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ADMISSIBILITY REGIMES: THE "OPINION RULE" AND OTHER ODDITIES AND EXCEPTIONS TO SCIENTIFIC EVIDENCE, THE SCIENTIFIC REVOLUTION, AND COMMON SENSE

David L. Faigman*

I. INTRODUCTION

Law schools provide little training in science.1 On the whole, practicing lawyers are not proficient in statistics and research methods, and, it is safe to say, have scant desire to become so. It is perhaps not surprising, therefore, that evidentiary rules that apply to expert witnesses often appear to have been born out of ignorance, and applied capriciously. No practice better reflects this than courts' tendency to exempt experience-based expert opinion from generally applicable standards for expert testimony. Although federal courts expressly reject the idea that non-scientific expert testimony is exempt from generally applicable evidentiary requirements,2 they nonetheless do exactly this in a wide variety of contexts. California courts, for their part, unabashedly distinguish between scientific expertise and ordinary expert opinion and apply rigid standards to the former but lax, if not nonexistent, standards to the latter.3 Whether explicit or implicit, however, this practice defies logic and contradicts centuries of scientific learning. It is an artifact of early scientific thought that should have been abandoned in the time of blood-letting and phrenology.

Traditionally, the discussion regarding expert evidence has concerned the permissiveness versus the restrictiveness of expert admissibility rules.

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3. People v. Kelly, 549 P.2d 1240, 1244-45 (Cal. 1976); see infra Part III.

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Hence, the California and federal practices of exempting certain kinds of expertise might be understood as simply relaxing the otherwise restrictive standards of ordinary rules of admissibility. But the underlying structure of an admissibility regime is not uni-dimensional, as this discussion suggests. Admissibility standards, in fact, vary along two continuous dimensions that appear to be largely independent of one another. An admissibility ruling might be permissive or restrictive and it might use either a standard that defers or one that does not defer to the professional field from which the expert comes. This Essay considers the California and federal practices of adopting varying standards for different expertises in light of this two-dimensional model of admissibility regimes.

II. THE THEORY OF EXPERT EVIDENCE RULES

Much of the contemporary debate about expert evidence has revolved around two famous federal court decisions. The first is the 1923 District of Columbia Circuit Court decision in Frye v. United States. The second is the 1993 United States Supreme Court decision in Daubert v. Merrell Dow Pharmaceuticals, Inc. Under Frye, scientific expertise is admissible if it is generally accepted in the particular field from which it comes. The Daubert test conditions admissibility on a finding that the basis for the scientific expertise is valid. The principal difference between the two tests is that Frye relies on the respective expert fields to determine validity, whereas Daubert calls upon courts to primarily assess the methods and principles underlying proffered expertise.

Following Daubert, a persistent debate arose over whether one test or the other was more restrictive in its admission of expert evidence. The empirical research on this issue has furnished a mixed picture. Sometimes Frye is more restrictive, sometimes Daubert is, and much of the time they produce similar outcomes. Upon reflection, this is not terribly surprising, since the two tests can be fairly easily manipulated in order to obtain the desired result. Frankly, a court that is results-oriented can reach the desired outcome using either Frye or Daubert. Much of the problem with both

6. Frye, 293 F. at 1014.
9. See infra notes 15-21 and accompanying text.
Frye and Daubert is that the tests were framed and subsequently developed in a theoretical vacuum. It is not entirely clear what legal or scientific cultural values are being advanced by these two tests. As a consequence, it is difficult to measure their respective success, since we do not know exactly what they are trying to accomplish.

Stepping back from the tests themselves, it is worth considering the underlying principles that ought to dictate the composition of an admissibility test for expert evidence. Based on historical practice, there are two basic issues that must be addressed regarding this decision point. The first is, how active should judges be in the role of "gatekeeper"? The second is, how should judges carry out this designated responsibility, that is, what are the components of the test? Hence, the potential for variability in evidentiary decision making in this area varies along two basic dimensions. As regards the first dimension, concerning how a jurisdiction defines the judge’s role in screening expert opinion, jurisdictions could adopt an active judicial role in screening evidence, while others might exercise little or no oversight. The two poles of the second dimension, concerning the nature of the test used to assess proffered expert testimony, can be represented by the alternative tests set forth in Frye and Daubert.

The first dimension, the mode of assessment, is largely a question of what criteria courts use to assess expert testimony. Among contemporary courts, this is basically a matter of a choice between a general acceptance test, like that set forth in Frye, or a validity assessment, as described in Daubert. Frye-like tests typically focus on whether experts from a particular field accept the empirical basis for the opinion. Under tests of general acceptance, courts largely defer to the conclusions of some identified group of professionals. The Daubert test, on the other hand, queries whether the expert opinion is based on sound methods and principles. Under the Daubert test and similar validity inquiries, courts assume the primary responsibility of evaluating the empirical bases of proffered expert opinion. The essential difference between Frye and Daubert is profound. A Frye test contemplates that judges need bring little or no knowledge of research methods to the admissibility decision. The

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10. I assume that courts have some gatekeeping role in regard to expert testimony, an assumption basic to the structure of all evidence codes. The role may be restrictive or permissive, but, just as with hearsay and character evidence, judges have some supervisory responsibilities over expert evidence.


