’ attention on the respective field’s view of its own members’ work. Thus, the *Frye* test, above all, is self-referential in that it is only as effective as the field doing the review.

Although the *Frye* test appears straightforward, the simplicity of stating it belies the complexity inherent in applying it to concrete cases. There are three basic components to the *Frye* test, each with its own intricacies. These are the substance of the proffered opinion, the designation of what has been generally accepted, and the identity of the particular field doing the accepting. These three components generate three questions: (1) at what conceptual level should the expert opinion be judged; (2) whether the scientific principle that is relevant under applicable law is the same as what is generally accepted in the field; and (3) which scientific field should be consulted to assess general acceptance. I examine these in turn.

The *Frye* test itself does not specify the conceptual level of generality at which the disputed “scientific principle or discovery” should be assessed. This issue, in fact, presents a spectrum of options for courts. On one pole, a court could simply find that a particular methodology is “generally accepted” and admit expert opinions based on that methodology without checking whether it was employed correctly or even permits the sort of opinions proffered. At this

¹³ See James Starrs, *A Still Life Watercolor: Frye v. United States*, 27 J. FORENSIC SCI. 684, 688 (1982).

¹⁴ *Frye*, 293 F. at 1014.

extreme, *Frye* would not require that the technique has been validated for the use to which it is put in the courtroom, so long as it is valid for some use. Such an approach might allow a neuroscientist to testify about a person's gambling addiction using functional magnetic resonance imaging (fMRI) technology because fMRI methodology is generally accepted, even if it has not been validated for this particular use. At the other pole, a court might require not only that fMRI be a generally accepted technology, but that it could be, and was, properly applied to the case at hand. At this extreme, the trial court would be required to ensure that the specific application of the technique in the instant case was validly performed. A middle ground might involve a court checking whether the fMRI is a valid technology that extends to the particular use for which it is offered but, if so, leave to the fact-finder the question whether the technology was employed reliably in the case at hand. Inevitably, the debate regarding where along this spectrum presents the better interpretation of a court's obligations under *Frye* depends on the jurisdiction's view of the proper division of authority between judge and fact-finder. A jurisdiction that gives judges little responsibility to ensure the accuracy of expert opinion evidence would limit threshold review to the most general level of assessment. Jurisdictions that mandate a rigorous role for judges would require a more searching and particularized assessment.

A second question pivotal to the proper application of the *Frye* test is whether the scientific field conceptualizes the subject in the same way that the law understands it. After all, if the law asks whether a specific scientific principle is generally accepted, any misunderstanding regarding just what "principle" is at issue will invalidate the answer provided by the particular field. For example, if psychologists were asked whether Post-Traumatic Stress Disorder (PTSD) is generally accepted, their answer would be yes. PTSD is a well-accepted psychiatric diagnosis as indicated by its inclusion in the Diagnostic and Statistical Manual of Mental Disorders.¹⁵ However, its acceptance is limited to therapeutic purposes; it has not been validated for forensic purposes.¹⁶ The diagnosis of PTSD, therefore, might be reliably associated with a person having suffered some trauma, but may have little validity for identifying the source of that trauma. The former is necessary for PTSD's therapeutic use; the latter is needed for forensic use. Merely asking whether a scientific methodology or

¹⁵ See AMERICAN PSYCHIATRIC ASSOCIATION, DSM-IV-TR 463-68 (2000).

¹⁶ See *id.* at xxxiii (explicitly eschewing any claim of etiological verity of its diagnostic categories).

principle has been generally accepted is not enough. Courts ought to be careful to specify to what use the expertise will be put.

The third pivotal question presented in the application of *Frye* is the matter of whom to ask about general acceptance, and, related to this, whether courts should actually survey a field to obtain the answer. It is intuitively obvious that this aspect of *Frye* is highly manipulable. Courts can influence the responses they receive by either narrowing or expanding the professional group that is defined as the “pertinent field” under *Frye*. If a court asks only neuroscientists who use fMRI technology to detect lying whether fMRI is generally accepted for lie detection, it is likely to get a skewed view of the acceptability (i.e., validity) of the technology for its intended use. Yet courts regularly limit their evaluation of the general acceptance of a scientific principle or discovery to those with a vested interest in its affirmation. For example, courts almost invariably ask only practicing latent-fingerprint examiners whether latent-fingerprint identification is generally accepted.¹⁷ Not surprisingly, latent print examiners overwhelmingly agree that latent print examinations are valid. This approach is not much of a test, since their livelihoods depend on an affirmative answer. Courts would be well advised to reach beyond the narrow field of experts who are employed in the profession that is in question.

Finally, although *Frye* seems to contemplate that courts will actually survey experts in particular fields, practice rarely matches this expectation. Trial courts tend to be convinced by testifying experts’ assurances that the bases for their opinions are generally accepted, though few experts are likely to have surveyed the field themselves or have access to such surveys done by others. Moreover, the “general acceptance criterion”¹⁸ refers to the opinions of scientists regarding the expertise, not the opinions of other courts. String citations of other courts’ admissibility decisions regarding the controverted expertise should not alone be sufficient to gauge “general acceptance.”¹⁹ What is generally accepted among courts may or may not be accepted by scientists in the field. In any case, while other courts’ acceptance of

¹⁷ See, e.g., *Commonwealth v. Patterson*, 840 N.E.2d 12, 32-33 (Mass. 2005) (finding fingerprint identification admissible under *Daubert* because it was generally accepted among fingerprint examiners).

¹⁸ See *Frye*, 293 F. at 1014.

¹⁹ See, e.g., *United States v. Harris*, 192 F.3d 580, 588 (6th Cir. 1999) (citing other courts’ general acceptance of police officer expert testimony under a *Daubert* analysis).

some particular expertise is not irrelevant, it is almost certainly not what was intended by *Frye*.²⁰

Although *Frye* is not conventionally understood as requiring scientific sophistication, the above discussion makes clear that some appreciation of science would go far in ensuring the test's functionality. In inquiring about general acceptance of a particular form of expert evidence, courts should at least ensure that it is valid at a reasonably precise conceptual level, that the scientific principle in question is one that is relevant under applicable law, and that the field accepting it is broad enough to include non-true-believers but narrow enough to include those who are knowledgeable in the field. For example, a court considering the admissibility of polygraph evidence under *Frye* should be able to define the level at which its validity is being assessed (i.e., general accord between physiological reactions and deception or as a diagnostic test of deception), the purpose for which the test is accepted (i.e., for lie detection or as a prop in interrogations), and the relevant field for assessing acceptance (i.e., polygraphers or behavioral scientists).

Frye, therefore, is not necessarily incompatible with an empirically sophisticated use of expert evidence, but the test does not promote it either. In contrast, *Daubert's* focus on the methods and principles underlying proffered expertise has exactly this effect.

B. *Daubert's Revolutionary Principles*

Despite — or possibly as a result of — the volumes written on *Daubert*, the decision remains generally misunderstood in many respects. The basic holding of *Daubert* can be simply described. It has three components, the first two of which are largely uncontroversial. First, the expert evidence must be relevant; that is, it must relate to an issue in the case. The Court referred to this element as one of “fit,” in that the empirical basis for the evidence must help answer a fact in dispute.²¹ Second, the expert must be qualified to testify on the subject

²⁰ As a separate consideration, courts might indeed find that precedent supports admission of challenged expertise, and citation of other court decisions would be entirely appropriate to demonstrate that judgment. This basis is distinct, however, from the inquiry set forth in *Frye*.

²¹ See *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 591 (1993); see, e.g., *McClain v. Metabolife Int'l, Inc.*, 401 F.3d 1233, 1250 (11th Cir. 2005) (“[The expert] testified at the *Daubert* hearing in a way more adjusted to agency-risk analysis than courtroom-causation analysis.”); *United States v. Birdsbill*, 243 F. Supp. 2d 1128, 1131 (D. Mont. 2003) (excluding psychological test intended for diagnosis and treatment that was not designed for the forensic purpose of detecting when a person has sexually abused

at-hand. This element is fairly permissive and can be met “by knowledge, skill, experience, training, or education.”²² It must be met, however, in light of the nature of the testimony being offered.²³ Third, the “[p]roposed testimony must be supported by appropriate validation,” what the *Daubert* Court referred to as “good grounds.”²⁴ According to the Court, “the requirement that an expert’s testimony pertain to ‘scientific knowledge’ establishes a standard of evidentiary reliability.”²⁵

Although the first two criteria for admissibility of expert evidence — relevance and qualifications of the expert — are essential, the third prong of reliability represents the revolutionary turn in this area. In order to assess the evidentiary reliability of proffered expert testimony, trial courts have the responsibility to examine the methodologies and principles underlying proffered expert testimony to determine whether those principles and methods are sufficiently valid to admit. Under Rule 104(a), a court must find this preliminary fact — that is, that the basis for the proffered evidence is sufficiently valid to support the expert’s testimony — by a preponderance of the evidence.²⁶ The *Daubert* Court explained Rule 104(a)’s operation when a court is “[f]aced with a proffer of expert scientific testimony,” as follows:

[T]he trial judge must determine at the outset, pursuant to Rule 104(a), whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. *This entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that*

children).

²² FED. R. EVID. 702; *see, e.g.*, *Banister v. Burton*, 636 F.3d 828, 832 (7th Cir. 2011) (holding that trauma surgeon was qualified to testify as to whether shooting victim had physical ability to throw something after he was shot, stating “[the expert] is a trauma surgeon who testified as to the nature and severity of [the victim’s] injuries at the time he treated him and then applied his knowledge of anatomy, gained through his experience as a trauma surgeon and as a student of medicine, to determine that the gunshot injuries would not have prevented [the victim] from using his arm to throw an object, or from crawling”).

