EVERYTHING NEW IS OLD AGAIN:
BRAIN FINGERPRINTING AND EVIDENTIARY ANALOGY
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Metaphors in law are to be narrowly watched, for starting as devices to liberate thought, they end often by enslaving it.

J. Cardozo

Whatever produces the judge's hunches makes the law.

Jerome Frank

ABSTRACT

Brain Fingerprinting uses electroencephalography to ascertain the presence or absence of information in a subject's brain based on his reaction to particular stimuli. As a new forensic tool, Brain Fingerprinting technology stands poised to exert a tremendous impact on the presentation and outcome of selected legal cases in the near future. It also provides a fertile case study to examine the role of analogical reasoning in the process by which lawyers, experts, judges, and the media influence how fact-finders perceive and evaluate unfamiliar types of proof. When juridical metaphor disguises, distorts, or destroys ideas, it ceases to serve as an aid to understanding and functions instead as an obstacle to knowledge. This Note explores the ways in which evidentiary analogy may insidiously shape how courts treat novel forms of scientific evidence.

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2 JEROME FRANK, LAW AND THE MODERN MIND 104 (1930).
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INTRODUCTION

Approaching novel forms of evidence through analogy to older and ostensibly better-understood forms can appear natural and even inevitable. Reasoning by analogy, metaphor, and prototype forms the heart of American legal procedure, dominates lawmaking, and typifies the manner in which rational thinkers understand new information and incorporate new ideas into their cognitive schema. Such processes comprise “the meat and potatoes of legal reasoning”;³ “the common, imaginative core of human rationality.”⁴ Analogical reasoning can render the alien, familiar; the obscure, comprehensible; the frightening, innocuous; the complex, simple. Yet we often ignore the damage done in the process: When the assimilation of new information takes place too swiftly and too smoothly, that ease may mark a failure to appreciate and assess precisely the novelty and difference that prompted the initial analogy. When it enacts violence upon ideas by disguising, deforming, or destroying them, metaphor ceases to serve as an aid to understanding and functions instead as an obstacle to knowledge.

Many have written extensively on the role of heuristics⁵ and cognitive illusions in legal decision-making and their effects on the quality

³ David Hricik, Reading Too Much Into Nothing: The Metaphor of Place and the Internet, 55 MERCER L. REV. 859, 860 (2004). Hricik notes that his Westlaw search seeking “Internet” in the same sentence with “analogy or metaphor” spawned 26 cases and 700 law review articles. Id at 860.


⁵ Heuristics are mental shortcuts or rules of thumb employed unconsciously to enable faster decisions. Cognitive scientists vary in the degree to which they find heuristics helpful or harmful, but “virtually everyone agrees that sometimes heuristics can get in the way of optimal decisionmaking.” Erica Beecher-Monas, Heuristics, Biases, and the Importance of Gatekeeping, 2003 MICH. ST. L. REV. 987, 995-96 (2003) (discussing how cognitive biases may affect evaluation of evidence and advocating for expansive gatekeeping). For example, three of the best-known heuristics are the representativeness, availability, and anchoring heuristics. The “representativeness” heuristic relies on comparing known or salient characteristics to a prototype, ignoring base rates; for example, in evaluating the probability whether Paul, an intelligent and argumentative person, is a lawyer or a waiter, most will judge him more likely to be a lawyer despite the fact that waiters outnumber lawyers significantly in a given sample group. According to the “availability” heuristic, people will over- or underestimate the likelihood that a given event will occur based on how quickly instances of similar events come to mind; for example, people will assume shark attacks occur far more often than they do if they have recently seen a shark attack in the news. The “anchoring and adjustment” heuristic says people will estimate an unknown value by beginning with a better-known “anchor” and then adjusting it; for example, asked to estimate how many hours his classmate studies in a week, a law student may first estimate how much he himself studies and then adjust that number up or down. Amos Tversky & Daniel Kahneman, Judgment Under Uncertainty: Heuristics and Biases, 185 SCIENCE 1124 (1974).
of adjudication. This article differs in its focus on a more explicit and thus more easily identifiable form of reasoning, where tropes for novel technology or expert evidence are deliberately selected and applied at various stages of trial. Analogical reasoning, while enabling those without technical expertise to better comprehend novel scientific evidence, undermines the objectivity of judges and jurors attempting to assess the admissibility or weight of such evidence. Although analogy may explain and demystify novel evidence and render scientific innovation ostensibly more accessible, such a rhetorical approach lends itself too well to manipulation and serves to mask new forms of evidence in the guise of older forms, piggy-backing on the authority and status of the more familiar models.