12. Id. at 592.

13. In fact, however, the proper application of Frye should require some measure of scientific sophistication. Without some basic knowledge of science and scientific disciplines, judges cannot know which scientists to survey to assess general acceptance. In the area of polygraphs, for
test can be applied simply by counting the noses of members of the pertinent field. In contrast, *Daubert* requires judges to have fairly developed empirical sensibilities, since they must evaluate the methods and principles underlying the proffered expertise.\(^{14}\)

Along the second dimension, the threshold level for admissibility, legal standards vary from rigorous to permissive. The more permissive the legal standard, the greater the quantum of expert testimony that will be heard by the trier of fact. A jurisdiction's decision regarding how high the bar should be set for experts typically depends on its resolution of the classic problem of defining the proper roles for judges and juries in the trial process. A high threshold indicates a relatively active judicial role in screening expert opinion for the jury. A low threshold leaves the evaluation function primarily to jurors. The issue regarding the division of fact-finding between judge and jury is a highly complex one, and can depend on such factors as the relative institutional competencies of the two, constitutional requirements, and the nature of the evidence involved. In the area of expert evidence, establishing the division of fact-finding responsibilities between judge and jury depends on such broad considerations as competence to make the assessment, avoidance of wasted time or confusion of the issues, fairness to the parties, efficiency, and many others.

The two dimensions of mode of assessment and threshold level roughly define most admissibility regimes in the United States. These two basic dimensions manifest themselves in practice into four basic approaches to the judicial role regarding expert evidence: (1) *Daubert*-rigorous, (2) *Daubert*-permissive, (3) *Frye*-rigorous, and (4) *Frye*-permissive. These evidentiary options can be illustrated in a basic 2X2 Table. (See Table 1).\(^{15}\) Somewhat surprisingly, the two dimensions underlying admissibility decisions appear to be largely independent. While *Daubert* is often perceived and applied by courts rigorously, it is regularly described as being a permissive test.\(^{16}\) Similarly, *Frye* is typically considered a rigorous

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\(^{14}\) *Daubert*, 509 U.S. at 580.

\(^{15}\) See infra tbl.1.

\(^{16}\) See, e.g., State v. Leep, 569 S.E.2d 133, 143 (W. Va. 2002) (The court observed that “the
test, but is often employed in a permissive manner.¹⁷

### TABLE 1

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<thead>
<tr>
<th>Mode of Assessment</th>
<th>Threshold Set for Admissibility</th>
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<td></td>
<td>( \text{High (Restrictive)} )</td>
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<tr>
<td>( \text{Daubert} )</td>
<td>( \text{Daubert-Restrictive} )</td>
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<tr>
<td>( \text{Frye} )</td>
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It must be emphasized that the choice is not categorical, since each of the dimensions represents a range of alternatives. Thus, the threshold can be set anywhere between utterly permissive to highly restrictive, just as the mode of assessment can be fully deferential to a respective field to non-deferential to that field. For instance, as regards the latter dimension, mode of assessment, the \( \text{Daubert} \) test itself is not entirely non-deferential in its approach. Of the four factors suggested as criteria of scientific validity — testability, error rate, peer review and publication, and general acceptance¹⁸ — only the first two are non-deferential, while the latter two reflect deference to the respective field. One could certainly imagine an admissibility standard that is considerably less deferential than this.

The situation, however, is somewhat more complex than this 2X2 model might suggest, for a couple of reasons. First, as noted at the start of this Essay, some jurisdictions create an exemption for non-scientific, experience-based, expert opinion. Specifically, some jurisdictions employ prior 'general acceptance' standard espoused in \( \text{Frye} \) . . . is obsolete and has been replaced by the more liberal determinative criteria enunciated in \( \text{Daubert} \).

¹⁷. See Paul C. Giannelli, The Admissibility of Novel Scientific Evidence: \( \text{Frye} \) v. United States, a Half Century Later, 80 COLUM. L. REV. 1197, 1209 (1980) (noting that how a court defines the relevant scientific community can affect the admissibility of the evidence, essentially making it easier to find “general acceptance”).

¹⁸. \( \text{Daubert} \), 509 U.S. at 580.
what they call a "relevancy test" for expert testimony. In effect, then, a third dimension exists and can operate either as an admissibility regime itself or as an exception to an otherwise applicable regime for certain kinds of expert testimony. This third option, however, is really no test at all, since it posits only the most basic queries common to all evidence codes, such as the relevance of the testimony and the competence (i.e., qualifications) of the witness. A second complication comes from the fact that while the 2X2 table describes the basic range of admissibility regimes available, particular jurisdictions might employ different regimes to different kinds of expertise. Hence, for example, a Daubert jurisdiction that does not apply the rule established in that case to non-scientific expertise, might operate in a Daubert-restrictive way for some kinds of evidence and a Daubert-permissive way for other kinds of evidence. 

The concept of admissibility regimes has both prescriptive and descriptive value. It is descriptive in the sense that it could be used to describe a jurisdiction's approach to particular kinds of expert evidence. As Figure 1 illustrates, it might be possible to grade a particular jurisdiction's admissibility opinion along each continuum in order to graph their approaches to the subject. This should be done based on the standards employed in the cases rather than the specific outcomes reached in the cases. Very strong evidence should be admitted under the most restrictive test and very weak evidence will be excluded under even a permissive test. For example, DNA profiling would pass muster under a strongly non-deferential high-threshold test, but a police officer's gang-profile evidence might fail under a highly deferential low-threshold test.