²³ *See Lujano v. Town of Cicero*, No. 07C4822, 2011 WL 6097719, at *3 (N.D. Ill. Dec. 6, 2011) (quoting *Carroll v. Otis Elevator Co.*, 896 F.2d 210, 212 (7th Cir. 1990)) (“Ultimately, ‘whether a witness is qualified as an expert can only be determined by comparing the area in which the witness has superior knowledge, skill, experience, or education with the subject matter of the witness’s testimony.’”).

²⁴ *Daubert*, 509 U.S. at 590.

²⁵ *Id.*

²⁶ FED. R. EVID. 104(a).

*reasoning or methodology properly can be applied to the facts in issue.*²⁷

The *Daubert* test, in contrast to *Frye*, focuses courts' attention on the methods and principles ostensibly supporting proffered expert opinion. Whether that opinion is based on good grounds, therefore, is a preliminary inquiry for the trial judge to determine.

In one sense, then, the gatekeeper function of *Daubert* is not very revolutionary at all. Under the Federal Rules, preliminary facts are handled routinely by this rule. Rule 104(a) simply requires that preliminary facts be decided by a preponderance of the evidence. So, on its face, expert evidence under *Daubert* is just like other kinds of evidence that require courts to find preliminary facts in the process of applying the Rules of Evidence.

This point can be illustrated with the simple example of the "dying declaration," which is an exception to the general rule against hearsay statements.²⁸ In order for the hearsay exception for dying declarations to apply, the statement involved must have been made under a belief of imminent death. That is a factual question. But it is a factual question that is necessary to the application of the rule and thus one that courts must make. In order to determine whether a statement was made under a belief of imminent death, a court would likely hear from witnesses — such as doctors, nurses, family members, and so forth — regarding the declarant's knowledge of his or her condition and likelihood of surviving. Rules of evidence are replete with preliminary facts that are necessary to their application. Other examples include whether a particular out-of-court statement was made in furtherance of a conspiracy under Rule 801(2)(E), or whether, under Rule 803(2), an out of court statement "relat[ed] to a startling event or condition, made while the declarant was under the stress of excitement that it caused."²⁹ Thus, under *Daubert*, the question whether the methods or principles underlying an expert opinion are more likely than not valid is merely a preliminary fact to be resolved under Rule 104(a).

The question, however, is, "Well, just how do judges do that?" Inherent in this inquiry lies the revolutionary character of *Daubert*, as well as much of the confusion that has adhered to that decision. The *Daubert* Court noted that in exercising their gatekeeping function of

²⁷ *Daubert*, 509 U.S. at 592-93 (emphasis added).

²⁸ FED. R. EVID. 804(b)(2) ("In a prosecution for homicide or in a civil case, a statement that the declarant, while believing the declarant's death to be imminent, made about its cause or circumstances.")

²⁹ FED. R. EVID. 801(2)(E), 803(2).

evaluating the underlying basis for proffered scientific evidence, judges might consider certain factors that would help them make this determination. By now, these factors are well known and include testability, peer-review and publication, error rate, and general acceptance. With regard to testability, the Court found that the scientific status of testimony was tied to “its falsifiability, or refutability, or testability.”³⁰ The Court asserted that, “a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (*and has been*) tested.”³¹ The second factor the Court identified, somewhat related to the first, was the “error rate” associated with the “particular scientific technique.”³² The Court provided precious little detail about how error rates affect admissibility, simply noting that courts should “ordinarily” consider them and ensure that “standards” exist to control “the technique’s operation.”³³ The third factor the Court identified that might assist courts preliminarily assessing the validity of the methods and principles of proffered expert testimony

³⁰ *Daubert*, 509 U.S. at 593 (quoting KARL POPPER, *CONJECTURES AND REFUTATIONS: THE GROWTH OF SCIENTIFIC KNOWLEDGE* 37 (5th ed. 1989)).

³¹ *Id.* at 593 (emphasis added). For example, in *Bielskis v. Louisville Ladder, Inc.*, 663 F.3d 887, 899 (7th Cir. 2011), the court affirmed the trial court’s exclusion of plaintiff’s engineering expert who sought to testify that a scaffold was defectively designed causing plaintiff’s fall and subsequent injuries. The Seventh Circuit criticized the expert’s more than “shaky” proof, including his use of Google to search for articles on “brittle fracture,” the putative cause of the accident. *Id.* at 894. More generally, the court observed as follows:

[The expert] made no attempt to test his hypothesis. [Plaintiff] suggests that this inquiry is unnecessary because [the expert] needed nothing more than his engineering background and experience to conclude that the caster stem collapsed on account of a brittle fracture brought on by overtightening. But that theory is certainly capable of being tested.

Id. Compare *Charney v. Sears, Roebuck & Co.*, No. 10-14267-CIV, 2011 WL 3844077, at *3 (S.D. Fla. Aug. 30, 2011) (finding adequate the fire expert’s contention that “he ‘tested’ the hypothesis through mental exercises”), with *Firemen’s Fund Ins. Co. v. Tecumseh Prod. Co.*, 767 F. Supp. 2d 549, 555 (D. Md. 2011) (“Neither Plaintiff nor [the fire expert] himself describe any attempts to gather data or create conditions that might falsify his explanation, which is what *testing*, in its scientific sense, means. Rather, all the Court is able to infer from these vague and conclusory accounts is that [the expert] observed three different heat pumps, imagined a sequence of events that would be consistent with his observations, and went no further.”) (emphasis in original).

³² *Daubert*, 509 U.S. at 594.

³³ *Id.* See generally D. Michael Risinger, *Whose Fault? — Daubert, the NAS Report, and the Notion of Error in Forensic Science*, 38 *FORDHAM URB. L.J.* 519, 519-20, 527-29 (2010).

was whether the research “has been subjected to peer review and publication.”³⁴ The Court emphasized that this factor was “not a *sine qua non* of admissibility,” but was a “relevant . . . consideration in assessing . . . scientific validity.”³⁵ Finally, the Court stated, “‘general acceptance’ can yet have a bearing on the inquiry.”³⁶ Lack of general acceptance, the Court observed, may lead judges to view the particular evidence “with skepticism.”³⁷

Early on, some courts and commentators thought that these four factors constituted the holding of *Daubert*.³⁸ But this approach is incorrect. The holding of *Daubert* is the requirement that judges find as a preliminary fact that the methods and principles underlying proffered expert testimony are sufficiently valid to support that testimony. The four “*Daubert* factors” were offered as guidelines to help courts assess expert testimony. These guidelines will sometimes be helpful, and sometimes not, and courts might consider other

³⁴ *Daubert*, 509 U.S. at 593.

³⁵ *Id.*; see, e.g., *Smith v. Ford Motor Co.*, 215 F.3d 713, 721 (7th Cir. 2000) (finding that district court abused its discretion in excluding plaintiff’s experts on the sole basis that the research they relied on had not appeared in peer reviewed journals).

³⁶ *Daubert*, 509 U.S. at 594.

³⁷ *Id.* In *United States v. Horn*, 185 F. Supp. 2d 530, 532 (D. Md. 2002), the court considered a variety of different kinds of standard field sobriety tests (SFSTs), such as the “walk and turn” test, the “one leg stand” test, and the “horizontal gaze nystagmus” test. On the question of general acceptance, the court offered the following insightful observations regarding what group of professionals should be surveyed to gauge acceptance:

Similarly, despite the conclusion of many state courts that the SFSTs have received general acceptance among criminologists, law enforcement personnel, highway safety experts and prosecutors, I remain skeptical whether this is sufficient for purposes of *Daubert* and *Kumho Tire*. Acceptance by a relevant scientific or technical community implies that that community has the expertise critically to evaluate the methods and principles that underlie the test or opinion in question. However skilled law enforcement officials, highway safety specialists, prosecutors and criminologists may be in their fields, the record before me provides scant comfort that these communities have the expertise needed to evaluate the methods and procedures underlying human performance tests such as the SFSTs.

Id. at 557.

³⁸ See, e.g., *Stanczyk v. Black & Decker, Inc.*, 836 F. Supp. 565, 567-68 (N.D. Ill. 1993) (stating that *Daubert* requires the consideration of certain factors, namely “whether the technique (or theory) being advanced by the expert can be or has been tested,” “whether there is peer review and publication of the technique,” and “general acceptance”).

criteria to help them make the necessary preliminary inquiry.³⁹ It is clear, however, that courts must use some set of criteria and explain clearly what they are. Moreover, as Justice Scalia pointed out concurring in *Kumho Tire Company v. Carmichael*, although “the *Daubert* factors are not holy writ, in a particular case the failure to apply one or another of them may be unreasonable, and hence an abuse of discretion.”⁴⁰

On its face, therefore, *Daubert* merely employed the existing scaffolding of the Federal Rules of Evidence to make scientific validity a preliminary fact necessary to the application of Rule 702. This scaffolding, however, concealed the radical character of the decision. Like most revolutionary ideas, the incendiary core of *Daubert* is a simple one. *Daubert* altered the perspective by which expert evidence, and particularly scientific research, was evaluated by the courts. Prior to *Daubert*, courts at most inspected merely the outer forms of expert evidence. *Daubert* reset courts’ gaze onto the inner workings of knowledge gathering. This shift marked a sea change and gave to courts the core instrument of the enlightenment, the scientific method. *Daubert* constituted a frontal assault on the Ancien Régime, thus giving birth to modernity in the law’s use of expertise.