The common law shift from Frye to Daubert, reflected in changes to the Federal Rules of Evidence and codified by many states’ own standards, shifted the burden of assessing the admissibility of new scientific and technological innovation from experts to judges. Where Frye evaluates technological evidence based on its general acceptance among scientists in the relevant field, Daubert asks judges to act as impartial gatekeepers by

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7 Frye v. United States, 293 F. 1013 (D.C. Cir. 1923) (holding systolic blood pressure deception test had not gained sufficient acceptance among scientists in the relevant field to be admissible). Courts followed Frye’s “general acceptance” standard for over seventy years. Frye held that “while 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.” Id. at 1014.


9 FED. R. EVID. 702.

10 The Court in United States v. Mitchell notes: [T]he court is often referred to as a “gatekeeper.” This metaphor is particularly apt because it works two ways: On the one hand, the court must exclude some evidence as a gatekeeper, by “preventing opinion testimony that does not meet the requirements of qualification, reliability and fit from reaching the jury.” But on the other hand, the court is only a gatekeeper, and a gatekeeper alone does not protect the castle; as we have
applying suggested criteria to the evidence in question and using their discretion to determine the evidence’s admissibility. In order to properly fulfill her role, the judge must seek to understand and assess the validity of scientific evidence on its own terms rather than relying on conventional wisdom and cognitive shortcuts. She must also use her authority to shape how the jury is led to understand that evidence. In both her initial assessment and her subsequent instructions guiding jurors to their own conclusions, the judge must remain attuned to attempts by experts, attorneys, and the press to steer decision-makers away from direct and deliberate analysis and toward comparison of the new form of evidence to some other, better-known form, capitalizing on the familiar evidence’s credibility and perceived validity (or lack thereof).

Brain Fingerprinting technology is just beginning to garner legal attention as a viable form of scientific proof in criminal trials. While the CIA and FBI already rely on Brain Fingerprinting, it has yet to gain full entrée into the courtroom. Because its status is still uncertain, it provides fertile ground for evaluation of various modes of rhetorical presentation and discussion as we watch its courtroom and cultural reception in a “post-Daubert, post-DNA world.”

With striking frequency, journal articles, newspapers, television coverage, trial transcripts, and scientific publications explained, “[a] party confronted with an adverse expert witness who has sufficient, though perhaps not overwhelming, facts and assumptions as the basis for his opinion can highlight those weaknesses through effective cross-examination.” (internal citations omitted.) United States v. Mitchell, 365 F.3d 215, 245 (3d Cir. 2003).

For evidence that judges’ decisions are often guided by heuristics and cognitive illusions that can lead to systematic errors in judgment, see Chris Guthrie et al., Inside the Judicial Mind, 86 CORNELL L. REV. 777, 816, 819 (reporting empirical study testing for the influence of five common cognitive illusions in decisionmaking by a sample of 167 judges, and finding that “judges rely on cognitive processes that are likely to induce them to make systematic errors,” especially anchoring, hindsight bias, and egocentric bias).

Comparing a new form of evidence to an older form may work to distinguish and disparage it as effectively as it serves to justify and defend it. See, e.g., Clive A. Stafford Smith & Patrick D. Goodman, Forensic Hair Comparison Analysis: Nineteenth Century Science or Twentieth Century Snake Oil?, 27 COLUM. HUM. RTS. L. REV. 227 (1996) (comparing pubic hair identification with fingerprint identification repeatedly to highlight the former’s shortcomings). “[H]air comparisons, unlike fingerprints, may not be used for positive identification.” Id. at 231 n.8. “[I]t will be next to impossible to develop a ‘bank’ of features of potential suspects which could be used to identify potential suspects in a case (as may be done with fingerprints).” Id. at 241 n.59. “[I]t's not a fingerprint, but it's normally a strong association,” Id. at 259 n.128 (citing State v. Magouirk, 539 So. 2d 50, 61 (La. Ct. App. 1989)). “Although probability standards for fingerprint and serology evidence have been established and recognized by the courts, no such standards exist for human hair identification,” Id. at 287 n.250 (citing Williamson v. Reynolds, 904 F. Supp. 1529, 1556-58 (E.D. Okla. 1995)). “[U]nlike fingerprints, however, comparative microscopy of hair is not accepted as reliable evidence to positively identify a person.” Id. at 229 n.4 (citing State v. Faircloth, 394 S.E.2d 198, 202 (N.C. Ct. App. 1990)).