20. See, e.g., Marron v. Stromstad, 123 P.3d 992, 1004 (Alaska 2005) ("But we have never adopted Kumho Tire's extension of Daubert to all expert testimony.... [W]e limit our application of Daubert to expert testimony based on scientific theory, as opposed to testimony based upon the expert's personal experience.").
21. See generally 1 MODERN SCIENTIFIC EVIDENCE, supra note 8, at 73-79.
The prescriptive value of the admissibility regime model is two-fold. First of all, it represents a jurisdiction's basic value-system regarding the boundary between judge and jury (permissive vs. restrictive) and its view of the proper criteria that should be used to set that boundary (deferential vs. non-deferential). Second, the model provides a scheme by which comparisons can be made between different kinds of expert evidence within and between jurisdictions. Within jurisdictions, for example, it might be argued that courts should be consistent in the test that they apply to expert evidence, unless good reasons exist otherwise. Between jurisdictions, the model permits comparisons of how courts approach the same kinds of expertise. Figure 2 provides an illustration of how such comparisons might look.
III. THE OPINION RULE

In the remainder of this Essay, I consider California and federal practice in light of this prescriptive aspect of the model. As noted above, California exempts non-scientific expertise from its otherwise restrictive/deferential rule of decision. And federal courts, as noted, implicitly relax their restrictive/non-deferential rule of decision for certain kinds of expert evidence, in particular, forensic science. The question presented is whether these practices are justified.

A. California Theory and Practice

California divides the world of expert evidence into two basic categories. On the one hand, experts sometimes offer opinions that are based on scientific or technical processes or tests, while, on the other hand, experts sometimes offer opinions based on professional experience. The former opinion is thought to be particularly worrisome, because of the aura

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22. See Kelly, 549 P.2d at 1244-45.
of certainty that might surround opinion based on the seeming wizardry of science. Using Frye, California erects evidentiary barriers to this sort of expert opinion, fearing that it might overwhelm the tender sensitivities of fact-finders. In contrast, expert opinion that is based on experience, and which claims no pretensions to scientific exactitude, does not receive this close evidentiary review. In effect, California exempts experiential expert opinion – or non-scientifically derived opinions – from the rigors of evidentiary review. This practice, one employed explicitly or implicitly in many jurisdictions, is often referred to as the “opinion rule.”\textsuperscript{24} In this Essay, I argue that the opinion rule, which is an explicit aspect of practice under the California Code\textsuperscript{25} and an implicit component of federal practice, especially in criminal cases,\textsuperscript{26} is contrary to basic principles of science and common sense. It should be abandoned in favor of an explicit consideration of the question of whether the particular proffered expert opinion should be the subject of testing and how much testing it should have received before it can be admitted.

Consider the case of People v. Miller,\textsuperscript{27} in which a California appellate court applied the opinion rule and held that psychiatric and psychological testimony predicting future violence under the state’s Sexually Violent Predator Act is not scientific evidence subject to Kelly-Frye.\textsuperscript{28} The defendant had complained that the state’s expert had relied on statistical tests that should have been demonstrated to be generally accepted by the relevant scientific community. The Miller court, however, rejected this argument, pointing out that the expert’s opinion was clinically-based and the statistical tests were used at most to support an experience-based clinical judgment. The court explained “that since the expert’s opinion testimony was not based solely on the actuarial evidence, but rather on a variety of factors and the expert indicated such evidence was not infallible, a Kelly hearing was not required.”\textsuperscript{29}

Under the California approach to expert testimony, therefore, psychological clinical opinion that is not primarily based on statistical techniques is admitted with no Kelly-Frye threshold check, but psychological opinion that is premised on such technology confronts the
formidable barriers of that test. In effect, the California rule means that expert opinion with little or no scientific basis is readily admitted, but opinion that is based on scientific test must survive the Kelly-Frye gauntlet. This approach is particularly perverse in the context of predictions of violence, since research has consistently demonstrated over the last five decades that actuarial prediction is more accurate than clinical prediction.\textsuperscript{30} Indeed, some studies indicate that using actuarial predictions of violence alone is more accurate than using clinical and actuarial methods in combination.\textsuperscript{31} This suggests that clinical judgment can actually detract from the power of actuarial tests. Moreover, research in the last decade is leading to the development of ever more powerful actuarial technology, so the gap between clinical judgment and actuarial methods is likely to further widen.\textsuperscript{32} Yet the California approach effectively gives a free pass to experience based clinical judgment and erects substantial barriers to the introduction of science-based actuarial techniques.

California and other jurisdictions advance two basic arguments in support of the rule that relaxes evidentiary standards for experience-based expert opinion. The first is not always spelled out, but such a regime must presume that a dividing line can be identified between scientific and non-scientific evidence. The second argument advanced to support the California rule is the belief that jurors are more likely to be impressed by the aura of infallibility that surrounds scientific opinion, but can critically assess non-scientific opinion readily enough. I consider these in turn.

1. Distinguishing Science from Non-Science

Although there is certainly a distinction to be drawn between science and non-science, logic does not recommend its use to support a rule that would allow non-scientific opinion easy admission and enact substantial hurdles to the admission of science based evidence. That something is not science is hardly reason to admit it for the jury’s consideration. The more pertinent question concerns the methods that were employed to study the underlying hypotheses of interest. Although there is no one method or paradigm that is uniquely “scientific,” some methods of study are clearly “non-scientific.” The California courts, however, have not explored this issue in any depth, but have merely assumed that a line dividing science and non-science is readily identifiable. Other courts applying the opinion rule

\textsuperscript{30} Paul Meehl, Clinical Versus Statistical Prediction (1954); see also Robyn M. Dawes et al., Clinical Versus Actuarial Judgment, 243 SCIENCE 1668, 1668 (1989).

\textsuperscript{31} Dawes et al., supra note 30, at 1669.

have sought to define the parameters of the boundary between science and non-science.