C. *Daubert’s Revolutionary Turn*

Daubert focused courts’ attention on the methods of knowledge gathering. Judges under *Daubert* were expected to know how science worked, not simply rely on self-proclaimed experts to tell them what to believe. The *Daubert* Court tasked lower courts with the obligation to assess “whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue.”⁴¹ This task plainly demands that judges have a fairly sophisticated understanding of research methods and statistics. There can be little doubt that this obligation to learn about science was a basic premise of the *Daubert* holding. Indeed, Chief Justice Rehnquist famously complained that while Rule 702 “confides to the judge some gatekeeping

³⁹ See, e.g., *Marcum v. Adventist Health System/West*, 193 P.3d 1, 4 (Or. 2008) (listing seven factors that may be considered in determining the admissibility of scientific evidence); see also Mark McCormick, *Scientific Evidence: Defining a New Approach to Admissibility*, 67 IOWA L. REV. 879, 911-12 (1982) (listing eleven factors for determining admissibility).

⁴⁰ *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 159 (1999) (Scalia, J., concurring).

⁴¹ *Daubert*, 509 U.S. at 592-93.

responsibility,” he did not think that it imposed “on them either the obligation or the authority to become amateur scientists.”⁴² While there are many contested issues in *Daubert* and its progeny, the fact that the holding demands that judges must now understand the methods and principles of science is not one of them.⁴³

Under *Frye*’s general acceptance test, in contrast, judges seemingly need little or no understanding of science.⁴⁴ All that is necessary is the ability to count. *Daubert* separated the expertise from the respective guilds that stood to benefit from their expertise being accepted by courts. The question after *Daubert* became, “Where are your data?” It was no longer, “Who else agrees with you?” This shift moved the judicial focus from counting noses among the numerous guilds that ply their wares in courtrooms everyday to examining the data, methods, principles, and standards on which these guilds’ supposed expertise lay.

What is most clear in *Daubert* is the basis on which proffered expert evidence should be judged. It is to be screened on its empirical merit, rather than its general acceptance among like-minded members of

⁴² *Id.* at 600-01 (Rehnquist, C.J., concurring in part and dissenting in part). See generally David L. Faigman, *Judges as “Amateur Scientists”*, 86 B.U. L. REV. 1207, 1209 (2006) (“In the twenty-first century — and the sooner the better — judges have no choice but to become amateur scientists.”).

⁴³ See PAUL C. GIANNELLI, EDWARD J. IMWINKELRIED, ANDREA ROTH & JANE CAMPBELL MORIARITY, *SCIENTIFIC EVIDENCE* § 1.08[b], at 45-48 (5th ed. 2012); Bert Black, Francisco J. Ayala & Carol Saffran-Brinks, *Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge*, 72 TEX. L. REV. 715, 753-57 (1994); Bert Black, *Focus on Science, Not Checklists*, 39 TRIAL 24, 24 (Dec. 2003). There are many examples illustrating this fact, but two in particular are telling. First, on remand to the Ninth Circuit, Judge Kozinski described the *Daubert* rule as “daunting.” *Daubert v. Merrell Dow Pharm., Inc.*, 43 F.3d 1311, 1315 (9th Cir. 1995) (“Federal judges ruling on the admissibility of expert scientific testimony face a far more complex and daunting task in a post-*Daubert* world than before.”). Second, Justice Breyer, concurring in *General Electric Company v. Joiner*, observed that the *Daubert* holding “will sometimes ask judges to make subtle and sophisticated determinations about scientific methodology and its relation to the conclusions an expert witness seeks to offer.” 118 S. Ct. 512, 520 (1997) (Breyer, J., concurring).

⁴⁴ I say seemingly because a sophisticated use of *Frye* would require a substantial understanding of science in at least two respects. Foremost, judges using *Frye* should know enough science to know what the relevant field is. Many courts, for instance, ask the very practitioners peddling the expertise whether their expertise is generally accepted. See, e.g., *Commonwealth v. Patterson*, 840 N.E.2d 12, 32-33 (Mass. 2005) (finding latent fingerprint identification admissible because it was generally accepted among fingerprint examiners). If courts ask only latent fingerprint examiners whether latent fingerprint examination is generally accepted, the answer is fairly predetermined. Asking astrologers whether astrology is generally accepted will produce a similar positive response.

some guild. The question that arises with the recognition that *Daubert* manifests an intellectual revolution in expert evidence law is why, or to what end? Certainly, it is possible that the Court merely interpreted Rule 702 to incorporate scientific sensibilities into the evidentiary gatekeeping responsibilities of trial court judges. If true, this interpretation would make the passage of the Federal Rules of Evidence akin to Galileo's heretical publication of the *Dialogue Concerning Two Chief World Systems*. Galileo's *Dialogue*, an early hallmark of the scientific revolution, marks a fundamental transition point away from pre-scientific thinking. Perhaps the Federal Rules and *Daubert* were intended to mark a similar transition in the law.

However much respect we might have for Justice Blackmun and the Court, this interpretation is a bit too generous. The more likely purpose for *Daubert* and its progeny is more pedestrian. Specifically, the *Daubert* trilogy principally concerned the fundamental purpose for rules of evidence, which are meant to set the boundary between the judge's responsibility to determine admissibility and the fact-finder's responsibility to assess weight. But the story is slightly more complicated than that. While the *Daubert* trilogy surely defined the division of labor for finding facts between judge and jury, it also broadened trial courts' managerial responsibilities. As the next section seeks to demonstrate, the Court's revolutionary turn to the more enlightened scientific perspective is integral to its apparent intention to permit trial judges greater power to better manage their dockets.

II. *DAUBERT* AS A POLITICAL REVOLUTION IN CASE MANAGEMENT

A central focus of debate immediately after *Daubert* was whether courts were up to the daunting task of evaluating the empirical merit of proffered expert testimony. A close second to this issue of the judiciary's scientific literacy was the question of the effect the *Daubert* ruling would have on the admission of experts. The initial presumption was that *Daubert* was meant to hold the line against junk science, thus meaning it would lead to greater exclusion of proffered expertise.⁴⁵ As this section explains, there are good reasons for

⁴⁵ This perception was the conclusion, for example, that Linda Greenhouse reached in her *New York Times* story reporting the decision. See Linda Greenhouse, *Supreme Court Roundup: Justices Put Judges in Charge of Deciding Reliability of Scientific Testimony*, N.Y. TIMES, June 29, 1993, <http://www.nytimes.com/1993/06/29/us/thesupreme-court-supreme-court-roundup-justices-put-judges-charge-deciding.html> (“[U]nderlying the majority opinion was a concern that judges would not [be doing] their jobs if they left it to juries to sort out untried or disputed theories.”). Courts and commentators were more inclined to disagree on this matter. See *infra* note 50.

reaching this conclusion. But *Daubert* is not simply an anti-junk science case. The move to a science-based evidence scheme was, to be sure, intended to tighten the rules of expert evidence. But this tightening, I believe, was meant to serve a greater agenda than simply an evidentiary one. It was meant to serve the managerial power of trial courts to control their dockets. The first part of this section focuses on the Supreme Court's cases in this area and the 2000 amendment to the Federal Rules, which effectively codified that case law. The second part argues that this revolution in perspective — i.e., the move from *Frye's* Ancien Régime to *Daubert's* scientific worldview — is a component of a much larger phenomenon in trial court practice, what has been referred to as “managerial judging.”⁴⁶

A. *The Daubert Trilogy, Plus Two*

Conventionally understood, *Daubert* is not a single case. It is generally described as a trilogy of cases, including *Daubert* itself, *General Electric Company v. Joiner*,⁴⁷ and *Kumho Tire Company v. Carmichael*.⁴⁸ To fully appreciate the import of the *Daubert* revolution, however, two additional developments must be considered. The first is the case of *Weisgram v. Marley*,⁴⁹ in which the Court provided its own interpretation of *Daubert's* significance. The second is the 2000 amendment of Rule 702, which largely codified the *Daubert* holding. Close study of these five developments from 1993 through 2000 — the *Daubert* trilogy, *Weisgram*, and Rule 702 — makes abundantly clear the Court's own view that 1993 marked a fundamental transformation in the law's use of expert evidence.

1. The Flexibly Liberal but Rigorously Conservative *Daubert* Standard

While plaintiffs' attorneys read *Daubert* to be a permissive standard that would admit more expert evidence, not surprisingly, perhaps,

⁴⁶ Judith Resnik, *Managerial Judges*, 96 HARV. L. REV. 374, 378 (1982); see also Robert Peckham, *The Federal Judge as Case Manager: The New Role in Guiding a Case From Filing to Disposition*, 69 CALIF. L. REV. 770, 770 (1981). *Daubert's* role in facilitating active case management has been noted by others. See, e.g., Sandra F. Gavin, *Managerial Judging in a Post-Daubert World: A Reliability Paradigm*, 234 F.R.D. 196, 196, 204-06 (2006) (arguing, critically, that this role for *Daubert* represents a “shift to the right”).

⁴⁷ 522 U.S. 136 (1997).

⁴⁸ 526 U.S. 137 (1999).

⁴⁹ 528 U.S. 440 (2000).

defense attorneys believed that *Daubert* would do the opposite and result in the exclusion of more expert evidence.⁵⁰ This debate has not appreciably ebbed with time. Judges have long disagreed over whether *Daubert* or *Frye* is the more restrictive test.⁵¹ Close consideration of this issue, however, suggests that, at least theoretically, neither test is inherently more permissive nor more rigorous than the other. It depends on the evidence being evaluated under the respective test; the tests alone are not inherently liberal or conservative.