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characterize Brain Fingerprinting by analogy. This article attempts to unravel and destabilize those analogies, and evidentiary analogy generally, by drawing explicit attention to analogy as artificial construct. The analysis raises questions about who employs these classificatory techniques and why, how conscious or unconscious such processes may be, and how they impact laymen and judges. Most importantly, this article uses Brain Fingerprinting as a case study to demonstrate that any single analogy crafted to render less complex and more familiar a new and complicated form of evidence is necessarily destructive and can hinder our attempts at a true understanding of that evidence, trumping whatever usefulness the analogy provides. As such, it is incumbent upon us to monitor evidentiary analogies, exposing them to their target audiences and debunking the ways in which they are inapplicable, reductive, or excessively ambitious. While analogical reasoning may be deeply embedded in the legal process, judges must reduce and unsettle such categorizations of new evidence in order to achieve the objectivity required by Daubert and avoid replacing a courtroom model of dueling experts with a less obvious but equally confusing set of dueling analogies.

14 The exchange between the judge in the Harrington case (discussed further infra) and Farwell as expert witness for the Defendant typifies the role analogy plays in almost all discussions of Brain Fingerprinting:

Q Now, probably you have had lots of people that want to draw an analogy between your brain fingerprinting test and a polygraph. Is what you are doing telling whether or not somebody is lying?
A No, it is not; has nothing to do with whether they are lying or not. In fact, you get the exact same results with brain fingerprinting whether the person is lying or telling the truth.
Q How is that?
A We are just detecting whether the information is there in their brain. It's as if -- Say the DNA, they have DNA from a crime scene and on the person of the suspect, or you have fingerprints at the crime scene, you have fingerprints on the fingers of the suspect. If those match, it doesn't matter what he says about it. What we are doing is detecting a match, or no match, between information stored in the brain and information that we get from the crime scene, or relevant to the crime. If it matches, it matches. If it doesn't, it doesn't; has nothing to do with what the person says.


15 The board game “Taboo” (Hasbro) provides a concrete example of navigating around associations and categorizations to define a given term. In it, players pick a card with a keyword they must communicate to teammates, but each card also includes a list of taboo words that the player is not allowed to say. For example, a player may have to communicate “Boston” without saying “Red Sox,” “Massachusetts,” “city,” “T,” or “Harvard.” If she utters one of the forbidden words, a player from the other team sounds a buzzer and her team is penalized. Buzzers sounding in the courtroom with any use of judicial analogy would be ludicrous, but the game provides a suggestive parallel for those situations when analogy seems inevitable or necessary.
I. JUDICIAL GATEKEEPING FROM FRYE TO DAUBERT

Prior to 1993, Rule 702 of the Federal Rules of Evidence was primarily construed under Frye as holding scientific expert evidence to a standard of “general acceptance” within the field, placing significant responsibility on scientists within a relevant specialty to evaluate a given form of evidence. In 1993, the Supreme Court ruled in Daubert that expert evidence should be evaluated according to a number of criteria, and consequently Rule 702 was updated to reflect the holding. Those criteria include, but are not limited to, (1) whether the expert’s methodology can be and has been tested; (2) whether the methodology has been published and subjected to peer review; (3) the method’s known or potential rate of error and the existence and maintenance of standards controlling its operation; and (4) whether the methodology or principle is generally accepted in its field. The Daubert decision emphasizes the malleability of its guidelines, explaining that each criterion is “not a sine qua non of admissibility” and that “the inquiry envisioned [is] a flexible one.” The decision “do[es] not presume to set out a definitive checklist or test,” only “some general observations.” Currently, states fall into one of three groups, with roughly a third each following Daubert, Frye, or a test of the state’s own design, typically Frye-plus.

The Supreme Court’s decision in Daubert marked an attempt to leave behind the dueling experts, a performance that often compels a jury faced with novel and complicated scientific evidence to act in accordance with the advice of the expert it trusts most or likes best. The Daubert

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16 Frye v. United States, 293 F. 1013 (D.C. Cir. 1923).
18 FED. R. EVID. 702.
19 Daubert, 509 U.S. at 593.
20 Id. at 594-95.
21 Id. at 593.
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standard also paved the way for new forms of evidence that have yet to gain the general acceptance Frye requires;\textsuperscript{24} at the time of the ruling, DNA typified such valid but controversial scientific proof.\textsuperscript{25} Daubert lessened the evaluative responsibility on lawyers, jurors, and experts and shifted the bulk of that burden onto the judiciary, expanding judges’ gatekeeping role and requiring pre-trial Daubert hearings to determine the admissibility of expert testimony before presenting it to jurors. Under Daubert, the judge evaluates the evidence’s relevance and reliability, and Frye’s general acceptance