The most ambitious attempt to set forth the premises underlying the opinion rule was advanced by the Arizona Supreme Court in *Logerquist v. McVey*. The court held that the *Frye* test, the state's ordinary rule of admissibility for scientific evidence, did not apply to non-scientific expert opinion. The court explained that "*Frye* is applicable when an expert witness reaches a conclusion by deduction from the application of novel scientific principles, formulae, or procedures developed by others." However, the court argued, *Frye* "is inapplicable when a witness reaches a conclusion by inductive reasoning based on his or her own experience, observation, or research." Hence, for the *Logerquist* court, opinion based on inductive reasoning is not subjected to any substantial threshold test, but opinion that stems from deductive reasoning receives close scrutiny.

The subject of the expert opinion in *Logerquist* was repressed memories. According to the court, this subject “has not yet been appropriately tested.” Thus, repression cannot qualify as science. Nonetheless, the court believed that an expert’s experience with the phenomenon still made the testimony probative, because the “[p]laintiff does not claim her memories are proved true as a matter of scientific fact.” Presumably, however, the plaintiff did claim that her memories were true as a matter of fact, just not as a matter of “scientific fact.”

The error the *Logerquist* court makes is believing that scientific knowledge is discrete or categorical. It is not. The scientific method is a process. Indeed, it is a process that invariably begins with experience. A medical doctor, for example, might observe that blood-letting relieves his or her patients’ headaches and thus develops a hypothesis regarding both the mechanism and effectiveness of this therapy. This experience might be multiplied by additional cases. Of course, it is to be expected that not all patients benefit from blood-letting therapy, but experience might well demonstrate that many do. Does experience demonstrate the effectiveness of blood-letting? For many centuries it did. In Arizona, it presumably still does.

34. *Id.* at 123.
35. *Id.* at 133.
36. *Id.*
37. *Id.* at 134.
38. *Id.* at 133.
39. *Logerquist*, 1 P.3d at 116 (stating that the defendant contended that the plaintiff's memories were not real or accurate, implying that the plaintiff claimed that her memories were true as a matter of fact).
A good scientist would systematically examine this hypothesis, comparing for instance, blood-letting to drug therapies, such as Advil, pseudo-therapies (such as a sugar pill placebo), or no therapy. The results of such a research project would be the product of the scientific method. In that sense, and that sense alone, they can be described as "scientific." But there is no threshold that marks a statement as "science" or "scientific." Hypotheses and theories are valuable only to the extent that good research methods corroborate them. Of course, the hypothesis that an association exists between blood-letting and headache relief was supported by clinical experience. In this sense, that hypothesis was a product of the scientific method too, since observation is part of that method. It is just that casual observation can often be very wrong, so scientists typically seek to bring additional methods to bear on any hypothesis. The point is that observation is not separate from the scientific method, it is an integral and necessary part of it. But it is merely the first step and, contrary to the Arizona court's conclusion, deserves no special deference.

Consider the example of repressed memories, the subject of the Logerquist decision. A doctor might have examined one or more people who claim to have begun remembering things of a disturbing nature that they had previously not known about. A scientist's approach to this observation would be at least two-fold. On the one hand, employing inductive reasoning, a scientist might look for further instances of this phenomenon. The initial observation could have been an anomaly or not accurate for a variety of reasons. In seeking confirmation, the wise researcher would want to ensure that the underlying traumas occurred, that the amnesia was not explainable by other factors -- such as biological amnesia -- and that the reports of repression were not spurious products of expectations of either the subjects or researchers. At the same time, using deductive reasoning, the scientist would seek to integrate his or her observations into what is generally known about human memory and the brain. Does this observation conform to theory? Perhaps theory suggests another explanation for the recalled memories other than repression. Or possibly -- and of potentially great excitement for the scientist -- the theory itself needs to be adjusted to account for these newly discovered facts.

There is no single recipe for how to conduct a scientific investigation. The scientific method is not really just one method at all. It is a rigorous, critical, and careful approach to the development of knowledge. Different empirical subjects require different paradigms to study them. An

entomologist might study ants in the laboratory and in the rain forest. A physicist might study the motion of water droplets in a vacuum chamber and in a waterfall. A psychologist might study the accuracy of eyewitness identifications in the laboratory and in the field. Scientists know that each method has its advantages and disadvantages and what is learned from one can be combined with the others to reach more or less certain conclusions. Repressed memories similarly could be, and should be, the subject of an assortment of methodologies, including clinical and experimental, qualitative and quantitative, prospective and retrospective, and psychological and neurological. Almost never will a study, or even a set of studies, resolve whether a phenomenon as complex as repressed memories exists and in what ways it might exist. Isolating the details surrounding this alleged phenomenon should require a prodigious research effort. So far, that research effort has produced little support for the claimed phenomenon.  

Given the structure of science, the distinction the Logerquist court makes between deductive and inductive reasoning, for purposes of admissibility standards, is chimerical. In fact, inductive reasoning does not really exist separately. It always serves the process of deductive reasoning. What the court called inductive reasoning is simply hypothesis formation through anecdotal experience. The subject of repressed memories well illustrates the point. In Logerquist, the plaintiff's expert, Dr. van der Kolk, said that he had treated "hundreds of survivors of childhood sexual abuse," and that he was prepared to testify that some of these "victims do have delayed memories, that their memories are as reasonably accurate as normal memories, if not better." How would he know something like this?