Much of the blame for the hand-wringing that occurred over the political consequences of the *Daubert* ruling lies with the Court itself. The *Daubert* opinion is comprised of a cornucopia of confused messages. The opinion began with a paean to the liberality of the Federal Rules of Evidence and the need for fact-finders to hear all relevant evidence. Justice Blackmun's opinion for the Court observed that the "basic standard of relevance" in the Federal Rules "is a liberal one."⁵² It also noted the Rules' "permissive backdrop" and the "austere standard" inherent in the traditional *Frye* approach.⁵³ Most significantly, the Court stated that the "rigid 'general acceptance' requirement would be at odds with the 'liberal thrust' of the Federal Rules and their 'general approach of relaxing the traditional barriers to 'opinion' testimony."⁵⁴ But much of the opinion concerned itself with the trial court's "gatekeeping" role and its need to evaluate the "reliability" of proffered expert opinion. The Court stated plainly that Rule 702 "clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify."⁵⁵ The Court held that "under the Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but

⁵⁰ Compare David Bernstein, *The Admissibility of Scientific Evidence After Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 15 CARDOZO L. REV. 2139, 2164-66 (1994) (discussing when a plaintiff's evidence can be excluded under *Daubert* to the benefit of the defendant), with Kenneth Chesebro, *Taking Daubert's "Focus" Seriously: The Methodology/Conclusion Distinction*, 15 CARDOZO L. REV. 1745, 1745-53 (1994) (discussing how the Court in *Daubert* was deferential to the plaintiff's experts).

⁵¹ Compare *MBIA Ins. Corp. v. Patriarch Partners VIII, LLC*, No. 09 Civ. 3255, 2012 WL 2568972, at *15 (S.D.N.Y. July 3, 2012) (quoting *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 588 (1993)) ("The Federal Rules of Evidence favor the admissibility of expert testimony and are applied with a 'liberal thrust.'"), with *Cavallo v. Star Enterprise*, 892 F. Supp. 756, 774 (E.D. Va. 1995) ("*Daubert* assigned district courts a more vigorous role to play in ferreting out expert opinion not based on the scientific method.").

⁵² *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 587 (1993).

⁵³ *Id.* at 588.

⁵⁴ *Id.* (quoting *Beech Aircraft Corp. v. Rainey*, 488 U.S. 153, 169 (1988)).

⁵⁵ *Id.* at 589.

reliable.”⁵⁶ Most significantly, the Court said that this holding required trial courts to be gatekeepers.⁵⁷ And the Court recognized that, “in practice, a gatekeeping role for the judge, no matter how flexible, inevitably on occasion will prevent the jury from learning of authentic insights and innovations.”⁵⁸ The Court accepted this “balance,” since “Rules of Evidence [are] designed not for the exhaustive search for cosmic understanding but for the particularized resolution of legal disputes.”⁵⁹

Daubert's mixed messages sparked considerable speculation over whether the practical effect of *Daubert* would be less or more expert testimony being admitted in court. It turns out that both views have some truth to them. The split depends on the nature of the expertise, or at least it should split on the basis of the nature of the expertise. And that is because the revolution of *Daubert* really lies in the scientific worldview it embraces. *Frye*, which requires judges to ask, “Is this method generally accepted in the particular field from which it comes?” is essentially a deferential test. Judges do not need to know very much about science; they simply need to be able to count. So judges ask, “You epidemiologists, is this method generally accepted? Raise your hand. One, two, three, four. Those who think it's not generally accepted? One, two, three.” *Daubert*, in contrast, requires that judges understand the methods and principles underlying science. They have to understand what a mean, median, or mode is. They have to understand basic hypothesis testing and research methods, possibly what a standard deviation is, and maybe even regression analysis. And if they do not, they cannot be effective gatekeepers. And it is this insight that should answer the question whether *Daubert*'s effect will be to admit more expert evidence, or less.

In traditional scientific fields, in which scientists collect data and vigorously debate their meaning, *Daubert* should lead to more generous admissibility standards than *Frye*'s general acceptance test. Within mainstream science, hypotheses are more likely to have been rigorously tested, despite ongoing debate about the details. *Daubert* permits courts to consider the validity of the methods and principles

⁵⁶ *Id.*

⁵⁷ *Id.* at 588 (“That the *Frye* test was displaced by the Rules of Evidence does not mean, however, that the Rules themselves place no limits on the admissibility of purportedly scientific evidence. Nor is the trial judge disabled from screening such evidence. To the contrary, under the Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable.”).

⁵⁸ *Id.* at 597.

⁵⁹ *Id.*

underlying such expertise, and does not require a consensus to form in the field. In contrast, in less traditional scientific fields, where little or no data are collected and little or no vigorous debate occurs, *Daubert* should lead to less generous admissibility standards than *Frye*'s general acceptance test. In those fields, consensus has replaced testing. Whereas *Frye* would admit such expertise based on the consensus of the guild, *Daubert* inquires into the basis for this consensus.

A good example of science coming to the law from a traditional field is DNA profiling. At least in theory, DNA profiling should have been accepted sooner in *Daubert* jurisdictions than in *Frye* jurisdictions.⁶⁰ DNA profiling was tested, published in peer reviewed journals, and had known error rates. But in the late 1980s and early 1990s, there was considerable disagreement among scientists regarding, in particular, what could be said statistically when finding a "match."⁶¹ Healthy science operates in exactly this way. Vibrant debate, critical commentary, and vehement disagreement are all hallmarks of mainstream science. These characteristics can also mean that consensus can be slow to develop, even when the fundamental science is relatively sound. Well-tested, peer reviewed and published research, with acceptable error rates, will often continue to attract strong discussion, especially at the margins. Under those circumstances, *Daubert* would be more liberal in admitting the evidence. In contrast, under *Frye*, a court might say, "Well, we really need to wait for consensus, let's slow down." So for a traditional scientific field, *Daubert* would be more likely to admit it and *Frye* would be more likely to exclude and await consensus.

In a field that is not traditionally scientific — and there is a lot of evidence from such fields that the courts admit⁶² — *Daubert* would operate as a more rigorous test and *Frye* would be a more permissive

⁶⁰ I say "in theory" because to my knowledge no one has closely studied this particular question.

⁶¹ Compare David H. Kaye, *DNA Evidence: Probability, Population Genetics, and the Courts*, 7 HARV. J.L. & TECH. 101, 119-20 (1993) (stating that simply sampling people in the relevant population, analyzing their DNA, and reporting the number who match the crime sample raises evidentiary and statistical concerns), with Richard C. Lewontin & Daniel L. Hartl, *Population Genetics in Forensic DNA Typing*, 254 SCIENCE 1745 (1991) (stating that the discussion of DNA statistics should focus on both the significance of matches and mismatches). See generally DAVID H. KAYE, *THE DOUBLE HELIX AND THE LAW OF EVIDENCE* (Harvard Univ. Press, 1st ed. 2010) (discussing the struggle between prosecutors and defense attorneys over the admissibility of DNA evidence).

⁶² See FAIGMAN ET AL., *supra* note 6, at 91-97.

test. Consider, for example, fields such as latent fingerprint identification, firearms, clinical psychology, and clinical psychiatry. In those fields, if judges ask the question, “Where are the data?” they would be met with blank stares. If you ask a latent fingerprint examiner, “Where are your data?” the answer is likely to be, “Data. We have no data. In fact, we don’t need data. We’re specialists.” This attitude is reminiscent of that famous movie line, “We don’t need no stinkin’ badges.”⁶³ Many of these experts have been practicing their trade for twenty-five years; they know it when they see it. They don’t need no stinkin’ data. Under *Daubert*, however, even if your data happen to be experience, you have to be able to articulate how you came to know what you think you know.⁶⁴

2. What the *Daubert* Trilogy Sought to Accomplish

Early on, courts and commentators began to consider whether the gatekeeping role extended beyond trial courts. Specifically, logic might dictate that appellate courts could have as large a role as trial courts in ensuring that expert evidence was reliable. This duty might be especially so if the ultimate objective is to develop a judicially more sophisticated approach to scientific evidence. In *General Electric Company v. Joiner*, however, the Supreme Court rejected the idea of appellate court gatekeepers. In the case below, the plaintiff claimed

⁶³ The line quoted in the text is from Mel Brooks’s inspired western comedy *BLAZING SADDLES* (Warner Brothers Pictures 1974), clip available at <http://www.youtube.com/watch?v=-lj056ao6GE> (last visited Nov. 9, 2012). The original version of this line comes from the book *The Treasure of the Sierra Madre*:

“All right,” Curtin shouted back. “If you are the police, where are your badges? Let’s see them.”

“Badges, to god-damned hell with badges! We have no badges. In fact, we don’t need badges. I don’t have to show you any stinking badges, you god-damned cabrón and ching’ tu madre!”

B. TRAVEN, *THE TREASURE OF THE SIERRA MADRE* 193 (The World Publ’g Co., 1st ed. 1947).

⁶⁴ The Advisory Committee emphasizes the need not to simply accept “experience,” without checking the basis for believing that the experience will produce reliable testimony. The Rules Committee commented as follows:

If the witness is relying solely or primarily on experience, then the witness must explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts. The trial court’s gatekeeping function requires more than simply “taking the expert’s word for it.”