\textsuperscript{24}Imwinkelried, supra note 24, at 901 (“One of the foremost criticisms of the former Frye rule was that it built in an undesirable lag time between the validation of a scientific technique in the laboratory and its admissibility in the courtroom”); David G. Owen, A Decade of Daubert, 80 DENV. U.L. REV. 345, 354 (2002).

standard becomes just one in a set of criteria that are considered but not required. Yet while Daubert appeased some, it irked others, since judges may be asked to assess innovative forms of evidence while lacking the technical knowledge to understand the science that underlies them. Likewise, while many criticize dueling experts’ lack of impartiality, others object that state judges who are elected rather than appointed may be biased or motivated to protect their popularity when ruling on whether to admit some novel form of evidence.26

II. THE ANALOGICAL FAMILY: METAPHOR, Prototype, Analogy

A. Metaphor: “Imaginary Gardens with Real Toads in Them”

Marianne Moore, decrying her objections to poetry (“I, too, dislike it”) in “Poetry,” nonetheless finds in it “a place for the genuine” where poets “can present/ for inspection, imaginary gardens with real toads in them.”27 Metaphor plays a crucial role in both poetry and law, and Moore’s “real toads” capture the kernel of truth that successful metaphor affords us.

Yet while the trouble created by an inapt metaphor in a poorly written poem28 may frustrate artists and aesthetes, inapt or misapplied metaphor in the legal realm may prove dangerous on a more immediate level. Bosmajian’s work on metaphor in judicial opinions focuses on tropes that began in one Supreme Court opinion and slowly became institutions unto themselves.29 The metaphors he discusses were, once uttered, reiterated by judges, journals, lawmakers, professors, and the population at large, until they came to be regarded as not merely principle and doctrine, but “central tenets.”30 Metaphors like “marketplace of ideas,” “schoolhouse gates,” “wall of separation,” and “chilling effect” have become irreversibly integrated into legal doctrine as though they supplied an objective account of the situation, rather than one man’s insight cloaked in metaphor.31 Burr Henly’s treatment of “penumbra”32 and Steven Winter’s analysis of the

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28 Or, just as problematically, a brilliant metaphor injected into the wrong poem.


30 Id. at 3.

31 Id. Bosmajian devotes a chapter apiece to each of those four metaphors, as well as “captive audience,” the set of tropes that describe speech in terms of fire, and the personifications of justice, the constitution, and judicial opinions.

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Metaphor refers to the welding together of two things not typically associated with one another in order to convey attributes of the one that are integral to the other, so that love is a rose, or a poem “an imaginary garden with real toads” in it. Some metaphors are so contrived or challenging as to leave us wondering what the two things compared have in common that sparked their comparison, like Moore’s garden; others are so rich that we may continually discover new ways to understand what the object of the metaphor suggests about the subject, like the common ground of love and rose; still others are so familiar that they present themselves as scarcely metaphors at all, such as clichés like “time flies,” familiar descriptors like “ponytail,” or conceptual metaphors embedded in language, like those treating the mind as a container or passionate love as fire.

In the courtroom, countless forms of evidence have relied on fingerprint as metaphor in order to capitalize on fingerprint’s status and appropriate its authority. Thus while footprints and palm prints do provide an analogous “print” and warrant the semantic overlap, neither voice spectography nor DNA analysis properly earns the titles of “voice printing” and “DNA fingerprinting” that advocates cleverly sought to

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34 I refer to the obvious fact that all three incorporate the word “print,” though prints of non-fingers have been held not merely analogous but synonymous in process, role, and reliability. See, e.g., United States v. Mitchell, 365 F.3d 215, 221 (3d Cir. 2003) (“[T]he print or handprint analysis is much the same as fingerprint analysis”).
assign them. Neither voice recordings nor DNA strands leave a mark or impression behind at a crime scene. Labeling them “prints” exploits similarities each may share with the role or process of fingerprint identification and fashion those similarities into an overall sense of sameness.

Stephanie Gore’s exploration of Internet metaphors proves telling. Examining tropes used to understand and legislate issues related to “emerging technologies” like computer hardware, software, semiconductors, and cable systems, she initially sets out to advocate for an objective understanding of these technologies, asking “[w]hy pick an analogy to begin with?...[W]hy shouldn’t courts simply make the effort to understand the technological underpinnings of the Internet and achieve a ‘metaphor-free’ understanding of the technology?” but ultimately rejects that goal as impossible. Gore surveys some of the metaphors and analogies applied to computers: Various high court decisions have compared a hard drive with “closed containers” or “dressers or file cabinets”; a computer file with “books, magazines, periodicals, films, and video tapes”; the Internet with telephone, newspaper, television, and “a free pass into the equivalent of every adult bookstore and video store.”