If the court had given the subject any thought, it would have realized that this is a remarkable statement. In fact, it is almost as unbelievable as if he had said that he could turn lead into gold. What sort of experience would be necessary to support his claims about repressed memories? Most importantly, he would have to have some idea of ground truth. How did the expert determine that any allegations of abuse actually happened? Somewhat less important, but much more arrogant, is the doctor's claim that "delayed memories" are as "accurate as normal memories, if not better." Better? He thus claims experience with repressed memory and normal memory formation, comparisons of the two, as well as the investigatory capacity to check claims of abuse several decades old. That is

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41. 2 MODERN SCIENTIFIC EVIDENCE, supra note 8, at 581-82.
42. Logerquist, 1 P.3d at 117 (citing Plaintiff's response to Defendant's Memorandum to Assist the Court in Evaluating the Admissibility of Expert Evidence).
43. Id.
some very impressive experience.

In fact, of course, he claims no such experience. What he apparently has had is experience with patients, some proportion of which manifest symptoms consistent with repression. He treats these people, but there is no reason to believe he can distinguish true memories from false memories or has any basis for believing that the phenomenon is real. His expertise is therapeutic, not forensic.

The basic error of Logerquist lies in the court’s failure to critically assess the proffered evidence in a scientifically sophisticated way. By his own statement, the plaintiff’s expert asserted that his opinion was informed, in part, by the process of deduction from a scientific theory extant for over a century. But this theory, built largely on a Freudian foundation, fails the test of modernity. It is not simply that repression is not yet science, it has repeatedly failed scientific attempts to validate it. The court’s embrace of personal experience of the truth of repressed memory over the contrary record of scientific exploration is akin to continuing to believe in cold fusion or even extra sensory perception (ESP). Despite fervent believers in these phenomena, many of whom have personal experience with them, the failure of science to demonstrate their validity must rule the day. This is not to say that repressed memories, cold fusion, or ESP might not turn out to be proved true one day. To be sure, science has yet to definitively disprove them. But in science, as in the law, the proponent has the burden of proof. Based on the record, that burden has not been met by proponents of repressed memories.

2. Juror Credulity

Even if a realm of non-scientific expert opinion could be reliably identified, is it reasonable to assume that no substantial threshold test is necessary, because jurors can readily assess its validity and weight? This is an issue that has received little research attention and certainly not enough to provide significant insights into the matter. In fact, it is not entirely clear what the substance of the claim is. According to the California Supreme Court, the primary concern with scientific opinion is the possibly overwhelming influence complex scientific evidence has on jurors. The court observed that “[l]ay jurors tend to give considerable weight to

44. Id. The court quoted the witness’s letter to counsel as follows: “I intend to testify that amnesia for traumatic experiences, including for sexual abuse, has been documented in numerous scientific reports for over a century.... I have conducted numerous studies on the nature of the human response to trauma, including specifically on memory processes in responses.” Id.

45. See 2 MODERN SCIENTIFIC EVIDENCE, supra note 8, at 581-82.

'scientific' evidence when presented by 'experts' with impressive credentials.\textsuperscript{47} The Frye threshold, therefore, establishes a barrier in order to protect against juror credulity. Non-scientific expert opinion, according to the California high court, does not present a similar danger: "When a witness gives his personal opinion on the stand – even if he qualifies as an expert – the jurors may temper their acceptance of his testimony with a healthy skepticism born of their knowledge that all human beings are fallible."\textsuperscript{48}

The first premise of the California opinion rule is thus that jurors bring a "healthy skepticism" to non-scientific expert opinion but fail to do so when confronting scientifically based opinion. Why jurors would suspend their critical faculties when hearing scientific opinion is not obvious. Certainly, one explanation the California Supreme Court advanced, "impressive credentials"\textsuperscript{49} of the scientific experts, is unlikely to be so, since experts testifying to "personal opinion" typically have as impressive resumes as those testifying to scientific opinion. Indeed, very often they are the same people. The rule focuses on the content of the testimony, not the credentials or scientific identity of the expert. Very often, so-called scientific experts in California, and thus subject to Kelly-Frye, have no advanced degrees, while those allowed to testify to personal opinion do have advanced degrees.

A second premise implicit in the California approach is the apparent belief that jurors are better able to parse personal opinion than they will be to critique scientific opinion. The court in People v. Venegas\textsuperscript{50} summarized this argument:

The Kelly test is intended to forestall the jury's uncritical acceptance of scientific evidence or technology that is so foreign to everyday experience as to be unusually difficult for laypersons to evaluate. In most other instances, the jurors are permitted to rely on their own common sense and good judgment in evaluating the weight of the evidence presented to them.\textsuperscript{51}

Although it might indeed challenge jurors to critically assess scientific opinion, it is not clear that they are likely to do considerably better with non-scientific opinion. How, in fact, should a juror evaluate non-scientific opinion? The California Supreme Court advances common sense and good

\textsuperscript{47} Id. at 1245.
\textsuperscript{49} Kelly, 549 P.2d at 1245.
\textsuperscript{50} People v. Venegas, 954 P.2d 525 (Cal. 1998).
\textsuperscript{51} Id. at 546 (citations omitted).
judgment as if these characteristics were self-defining and obviously applicable to the task at hand. In most cases, non-scientific opinion is based on a combination of personal experience with the subject and professional training.

Consider again the issue of repressed memories, a subject generally thought to be exempt under the opinion rule. An expert might testify that the plaintiff repressed her memory from a young age until adulthood, that such a phenomenon has occurred in other cases, and that the memories recalled are reliable. If you are a commonsensical juror with good judgment, how do you assess this claim? There are an assortment of possibilities, such as demeanor, the prospect of bias due to expert witness fees, credentials, and admissions or inconsistent statements elicited on cross-examination. Of course, all of these common sense good judgments are available to critically assess scientific opinion as well. Other than these standard indicia of reliability, all with questionable value, there is nothing more. Non-scientific expert opinion is, in fact, little more than *ipse dixit*. Repressed memories are so, because the expert has twenty years of experience with the subject. By this measure, blood-letting and alchemy were so too.