FED. R. EVID. 702, advisory committee’s note.

that his exposure to polychlorinated biphenyls (PCBs) had enhanced the onset of his lung cancer. The trial court had excluded the plaintiff's experts under a *Daubert* analysis. The Eleventh Circuit reversed, holding that appellate courts maintained a duty to review a lower court's admissibility decisions, where the trial court excluded proffered expert testimony and this exclusion was outcome determinative.⁶⁵ For the Eleventh Circuit, this stringent review was mandated since it read *Daubert* to indicate that the Supreme Court envisioned a "lower threshold" for expert testimony.⁶⁶ The appellate court believed that the judge's gatekeeping role is limited to excluding experts whose testimony is "mere speculation," but does not require a substantive review of the scientific basis for the expert opinion.⁶⁷

The principal issue before the *Joiner* Court concerned the issue of the appropriate standard of appellate review of trial court *Daubert* decisions. Chief Justice Rehnquist wrote for a unanimous Court, ruling that appellate courts owe deference to a trial court's admissibility rulings. The Court held "that abuse of discretion is the appropriate standard."⁶⁸ The Eleventh Circuit had erred in second-guessing the trial court's determination that the proffered expert testimony was unreliable.⁶⁹ There are several aspects of *Joiner* that are

⁶⁵ *Joiner v. Gen. Electric Co.*, 78 F.3d 524, 528 (11th Cir. 1996).

⁶⁶ *Id.* at 530.

⁶⁷ *Id.*

⁶⁸ *Gen. Electric Co. v. Joiner*, 522 U.S. 136, 139 (1997).

⁶⁹ One aspect of *Joiner* displays the Court's basic lack of understanding of science. In adopting the abuse of discretion standard, the *Joiner* Court treated scientific evidence just like other kinds of evidence that trial courts hear. The preliminary fact issue regarding validity under Rule 702, the Court believed, was functionally equivalent to preliminary fact questions presented by other rules, such as hearsay. But scientific evidence is different. In most evidentiary contexts, the preliminary assessment that is required to admit or exclude ordinary evidence is specific to the case at hand. In contrast, a significant component of assessing virtually all scientific evidence involves making judgments about matters that transcend particular cases. For instance, whether, and at what level, fMRI technology can validly distinguish people who are lying from people telling the truth is not specific to a particular case. Similarly, whether the brain structure or function of "psychopaths" is distinguishable from that of "normal" brains is a subject of general research findings. As regards the validity of scientific claims that transcend particular cases, therefore, a rule that would make appellate courts partners in the gatekeeping process might reflect the core principles inherent in *Daubert* better than the abuse of discretion standard embraced in *Joiner*. See generally David L. Faigman, *Appellate Review of Scientific Evidence Under Daubert and Joiner*, 48 HASTINGS L.J. 969 (1997) (arguing that the appellate courts are uniquely situated to determine and balance the policy implications raised by the science, to ensure consistency across jurisdictions, and to evaluate the methods, principles and reasoning of multiple research studies); Christopher B. Mueller, *Daubert Asks the Right Questions: Now Appellate Courts Should Help Find the Right*

relevant to the question of how the Court understood its own test. First, the *Joiner* Court reversed the Eleventh Circuit, which had adopted a non deferential appellate standard that had a thumb on the scale in favor of admissibility. According to the *Joiner* Court, the Eleventh Circuit had over interpreted the Federal Rules' display of a preference for admissibility.⁷⁰ The *Joiner* Court highlighted the language from *Daubert* that obligated trial courts to screen expert evidence to "ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable."⁷¹

A second aspect of *Joiner* worthy of note was that Chief Justice Rehnquist wrote the opinion for the Court. Rehnquist had written separately in *Daubert*, concurring in part and dissenting in part, and had famously complained that the Court's ruling would force trial judges to become "amateur scientists."⁷² But in *Joiner*, Rehnquist considered in some detail the research that the district court had found insufficient to support admissibility of the plaintiff's expert's testimony, thus himself becoming something of the amateur scientist that he decried in *Daubert*.⁷³

The third significant aspect of *Joiner* was the Court's clarification of the language in *Daubert* that a trial court's "focus, of course, must be solely on principles and methodology, not on the conclusions that they generate."⁷⁴ This language had been cited by courts and commentators as limiting the reach of the district court's gatekeeping responsibilities.⁷⁵ But the *Joiner* Court observed that "nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert."⁷⁶

The next big question on the *Daubert* horizon after *Joiner* concerned the intended reach of that decision. *Daubert*, as noted, required courts to ask, at least, whether the basis for proffered expert opinion

Answers, 33 SETON HALL L. REV. 987 (2003) (arguing that appellate courts should apply a de novo standard when reviewing rulings admitting or excluding evidence presented as science). For the time being, however, the abuse of discretion standard remains the prevailing rule in federal cases. I return to this issue *infra* Part III.A.

⁷⁰ *Joiner*, 522 U.S. at 140.

⁷¹ *Id.* at 142 (quoting *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 589 (1993)).

⁷² *Daubert*, 509 U.S. at 600-01 (Rehnquist, C.J., concurring in part and dissenting in part).

⁷³ *See Joiner*, 522 U.S. at 144-46.

⁷⁴ *Id.* at 146 (quoting *Daubert*, 509 U.S. at 595).

⁷⁵ *See, e.g., Chesebro, supra* note 50, at 1746-48 (discussing the distinction between an expert's "methodology" and an expert's "conclusion" in *Daubert*).

⁷⁶ *Joiner*, 522 U.S. at 146.

testimony had been tested. However, many experts that had been longtime participants in the judicial process testified largely, if not entirely, based on experience or using technologies that had never been validated. Experts from forensics, clinical medicine, clinical psychology, and many other fields simply had no answer to the question, “Where are the data that support your opinion?” A faithful application of *Daubert* seemed to demand the exclusion of such veritable forms of expertise as latent fingerprints and firearms identification, medical and psychological diagnoses, and many others. The nonscientific specialists’ response to this fundamental challenge was elegant, if facile. Rule 702 speaks of “scientific, technical, or other specialized knowledge.” *Daubert*, they argued, applies only to scientific expertise. Technical experts or specialists do not fall within the trial court’s gatekeeping responsibilities. Overnight, forensic scientists and others shed their white coats and became specialists, hoping to escape the rigors of scientific scrutiny.

In *Kumho Tire*, however, the Court disagreed that there was any relevant evidentiary distinction between science and nonscience. Justice Stephen Breyer, writing for the Court, said that “it would prove difficult, if not impossible, for judges to administer evidentiary rules under which a gatekeeping obligation depended upon a distinction between ‘scientific’ knowledge and ‘technical’ or ‘other specialized’ knowledge. There is no clear line that divides the one from the others.”⁷⁷ The Court also rejected the proposition that jurors are likely to be more impressed with the science label than with technical or specialized expertise. The Court observed that all experts are given considerable leeway to offer opinion evidence. Any concern with triers of fact yielding to the authority of scientific opinion was similarly present with all expert testimony.⁷⁸

The more difficult issue presented under *Daubert*, and one brought into question by *Kumho Tire*, involved the manner in which trial courts should carry out their gatekeeping duties given the multitude of disciplines that enter courtrooms every day. The *Daubert* factors could not be applied to every sort of expert, and the rigor represented by those factors might not be appropriate in all cases. Rule 702, the subject of *Daubert* and its progeny, applies to neuroscience, real estate appraisals, accounting, DNA technology, social psychology, and clinical medicine. *Kumho Tire* extended *Daubert* beyond just “scientific” expertise but elided the question of how trial courts should

⁷⁷ *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 148 (1999).

⁷⁸ *See id.*

measure the validity of the great variety of expertises that courts confront daily. The Supreme Court stated:

The conclusion, in our view, is that we can neither rule out, nor rule in, for all cases and for all time the applicability of the factors mentioned in *Daubert*, nor can we do so for subsets of cases categorized by category of expert or by kind of evidence. Too much depends upon the particular circumstances of the particular case at issue [A] trial court should consider the specific factors identified in *Daubert* where they are reasonable measures of the reliability of the expert testimony.⁷⁹

Kumho Tire thus imposes on trial courts the responsibility to examine the premises of all expert opinion, whether derived from rigorous experimental tests or daily experience with the subject. The ultimate question is whether the expert testimony is based on good grounds. But what grounds qualify as good is something of a moving target.

The debate over *Daubert*'s import did not cease after *Kumho Tire*, despite the strong language Justice Breyer brought to the expertise proffered in that case. The Court emphasized that *Daubert* "imposes a special obligation upon a trial judge to 'ensure that any and all scientific testimony . . . is not only relevant, but reliable.'"⁸⁰ That special obligation, moreover, applies to any "knowledge [that] might become the subject of expert testimony," not just of the scientific variety.⁸¹ The Court stated emphatically, "And where such testimony's factual basis, data, principles, methods, or their application are called sufficiently into question . . . the trial judge must determine whether the testimony has 'a reliable basis in the knowledge and experience of [the relevant] discipline.'"⁸² This mandate could be said to be the

⁷⁹ *Id.* at 150-52; see, e.g., *United States v. Thomas*, Nos. 10-4725, 10-4729, 2012 WL 2951410, at *5 (4th Cir. July 20, 2012) ("The *Daubert* factors . . . simply are not applicable to this kind of testimony [from a gang expert], whose reliability depends heavily on the knowledge and experience of the expert, rather than the methodology or theory behind it.") (internal quotation marks and citation omitted).

⁸⁰ *Kumho Tire*, 526 U.S. at 147 (quoting *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 589 (1993)).