Cross-examination is unlikely to be particularly effective with well-credentialed experts for another reason. Most of these witnesses fully believe the content of their testimony. A lying witness may have sweaty palms, avoid eye-contact, and stutter. A lying witness might also be caught in a contradiction or be unable to explain prior inconsistent statements. But many experience-based experts are fully convinced of the validity of their judgment. Experience, after all, has failed to falsify their beliefs. The weakness of their testimony does not lie with the witness, it lies with the content of their opinion and the methods they used to form it. Experience and observation, without question, are important and integral components of scientific research. But they are typically employed to form hypotheses, not confirm them. The history of science is replete with examples of experience and observation – over decades and even centuries – that have been demonstrated wrong when subjected to systematic and careful test.

Cross-examination could be used to reveal the fact that expert opinion based on experience is profoundly weak in comparison to systematic scientific test. This line of questioning, however, raises exactly the issue that the California courts thought was avoided by their rule. Venegas’ reliance on “common sense and good judgment” does not help much in

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52. See Wilson v. Phillips, 86 Cal. Rptr. 2d 204, 206, 208 (Ct. App. 1999) (holding that Kelly-Frye does not apply to repressed memory expert testimony).
53. Venegas, 954 P.2d at 546.
assessing the value of scientific methods, or whether they could, or should, have been brought to bear on the subject. This sort of critical analysis requires exactly the sort of scientific sophistication that California courts think jurors lack. California courts employ the Frye rule because they do not trust jurors to have the background or ability to critically assess scientific issues beyond what simple common sense and good judgment would allow.

Although jurors may not be scientifically sophisticated, scientific opinion testimony readily lends itself to critique, especially as compared to experience-based opinions. Scientists customarily set forth the methodological premises for their opinions, including both the general research that describes the phenomenon in issue as well as the reasons why this particular case is an instance of that phenomenon. Scientists routinely itemize in detail research design, statistical analyses performed, methods of data collection and coding, make-up of the sample population studied, statistical strength of the results, and to what extent the methods and principles employed in the research support the conclusions reached. Hence, on the one hand, experience-based opinion is judged by whether the witness is nervous, has sweaty palms, and fails to make eye-contact; on the other hand, science-based opinion can be judged on these factors as well as whether the research was prospective or retrospective, used comparison groups, blinded experimenters to condition, used adequate statistical measures, appropriate subject populations, and a score of other not-so-difficult-to-understand criteria for high quality research.

California’s practice of employing a restrictive test for science-based expert opinion and a permissive test for experience-based expert opinion is arguably the opposite of what good scientific common sense would recommend. At the very least, however, there is no compelling basis for California’s approach of using two different tests for expert opinion evidence. Expert opinion, whatever the ostensible foundation it rests upon, presents similar dangers to jurors. Moreover, the factors that are likely to be relevant to determining the weight of proffered expert opinion are generally the same, whether the evidence is scientifically-based or experience-based. Indeed, in Kumho Tire, this was the conclusion the United States Supreme Court reached in regard to whether Daubert’s judicial gatekeeping obligations extended to non-scientific expert testimony.\footnote{Kumho Tire, 526 U.S. at 147.} The Court held that Daubert “applies to all expert testimony.”\footnote{Id.} Despite this injunction, significant portions of federal

\footnote{Kumho Tire, 526 U.S. at 147.}
\footnote{Id.}
practice bear a disturbing similarity to California’s exemption for experience-based expert opinion.

IV. FEDERAL PRACTICE

Although the Daubert test was first framed in a civil case amidst the swirl of controversy surrounding fears of exploding litigation, the rule applies similarly to criminal cases. Rule 702 does not distinguish between the civil and criminal contexts in regard to expert testimony. In fact, much of Daubert’s early evolution occurred through court responses to DNA evidence offered in criminal cases.

While Daubert ostensibly applies in the same way in criminal and civil cases, social scientists have increasingly raised the issue whether courts, in fact, employ Daubert more lackadaisically in criminal trials – especially in regard to prosecution evidence. Early research lends some credence to this belief. 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. Comparisons of the rate of pretrial challenges to the admissibility of expert evidence before and following Daubert found, overall, a marked increase. But, in the civil arena, Risinger found nearly 90% 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

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56. Portions of this section are drawn from 1 MODERN SCIENTIFIC EVIDENCE, supra note 8, at 101-05.
57. United States v. Bahena, 223 F.3d 797, 808 (8th Cir. 2000) (“Daubert does apply to criminal cases.”).
58. FED. R. EVID. 702.
59. See, e.g., United States v. Bonds, 12 F.3d 540, 562 (6th Cir. 1993) (holding that DNA evidence was properly admitted because DNA profiling and the basic procedures used were generally accepted in the scientific community); Gov’t of the Virgin Islands v. Penn, 838 F. Supp. 1054, 1073-74 (D.V.I. 1993) (concluding that the DNA profiling process was relevant and reliable and thus DNA evidence was admissible).
61. See Groscup et al., supra note 59.
63. Id. at 145.
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 those, the prosecution brought more challenges to defense evidence than vice-versa by a ratio of 7:2, though the government presents the far larger target for attack.

If a challenge is mounted, what is the federal court response? 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 and Gill found exclusion of challenged expert evidence to result about 50% of the time pre-Daubert, rising to as much as 70% in years post-Daubert. In Kafka et al.'s surveys conducted both before and after Daubert, federal judges reported excluding or limiting challenged expert evidence 25% of the time pre-Daubert compared to 41% of the time post-Daubert. 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. In the smaller set of cases where plaintiffs challenged defense experts, the challenges succeeded less than half the time.