⁸¹ *Id.*

⁸² *Id.* at 149 (quoting *Daubert*, 509 U.S. at 592); see also Edward J. Imwinkelried, *The Meaning of "Appropriate Validation" in Daubert v. Merrell Dow Pharmaceuticals, Inc., Interpreted in Light of the Broader Rationalist Tradition, Not the Narrow Scientific Tradition*, 30 FLA. ST. U. L. REV. 735, 739 (2003) ("The courts should be open to a variety of validation techniques, including, but not limited to, empirical induction and mathematical deduction. Adopting the attitude of a skeptical rationalist, the judge ought to inquire whether the results of the use of the technique in question demonstrate that the technique 'works'; that is, whether the technique enables the

hallmark of modern scientific discovery. The scientific revolution, after all, was never really about what we know, but how we come to know it. *Kumho Tire* was as express an invitation to trial courts to join the scientific revolution as the Court could have fashioned.

The Court's own pronouncements in *Daubert*, *Joiner*, and *Kumho Tire* seemingly make clear that the gatekeeping responsibility imposed on trial courts was intended to be a serious and substantive one. If there was any question about this, however, it should have been answered by a fourth case, an unusual situation in which the Court had the opportunity to comment on the *Daubert* line of cases. In *Weisgram* the trial court had admitted expert testimony regarding the source of a fire that destroyed the plaintiff's home.⁸³ The jury returned a verdict for the plaintiff. On appeal, the Eighth Circuit held that the lower court erred when it admitted the plaintiff's experts, finding that they failed to pass muster under *Daubert*. Significantly, and controversially, the Eighth Circuit then ruled that, without this expert evidence, the plaintiff had insufficient evidence to support his case, and the court then directed a judgment in favor of the defendant. Thus, the Eighth Circuit refused to remand the case to the trial court to give the plaintiff a second "bite at the apple." In agreeing that the plaintiffs should not be given a second chance to find admissible experts, Justice Ginsburg, writing for the Court, stated:

Since *Daubert* . . . parties relying on expert evidence have had notice of *the exacting standards of reliability such evidence must meet*. It is implausible to suggest, post-*Daubert*, that parties will initially present less than *their best expert evidence* in the expectation of a second chance should their first try fail. We therefore find unconvincing [the plaintiffs'] fears that allowing courts of appeals to direct the entry of judgment for defendants will punish plaintiffs who could have shored up their cases by other means had they known their expert testimony would be found inadmissible.⁸⁴

The final piece of the puzzle regarding *Daubert's* true import comes from amended Rule 702. Despite the *Daubert* Court's statement that it was merely interpreting Rule 702 as it would interpret any statute,

expert to accurately perform the specific task at hand. As the task itself varies, as when the expert puts the technique to different uses and applications, the required validation must also change.").

⁸³ *Weisgram v. Marley*, 528 U.S. 440, 445 (2000).

⁸⁴ *Id.* at 456-57 (emphasis added).

Rule 702 was amended in 2000.⁸⁵ Rule 702 requires that an “expert’s scientific, technical, or other specialized knowledge” be “based on sufficient facts or data,” “the product of reliable principles and methods,” and “reliably applied . . . to the facts of the case.”⁸⁶ This amendment effectively codifies several key provisions of the *Daubert* trilogy. First, it maintains the judge’s gatekeeping role to ensure that the expert testimony is based on reliable principles and methods. Second, this role extends to all expert evidence, not just scientific evidence. Third, it adds the word “sufficient,” mandating that courts not simply evaluate whether there are some facts or data supporting the expert’s opinion, but that those bases are sufficient to support that opinion. Finally, and somewhat less remarked upon than the other components of Rule 702, the amendment obligates trial courts to check whether the basis for the expert’s opinion can be “reliably applied” to the particular case.

The *Daubert* trilogy, together with *Weisgram* and amended Rule 702, fairly well demonstrate that the Court meant to impose at least not-insubstantial demands on proffered expert evidence. These authorities accomplished this heightened inspection through the adoption of a test with a certain degree of scientific sophistication. On its face, at least, this observation suggests that the Court sought to bring a certain scientific sensibility to evidentiary decisions about expert evidence. The *Daubert* trilogy, under this view, would signify that the law had finally joined the scientific revolution. As the next section discusses, however, the purpose of the *Daubert* trilogy was more pedestrian than that, albeit still revolutionary. It was politically revolutionary, though by choosing the scientific paradigm as its vehicle, the Court sparked an intellectual revolution at the same time.

III. MANAGERIAL JUDGING

Throughout this Essay, two hypotheses have competed to explain the *Daubert* trilogy. Both posit that *Daubert* was a revolutionary event.⁸⁷ One holds that it was a revolution of ideas, bringing scientific

⁸⁵ The Advisory Committee on Evidence Rules proposed amending the rule “on experts in light of the Supreme Court’s decision in *Daubert*.” Advisory Committee on Evidence Rules, *Minutes of the Advisory Committee on Evidence* (Apr. 6-7, 1998) available at <http://www.uscourts.gov/uscourts/RulesAndPolicies/rules/Minutes/0498evidenceminutes.htm>.

⁸⁶ FED. R. EVID. 702. The quoted language is drawn from the “restyled rules,” which went into effect in 2012. The restyling was not intended to change the meaning of any of the rules.

⁸⁷ Of course, other hypotheses are possible, including that *Daubert* was not

sensibilities to the law of evidence, and any political ramifications were secondary. The second holds that it was a revolution of politics, intended to give trial courts greater managerial power over their dockets, and any intellectual ramifications were secondary. Based on several grounds, the second hypothesis appears to accord more closely to the evidence.

This section examines these grounds. Space precludes an exhaustive treatment of the issue, and indeed this matter could occupy a book. But, on the whole, the evidence appears clear that *Daubert* and its progeny were designed to improve trial courts' ability to manage cases.⁸⁸ In particular, three separate grounds support this conclusion: (1) the Court's repeated statements throughout the *Daubert* trilogy regarding trial court discretion and deferential appellate review for admissibility decisions; (2) the disposition of the cases of the *Daubert* trilogy, as well as *Weisgram*; and (3) the more vehement results stemming from the rigors of *Daubert* in civil cases than in criminal cases.⁸⁹

revolutionary at all. Bert Black fondly tells the story of what Judge Thomas Reavley said about *Daubert*: "Never has a case changed the law so little and practice so much." Bert Black, Remarks at the University of California, Davis Law Review Symposium: The *Daubert* Hearing — From All the Critical Perspectives (Mar. 2, 2012), in 46 UC DAVIS L. REV. 759, 859 (2013).

⁸⁸ I have largely avoided the greater and more fact-intensive question whether *Daubert* has indeed resulted in courts exercising greater case management. I consider this question somewhat, but only cursorily, *infra* notes 100-115 and accompanying text, in discussing *Daubert's* possible differential application in civil and criminal cases.

⁸⁹ A possible fourth ground could come this year with the Supreme Court's decision to grant certiorari in *Behrend v. Comcast Corp.*, 655 F.3d 182 (3d Cir. 2011), *cert. granted*, 80 USLW 3442 (U.S. June 25, 2012) (No. 11-864).

The Court will consider the question of "whether a district court may certify a class action without resolving whether the plaintiff class has introduced admissible evidence, including expert testimony, to show that the case is susceptible to awarding damages on a class-wide basis." *Id.* This issue has led to a split in the circuit courts. See *Ellis v. Costco Wholesale Corp.*, 657 F.3d 970 (9th Cir. 2011) (holding that a district court must consider the merits if they overlap with class certification issues); *Bennett v. Nucor Corp.*, 656 F.3d 802 (8th Cir. 2011) (holding that a district court may resolve disputes going to the factual setting of the case if necessary to the class certification analysis). In *Wal-Mart Stores Inc., v. Dukes*, the Court off-handedly addressed this issue stating, "The District Court concluded that *Daubert* did not apply to expert testimony at the certification-stage of class-action proceedings. We doubt that is so . . ." 131 S. Ct. 2541, 2553-54 (2011) (citation omitted).

The lower courts have fundamentally disagreed regarding the required *Daubert* analysis at the class certification stage. Compare *In re Zurn Pex Plumbing Prod. Liab. Litig.*, 644 F.3d 604, 612-14 (8th Cir. 2011) (rejecting call to require "a full and conclusive *Daubert* inquiry" at the class certification stage, and concluding that the

A. *Deference to Trial Court Admissibility Decisions*

If the Supreme Court's focus had been to improve the scientific quality of the judiciary, it would have crafted a rule that included appellate courts in the gatekeeping function. This is so for several reasons. First, scientific evidence can be complex and difficult and not readily handled by busy trial courts. Unlike trial courts, appellate courts have both the luxury of time and the luxury of numbers. The appellate experience is typically more cerebral and academic, exactly the sort of qualities that would best resolve complex scientific questions.⁹⁰

Another — and perhaps more compelling — reason for inviting appellate participation in scientific evidentiary disputes is that many of

“tailored *Daubert* analysis” used by the district court was sufficient), *with* American Honda Motor Co. v. Allen, 600 F.3d 813, 815-16 (7th Cir. 2010) (“[W]hen an expert’s report or testimony is critical to class certification, . . . a district court must conclusively rule on any challenge to the expert’s qualifications or submissions prior to ruling on a class certification motion. That is, the district court must perform a full *Daubert* analysis before certifying the class if the situation warrants.”). If the Court decides, as might be expected given the statement in *Dukes*, that *Daubert* applies at the certification-stage of class actions, it will constitute an additional ground for the conclusion reached in this section — that the *Daubert* trilogy was meant to further the managerial function of trial courts.