On the criminal side, the picture is quite different. Risinger found that, post-Daubert, in federal district courts, defense challenges to government evidence succeeded less than 10% of the time. Government challenges to defense evidence succeeded two-thirds of the time. On appeal, defense-proffered expertise was found to have been properly excluded 83% of the time. Prosecution-proffered expertise that had been admitted at trial was excluded only once on appeal.

"Of course, none of this," as Risinger notes, "goes directly to the

64. Id. at 109-10.
65. Id. at 109.
66. Id. at 109.
69. Krafka et al., supra note 66, at 322.
70. Risinger, supra note 23, at 110.
71. Id. at 108.
72. Id. at 108.
73. Id. at 111.
74. Id. at 110.
75. Id. at 108.
76. Risinger, supra note 23, at 108.
validity of any given decision," but the data "are fairly striking in their own right." 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 difference in the quality of advocacy (borne of difference in resources) in the two realms. On the other hand, it might be suggested that social and political differences 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 when presenting equivalent evidence or arguments. A more definitive explanation of the pattern awaits future research.

Nonetheless, there are assorted hints that federal courts use a Daubert-permissive admissibility scheme for prosecution-based expert opinion, while in the civil arena they use a Daubert-restrictive test. For example, Risinger's analyses of decisions by type of expert evidence proffered in criminal cases, as well as other reviews of government "science" in criminal cases, suggest that if Daubert gatekeeping were rationally based on the quality of the underlying expert evidence, the exclusion rate pursuant to defense challenges would be higher than it is. Even a casual glance at many courts' treatment of prosecution experts, from police officers to bitemark identification, suggests a leniency applied to the government that is not enjoyed by civil plaintiffs.

Federal courts' Daubert failures generally fall into two categories. In the first, and more common, courts simply defer to the government's theory regarding the validity of the proffered expert testimony. Under this approach, the courts appear to mouth the suggested criteria of Daubert, such as testing, error rate, peer review, and general acceptance, but register little or no interest in actually considering the import of those criteria for the case-at-hand. In these cases, the Daubert criteria become a mantra to recite, but without any seeming conscious understanding. The second category of Daubert failure occurs when the courts appear to take the suggested criteria seriously, but apply them in a fantastically ignorant fashion. In many ways this category is worse than the mantra-reciting category, because it indicates an affirmative illiteracy regarding basic scientific concepts.

In the first category of Daubert-as-mantra, two cases are worth
considering, United States v. Allen and United States v. Hicks. In United States v. Allen, the defendant claimed that the trial court erred in admitting expert testimony regarding shoe-print identification. The defendant argued that this testimony did not pass muster under Daubert. The court responded to this assertion by relating the statements made by two of the state’s experts, that “accurate comparisons require a trained eye; the techniques for shoe-print identification are generally accepted in the forensic community; and the methodologies are subject to peer review.” The court did not otherwise assess the claims that shoe-print identification has achieved “general acceptance,” or that it is “peer-reviewed.”

In United States v. Hicks, the defendant claimed that the trial court should have excluded the government’s expert’s opinion that the shell casings recovered from the scene of the shooting had been fired from a rifle retrieved from the defendant’s home. The court simply recited the expert’s claimed basis for his opinion, without critically assessing even the somewhat incredible claim that this technique has a zero or near zero error rate. The court stated as follows:

[S]tandards controlling firearms comparison testing exist. As [the expert] testified at the state-court Daubert hearing, he followed well-accepted methods and scientific procedures in making his comparisons. He also testified in federal court that the Association of Firearm and Tool Mark Examiners produces literature about firearms comparison testing that he relied on and that is authoritative in the field of firearms and tool mark examination. Further buttressing the reliability of his methodology, [the expert] also testified at the state-court Daubert hearing that the error rate of firearms comparison testing is zero or near zero.

In the second category, what might be called the scientific illiteracy cases, one in particular stands out. In United States v. Havvard, the defendant filed a motion in limine seeking to exclude the government’s

80. United States v. Allen, 390 F.3d 944 (7th Cir. 2004).
81. United States v. Hicks, 389 F.3d 514 (5th Cir. 2004).
82. 390 F.3d at 950.
83. Id. at 949.
84. Id. at 949-50.
85. Id. (The court held that the shoe print evidence was properly admitted without further addressing the general acceptance of peer review claims.)
86. Hicks, 389 F.3d at 514.
87. Id. at 523.
88. Id. at 526.
89. Id. at 526.
fingerprint expert under Daubert and Kumho Tire. The defense argued that “there is no reliable statistical foundation for fingerprint comparisons and no reliable measure of error rates in latent print identification, especially in the absence of a specific standard about the number of points of identity needed to support an opinion as to identification.” The government, in response, suggested that “fingerprint identification is so well-established that the court should not even hold a hearing on the issue.” The court, however, ruled that a hearing was necessary, because “it is clear that the court has no discretion as to whether to evaluate reliability.”

The court went on to apply the Daubert factors in a way that approaches a caricature of scientific standards. The court observed first that “the methods of latent print identification can be and have been tested.” The court explained:

They have been tested for roughly 100 years. They have been tested in adversarial proceedings with the highest possible stakes – liberty and sometimes life. The defense has offered no evidence in this case undermining the reliability of the methods in general. The government points out correctly that if anyone were to come across a case in which two different fingers had identical fingerprints, that news would flash around the legal world at the speed of light. It has not happened in 100 years.

Obviously, Daubert’s reference to testing involves studies by scientists, not cross-examination by lawyers in the courtroom. If the court’s definition of testing were correct, then no previously admitted scientific evidence could be subsequently challenged, at least until the opponents of the evidence produced research refuting it. In addition, the court confuses

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91. Id. at 849.
92. Id. at 850-51.
93. Id. at 851.
94. Id.
95. Havward, 117 F. Supp. 2d at 853-54. The court’s ignorance of science was compounded by its superciliousness. For instance, it noted that a hearing was necessary despite the fact that its “decision may strike some as comparable to a breathless announcement that the sky is blue and the sun rose in the east yesterday.” Id. at 849. Of course, unlike finding that the sky is blue, the ability of fingerprint examiners to reliably identify the person who left a partial latent fingerprint is not merely a product of casual observation.
97. Id.
98. Also, the Havward court appears to place the burden of proof on the defendant when Daubert places it squarely on the proponent of the evidence. Id. at 855 (denying Defendant’s motion to exclude the government’s proffered opinion testimony because he failed to call his own witness to offer a different opinion or show the jury that discrepancies between the latent and known prints existed).
two testable hypotheses pertinent in these cases. Even if, as the court believes, every person’s fingerprints are unique, this does not mean that forensic scientists have the ability to make reliable identifications. The operative question for the law is whether fingerprint examiners can reliably “match” a known fingerprint to an unknown print that may be smudged, little more than a fragment, or otherwise severely degraded. The court cited no validity or proficiency tests whatsoever on this issue.\textsuperscript{99}

The court next found that the peer review and publication requirements were met for fingerprint identification.\textsuperscript{100} The peer review comes from the fact that it is routine practice in government laboratories to have a second examiner compare the prints.\textsuperscript{101} However, as the court acknowledged, this is not done blind.\textsuperscript{102} It is also hardly the sort of “peer review” ordinarily associated with science. For the court, the publication requirement was met by the same one-hundred years of “adversarial testing”\textsuperscript{103} that satisfied the first Daubert prong. Needless to say, perhaps, this is not what the Daubert court had in mind.

As regards the last Daubert factor the Havward court considered,\textsuperscript{104} error rates, the government claimed that the “error rate for the method is zero.”\textsuperscript{105} The court was disinclined to believe this “breathtaking” claim, pointing out that individual examiners could make mistakes.\textsuperscript{106} The court found that “[e]ven allowing for the possibility of individual error, the error rate with latent print identification is vanishingly small when it is subject to fair adversarial testing and challenge.”\textsuperscript{107} The court never explained how it

\textsuperscript{99} Id. at 853 (The Court explained that a fingerprint expert goes through a four-step process to analyze fingerprints, but did not state that the fingerprint expert in this case went through any of these tests.)

\textsuperscript{100} Id. at 854.

\textsuperscript{101} Id. at 853.

\textsuperscript{102} Havward, 117 F. Supp. 2d at 853.

\textsuperscript{103} Id. at 854.

\textsuperscript{104} The Havward court, somewhat surprisingly, did not discuss whether latent fingerprint identification was “generally accepted,” the fourth factor suggested in Daubert. Among forensic specialists who practice this trade for a living, it is undoubtedly generally accepted. See 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). If a broader community of scientific methodologists were surveyed, general acceptance might not be met. See David M. Siegel et al., The Reliability of Latent Print Individualization: Brief of Amici Curiae submitted on Behalf of Scientists and Scholars by The New England Innocence Project, Commonwealth v. Patterson, 42 CRIM. L. BULL. 21, 27-29 (2006); see also 4 MODERN SCIENTIFIC EVIDENCE, supra note 8, at 302-03 (fingerprint identification).

\textsuperscript{105} Havward, 117 F. Supp. 2d at 854.

\textsuperscript{106} Id. at 854.

\textsuperscript{107} Id.
knew this to be so.

V. CONCLUSION

Much of the debate surrounding standards of admissibility has revolved around the question whether the United States Supreme Court's decision in Daubert tightened or relaxed the standards for expert opinion evidence. Although this is not an uninteresting matter to explore, it somewhat misses a more important issue. Specifically, jurisdictions should consider more explicitly the question of what sort of admissibility regime ought to apply to expert evidence, given the legal and scientific values they wish to advance.

A jurisdiction's admissibility rules might vary along two basic dimensions. The first concerns what criteria trial courts use to assess proffered expert testimony. In most cases today, this is fundamentally a choice between a general acceptance test, as established in Frye, and the validity test, which is at the core of Daubert. The second dimension of a jurisdiction's admissibility rule concerns the threshold level chosen for admitting evidence. This dimension might vary from permissive to rigorous, with a permissive standard permitting a greater amount of expert evidence to reach the trier of fact. Hence, a jurisdiction's admissibility regime might fall into one of four basic approaches to the problem of managing expert opinion: (1) Daubert-rigorous, (2) Daubert-permissive, (3) Frye-rigorous, and (4) Frye-permissive.

Complicating the basic scheme of admissibility is the practice in some jurisdictions of using different regimes for different kinds of expert evidence. This essay considers two such examples. The first is California's practice of exempting non-scientific expert opinion from its ordinarily applicable Frye-restrictive admissibility regime. The second is the apparent federal practice of employing a more lenient standard for forensic science evidence (seemingly using a Daubert-permissive approach) than is applied in other contexts, such as toxic tort or product liability civil cases, in which a Daubert-restrictive rule is generally employed. Neither the California rule nor the federal practice is justified by scientific or logical principles or, indeed, by basic common sense.