⁹⁰ Judge D. Brooks Smith, in a talk on the Y2K litigation in Austin, Texas, related a humorous allegory that perfectly captures the different roles of trial, appellate, and Supreme Court judges. It follows:

It seems that there were three members of the federal judiciary who had gotten together for a duck hunt: a Supreme Court justice, a member of the court of appeals, and a district judge. The trio were warned that in the particular venue they had selected the game laws were strictly enforced, and that they should take great care to be shooting at the right thing.

Well, the morning of the hunt arrived, and as the three stood in the duck blind, a bird flew from the water to their right. The Supreme Court justice stepped forward, raised his shotgun, and pondered, “The question before me is to determine first the nature of a duck. This is not simply a question of definition; it is an issue of ontological import.” And by the time the justice had held forth on the ontology of “duckness,” the bird was gone.

Then came the appeals court judge, who quickly got a bead on the next bird to come off the water, and who, upon seeing it, ruminated, “We assume, of course, that all ornithological requirements are met. But to assure that what we confront is in fact a duck, we will establish a three-part test. First . . . ” Again, by this time, the bird was no longer in sight. Finally, it was the turn of the district judge. As soon as he saw something fly within range, he fired away, brought down a bird, and exclaimed, “Damn, I hope that was a duck.”

D. Brooks Smith, *The Managerial Judge and Y2K Litigation*, 18 REV. LITIG. 403, 404 (1999).

the controverted issues surrounding applied science are not case specific. Indeed, all of the applied science introduced in courts is based explicitly or implicitly on general principles or findings that transcend particular cases. A toxic tort case, for example, might appear to present the question whether Bendectin caused the plaintiff's birth defects. But this determination depends on research that demonstrates first of all that Bendectin can sometimes cause birth defects in the population. Whether Bendectin causes birth defects is a fact that is not particular to an individual case or a specific jurisdiction. Similarly, the validity of DNA profiling, firearms identification technology, or polygraphs all depend on general research findings. As a matter of the logic of scientific discovery, there is absolutely no reason why an appellate court should be deferential to a trial court regarding general scientific findings.

In *Joiner*, however, the Court held that the ordinary standard — “abuse of discretion” — that applies to trial court evidentiary rulings “should apply in reviewing a trial court’s decision to admit or exclude expert testimony under *Daubert*.”⁹¹ There was no mention of the differences between scientific evidence and ordinary evidence, and no discussion of any benefit to courts’ use of science by having appellate participation in this review.

Even more telling than the standard settled upon in *Joiner* are the statements regarding appellate deference in *Kumho Tire*. The key issue in *Kumho Tire* was whether the gatekeeping obligations of *Daubert* extended to non-scientific — i.e., “technical or other specialized” — evidence. The Court ruled that it did, but this holding meant that courts would have to identify the global criteria by which to measure the validity of experts who are not “scientists,” such as historians, real estate appraisers, economists, and accountants. This result is the sort of meta-consideration on which a scientifically sensible jurisprudence might seek appellate court input. The *Kumho Tire* Court, however, came to the opposite conclusion, again investing broad discretionary authority in trial courts. The Court explained its reasoning as follows:

The trial court must have the same kind of latitude in deciding how to test an expert’s reliability, and to decide whether or when special briefing or other proceedings are needed to investigate reliability, as it enjoys when it decides whether or not that expert’s relevant testimony is reliable. Our opinion in *Joiner* makes clear that a court of appeals is to apply an abuse-of-discretion standard when it “review[s] a trial court’s

⁹¹ Gen. Electric Co. v. *Joiner*, 522 U.S. 136, 138-39 (1997).

decision to admit or exclude expert testimony.” That standard applies as much to the trial court’s decisions about how to determine reliability as to its ultimate conclusion. Otherwise, the trial judge would lack the discretionary authority needed both to avoid unnecessary “reliability” proceedings in ordinary cases where the reliability of an expert’s methods is properly taken for granted, and to require appropriate proceedings in the less usual or more complex cases where cause for questioning the expert’s reliability arises. Indeed, the Rules seek to avoid “unjustifiable expense and delay” as part of their search for “truth” and the “jus[t] determin[ation]” of proceedings. Thus, whether *Daubert*’s specific factors are, or are not, reasonable measures of reliability in a particular case is a matter that the law grants the trial judge broad latitude to determine.⁹²

The trial court under *Kumho Tire* thus largely determines both what criteria are used to test reliability and whether the expert’s testimony meets those criteria. Moreover, the Court highlighted the fact that this broad delegation of authority is tailored, at least in part, to avoiding unjustifiable expense and delay.

The Supreme Court’s insistence that trial courts have broad discretion over what factors are used to determine reliability as well as the judgment over whether the proffered testimony is reliable, invest them with considerable authority to manage these cases. As the *Kumho Tire* Court made clear, this authority ensures that judges have the “discretionary authority” to hold or dispense with “appropriate proceedings,” as they see fit.⁹³ And, importantly, these judgments can be informed by the objective of avoiding “unjustifiable expense and delay,” though the ultimate objective is the “search for ‘truth’” and the “jus[t] determination” of proceedings.⁹⁴ “Truth,” it might be argued, would be more likely to be advanced by having appellate courts participate in the process of resolving disputed scientific evidence. Such a process, however, would surely be inimical to avoiding “expense and delay.”

⁹² *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152-53 (1999) (internal citations omitted).

⁹³ *Id.* at 152.

⁹⁴ *Id.* at 152-53.

B. *The Daubert Trilogy, Weisgram, and Summary Dispositions*

Toward the end of its *Daubert* opinion, the Court observed that “in the event the trial court concludes that the scintilla of evidence presented supporting a position is insufficient to allow a reasonable juror to conclude that the position more likely than not is true, the court remains free to direct a judgment . . . , and likewise to grant summary judgment.”⁹⁵ On remand, the Ninth Circuit held, as a matter of law, that the evidence did not pass muster under *Daubert* and directed a verdict for the defendant.⁹⁶

The other two legs of the trilogy ended similarly. Although the *Joiner* Court found that there remained open questions necessitating remand for further proceedings, the Court’s affirmance of the district court’s principal ruling finding that the plaintiff’s experts’ testimony was inadmissible effectively ended the case.⁹⁷ In *Kumho Tire*, the trial court had excluded the plaintiff’s expert and granted the defendants’ motion for summary judgment, a ruling affirmed by the Supreme Court.

The case that most supports the hypothesis that *Daubert* and its progeny were intended to serve case management needs of trial courts is, ironically, the one case in which an appellate court’s management was affirmed. As noted above, the trial court in *Weisgram* admitted plaintiffs’ three experts on the question of whether a home heater had been defective and caused the fire. The jury returned a verdict for the plaintiffs. The Eighth Circuit reversed, finding that the trial court abused its discretion in admitting the plaintiffs’ experts. The circuit court, however, then held as a matter of law that the expert opinion was inadmissible and then remanded and ordered the district court to enter judgment for defendant. The plaintiffs appealed, arguing that the circuit court erred when it granted judgment as a matter of law to the defendant after excluding the plaintiffs’ experts’ testimony. The *Weisgram* Court disagreed. The Court held “that the authority of courts of appeals to direct the entry of judgment as a matter of law extends to cases in which, on excision of testimony erroneously admitted, there remains insufficient evidence to support a jury’s verdict.”⁹⁸

⁹⁵ *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 596 (1993) (internal citations omitted).

⁹⁶ *Daubert v. Merrell Dow Pharm., Inc.*, 43 F.3d 1311, 1322 (9th Cir. 1995).

⁹⁷ A subsequent history search on Westlaw indicated that the Eleventh Circuit remanded the case pursuant to the Supreme Court’s ruling, but there are no subsequent reports from the trial court at present.

⁹⁸ *Weisgram v. Marley Co.*, 528 U.S. 540, 457 (2000).

Although it is a set of only four cases, it can hardly be a coincidence that all four of the Court's major expert evidence cases ended with the exclusion of the proffered expertise and summary disposition on the merits. This exclusion is not to suggest, of course, that the Court intends to erect insurmountable barriers to complex litigation involving substantial expert testimony. But the Court has complete control of its docket and is reputed to select cases with one eye on their convenience for reaching particular outcomes and the other on the messages that will be sent.⁹⁹ *Daubert*, *Joiner*, *Kumho Tire*, and *Weisgram*, were, by this measure, all of a kind. They each contained relatively weak expert evidence in which close inspection of their scientific premises led to their exclusion, followed by summary judgment. The message seems fairly clear.

C. *Do the Rigors of Daubert Apply Equally to Criminal Cases?*

Rule 702 does not distinguish between civil and criminal cases and so its dictates should apply equally in the two contexts.¹⁰⁰ And courts have so held.¹⁰¹ Yet, all of the action in the Supreme Court, from *Daubert* to *Weisgram*, has been on the civil side of the docket. If the issue is simply one of scientific sophistication, *Daubert* should play out similarly in civil and criminal cases. However, if *Daubert* is principally about case management, we should expect substantial differences in these two areas. The idea of the managerial judge is largely limited to civil cases. Once again, though the evidence is not conclusive, lower

⁹⁹ See Edward A. Hartnett, *Questioning Certiorari: Some Reflections Seventy-five Years After the Judges' Bill*, 100 COLUM. L. REV. 1643, 1707 (2000) ("[T]he Supreme Court does not so much grant certiorari to particular cases, but rather to particular questions."); see generally SAMUEL ESTREICHER & JOHN SEXTON, *REDEFINING THE SUPREME COURT'S ROLE: A THEORY OF MANAGING THE FEDERAL JUDICIAL PROCESS* (1986) (introducing a managerial model of the Supreme Court's case selection process); H.W. PERRY, JR., *DECIDING TO DECIDE: AGENDA SETTING IN THE UNITED STATES SUPREME COURT* (1994) (examining the case selection process from 1976 to 1980 through interviews with Justices and their clerks).

¹⁰⁰ This section of the Essay draws significantly from the discussion in FAIGMAN ET AL., *supra* note 6, at 114-17.

¹⁰¹ See *United States v. Bahena*, 223 F.3d 797, 808 (8th Cir. 2000) ("*Daubert* does apply to criminal cases."); see also *United States v. Hebshie*, 754 F. Supp. 2d 89, 114-15 (D. Mass. 2010) ("While most of the [listed] cases [involving fire experts] are civil, it cannot be that science is different in criminal cases than in civil ones. Bad science is bad science; unreliable methodologies are unreliable methodologies, no matter the side of the docket.").

courts at least appear to take their gatekeeping duties more seriously in managing civil cases.¹⁰²

Social scientists have increasingly raised the issue whether courts, in fact, employ *Daubert* more lackadaisically in criminal trials — especially in regard to prosecution evidence — than in civil cases, especially in regard to plaintiffs' evidence. This allegation is a serious charge. Early research, however, lends some credence to it. Several studies have examined the patterns of admissibility decisions in cases decided prior to and after the adoption of *Daubert*, casting at least some light on the behavior of both federal and state courts in several categories of cases.¹⁰³ Comparisons of the rate of pretrial challenges to the admissibility of expert evidence before and following *Daubert* found a marked increase overall.¹⁰⁴ But, in the civil arena, Risinger found nearly ninety percent of the challenges being raised by defendants against plaintiffs' expert evidence. Among the criminal cases, where the overwhelming bulk of expert evidence is offered by the government, defendants are far less active in bringing challenges, often failing to raise objections that would have been reasonable and available, and which presumably would have been raised in a civil case involving evidence with similarly weak foundations. Of the challenges to expert evidence brought in federal courts, fewer than ten percent were in criminal cases. Of those, the prosecution brought more challenges to defense evidence than vice-versa by a ratio of seven to two, though the government presents the far larger target for attack.¹⁰⁵

Given that a challenge is mounted, what is the response of the courts? In civil cases, the answer is that the post-*Daubert* courts are more likely to exclude challenged expert evidence than they had been before. Dixon & Gill found exclusion of challenged expert evidence to

¹⁰² This appears to be the general view among academic writers. See Donald E. Shelton, *Forensic Science Evidence and Judicial Bias in Criminal Cases*, 49 NO. 3 JUDGES' J. 18, 19-20, 24 (Summer 2010); see also Elizabeth L. DeCoux, *The Admission of Unreliable Expert Testimony Offered by the Prosecution: What's Wrong with Daubert and How to Make it Right*, 2007 UTAH L. REV. 131, 132-33 (2007); Jennifer L. Groscup et al., *The Effects of Daubert on the Admissibility of Expert Testimony in State and Federal Criminal Cases*, 8 PSYCHOL. PUB. POL'Y & L. 339, 346 (2002); Wes R. Porter, *Repeating, Yet Evading Review: Admitting Reliable Expert Testimony in Criminal Cases Still Depends Upon Who Is Asking*, 36 RUTGERS L. REV. 48, 49 (2009); D. Michael Risinger, *Navigating Expert Reliability: Are Criminal Standards of Certainty Being Left on the Dock?*, 64 ALB. L. REV. 99, 109-12 (2000).

¹⁰³ See DeCoux, *supra* note 102; Risinger, *supra* note 102.

¹⁰⁴ See Lloyd Dixon & Brian Gill, *Changes in the Standards for Admitting Expert Evidence in Federal Civil Cases Since the Daubert Decision*, 8 PSYCHOL. PUB. POL'Y & L. 251, 298 (2002); Risinger, *supra* note 102, at 102-05.

¹⁰⁵ Risinger, *supra* note 102, at 109-10.

result about fifty percent of the time pre-*Daubert*, rising to as much as seventy percent in years post-*Daubert*.¹⁰⁶ In Krafska et al.'s surveys conducted both before and after *Daubert*, federal judges reported excluding or limiting challenged expert evidence twenty-five percent of the time pre-*Daubert* compared to forty-one percent of the time post-*Daubert*.¹⁰⁷ But as between plaintiffs and defendants, the data reveal a notable lack of symmetry. Risinger found that defendants succeeded about two-thirds of the time in the many federal cases in which they challenged plaintiff experts.¹⁰⁸ In the smaller set of cases where plaintiffs challenged defense-proffered expertise, the challenges succeeded less than half the time.¹⁰⁹ This pattern was repeated on appeal.¹¹⁰ In state civil cases, Risinger found that challenges by plaintiffs and by defendants succeeded at about the same forty percent rate, but of course defendants were more active in bringing challenges (eighty-two percent of the challenges on appeal were by defendants).¹¹¹ A reading of the cases confirms that courts have become more aggressive in their scrutiny and exclusion of evidence in civil cases.

On the criminal side, the picture is quite different. Risinger found that, post-*Daubert*, defense challenges to government evidence succeeded less than ten percent of the time in federal district courts.¹¹² Government challenges to defense evidence succeeded two-thirds of the time. On appeal, defense-proffered expertise was found to have been properly excluded eighty-three percent of the time.¹¹³ Prosecution-proffered expertise that had been admitted at trial was excluded only once on appeal. Defendants did somewhat better in state courts than in federal courts, winning a quarter of their challenges.¹¹⁴ Prosecution challenges to defense expertise succeeded about three-quarters of the time.¹¹⁵

¹⁰⁶ Dixon & Gill, *supra* note 104, at 225.

¹⁰⁷ Carol Krafska et al., *Judge and Attorney Experiences, Practices, and Concerns Regarding Expert Testimony in Federal Civil Trials*, 8 PSYCHOL. PUB. POL'Y & L. 309, 322 (2002).

¹⁰⁸ See Risinger, *supra* note 102, at 110.

¹⁰⁹ See *id.*

¹¹⁰ See *id.*

¹¹¹ See *id.* at 111.

¹¹² See *id.* at 108.

¹¹³ See *id.*

¹¹⁴ See *id.* at 111.

¹¹⁵ See *id.* Groscup et al.'s data (criminal cases drawn from federal appellate courts) suggest that patterns of admission and exclusion are unchanged from before *Daubert* to after, and that this pattern holds true for each category of expert testimony

“Of course, none of this,” Risinger notes, “goes directly to the validity of any given decision,” but the data “are fairly striking in their own right.”¹¹⁶ One possibility is that the differences between civil and criminal cases reflect meaningful differences in science being used or its application to the different groups of cases, and that there are systematic differences between the factual issues that arise in civil and criminal cases. Or, perhaps, the differential outcomes are attributable to differences in the quality of advocacy (borne of differences in resources) in the two realms. On the other hand, some commentators suggest that social and political differences easily explain the differential treatment: that, as a general proposition, judges disfavor civil plaintiffs and criminal defendants and are more likely to rule against them than against their opposites even when presenting equivalent evidence or arguments. A more definitive explanation of the pattern awaits future research.

CONCLUSION

History will one day record definitively the revolutionary character of *Daubert v. Merrell Dow Pharmaceuticals, Inc.* *Daubert* fundamentally altered the perspective by which courts evaluate the admissibility of expert testimony. Under the Ancien Régime of *Frye v. United States*, courts merely assessed whether the basis for scientific evidence was generally accepted in the particular field from which it came. This test demanded little scientific sophistication, and courts rarely evidenced any sophistication in applying it. *Daubert*, in contrast, requires courts to assess the methods and principles underlying proffered expertise. The validity test of *Daubert* thus places a considerable onus on trial court judges to understand basic principles of statistics and scientific research methods.¹¹⁷ To be sure, courts have yet to adequately fulfill

examined. Much of the difference between the conclusions of this study and that of the others is probably attributable to the universe of cases on which it focused. Specifically, the findings reflect the behavior of the courts in the body of cases examined. As Groscup et al. realize, by focusing on appellate cases, they are missing most of the action (or inaction) at the trial court level. The only trial rulings their selection method captures are those that resulted in appeal, meaning cases in which defendants lost *Daubert* challenges followed by losing their trials. On the other hand, their method allows them to see more precisely how the decisions of appellate courts compare to the decisions of trial courts on the same cases. Jennifer Groscup et al., *supra* note 102, at 342-44 (2002).

¹¹⁶ See Risinger, *supra* note 102, at 108.

¹¹⁷ See *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 147 (1999) (quoting *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 589 (1993)) (“[*Daubert*] imposes a special obligation upon a trial judge to ‘ensure that any and all scientific testimony . . . is not

this obligation. Indeed, the *Daubert* revolution will not be fully realized until they do.

Although *Daubert's* revolutionary character lies principally in altering the intellectual preconceptions of *Frye's* Ancien Régime, this was probably not the Supreme Court's intention. Instead, this Essay argues that the Court had a somewhat more modest and more pedestrian intention. Specifically, close consideration of *Daubert* and its progeny indicates that the Court's principal objective was to empower trial courts to better control their dockets. The cases of *Daubert*, *Joiner*, *Kumho Tire*, and *Weisgram* all support the thesis that the Court invoked a validity test for expert opinion testimony in order to improve trial courts' ability to manage cases.

Still, whatever the original motivation the Court might have had for setting forth a validity test for expert evidence, the shift in perspective of this new test fundamentally transformed legal practice. *Daubert* was decided on June 28, 1993. Although we are twenty years into the revolution, it still remains too early to say just how much has changed. Yet everything is different.