Gore notes some of the dangers of allowing metaphor to dominate conversations about technology:


38 Id. at 408.
39 Id. at 438.
40 Id. at 409-10.
41 Gore focuses primarily on the issue of the minimum contacts required for personal jurisdiction as applied to web transactions.
42 Id. at 418 (citing United States v. Carey, 172 F.3d 1268, 1275 (10th Cir. 1999)).
43 Id. at 417 (citing United States v. Walser, 275 F.3d 981, 986 (10th Cir. 2001)).
44 Id. at 418 (citing United States v. Thompson, 281 F.3d 1088, 1091 (10th Cir. 2002)).
46 Id. at 423 (citing ACLU v. Reno, 929 F. Supp. 824, 883 (E.D. Pa. 1996) (Dalzell, J., concurring)).
47 This analogy was asserted by the government and feared by the prosecution in ACLU, but not adopted by judges. Id. at 422-23 (citing ACLU v. Reno, 929 F. Supp. 824, 881 (E.D. Pa. 1996), aff’d, 521 U.S. 844).
48 Id. at 421. (citing Transcript of Oral Argument at 4, Reno v. ACLU, 521 U.S. 844 (1997) (No. 96-511)).
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First, concerns have been raised regarding the judiciary’s ability to understand complex technology. Second, fear is a powerful barrier to learning, and fear of technology is a common phenomenon. Third, metaphors can be seductive, and may lead a person to end efforts to understand a new (perhaps daunting) concept too quickly. Finally, metaphors play a particularly powerful role in the law, since a court may inherit as precedent metaphors chosen by another court. All of this leads to the potential for the creation of precedents in which courts substitute poorly fitting metaphors for true comprehension of the technology at issue.\textsuperscript{49}

Despite widespread attempts to metaphorize the Internet, many Internet users concur that, when applying existing law to cyberspace, “old analogies just don’t cut it.”\textsuperscript{50} One user, objecting to analogizing computer account break-ins to real property break-ins, locates the problem in “applying analogies from the everyday world in the first place. Things are different enough in Cyberia that our customary paradigms frequently don't fit....We may just need new rules.”\textsuperscript{51}

B. PROTOTYPE: SOME TOADS MORE “TOAD” THAN OTHER TOADS

The prototype theory of classification holds that categories are typically not black-and-white, but are founded upon stereotypes, fuzzy boundaries, and resemblances. Categories are not explicable merely by reference to similar characteristics; rather, judgments of similarity depend on properties, relations, and categories already learned.\textsuperscript{52} Notably, Eleanor Rosch’s work on representativeness documented how, rather than considering all members of a category to serve as equally valid examples of that category, speakers differentiate between good and bad examples of a certain category, or “central” and “non-central” members. While the classical theory regarded membership in categories as uniform, so that a given amphibian is either a toad or not but no toad is any more “toad” than any other toad, the modern theory acknowledges that when faced with an albino toad or a toad missing a leg, we may acknowledge its full

\textsuperscript{49} Id. at 403.

\textsuperscript{50} I. Trotter Hardy, The Proper Legal Regime for “Cyberspace,” 55 U. Pitt. L. Rev. 993, 994 (1994). Hardy conducted an electronic conference over the Internet on whether cyberspace should be treated as a separate jurisdiction; his article includes insightful quotes from participants frustrated with the legal world’s attempts to assimilate the circumstances and rules of Cyberspace using the extant rules and laws of meatspace.

\textsuperscript{51} Id.

membership in the category “toad” while simultaneously considering it a less representative and thus less useful example of a toad.53

Several theorists have applied prototype theory in their pursuit to better understand jurors’ decision-making processes. They have discovered that individuals enter a jury box not with the tabulae rasae the law assumes, but with “stereotypes of offenders,”54 “prototypes of offenses,”55 “case-relevant attitudes,”56 and “knowledge about everyday events”57 that affect their conclusions.58 Vicki Smith found that laypeople possess naïve concepts of crimes that they organize by prototype, not by necessary and sufficient elements.59 Juries faced with “burglars” and “rapists” who fit squarely within their preconceived categories of “burglar” and “rapist,” central members rather than outliers made faster and more predictable decisions. Regardless of statutory definition or charge from the judge, jurors have more trouble with non-central examples of perpetrators or victims, as in acquaintance rape cases without force, where the “best” example of rape might be stranger rape involving a weapon.60 Stuart Green applies cognitive

53 Rosch uses other examples: A bed is a better example of furniture than is a clock; a robin is a better example of a bird than is an ostrich; a German Shephard is a better example of a dog than is a Pekinese. Eleanor Rosch, Cognitive Representations of Semantic Categories, 104 J. EXPERIMENTAL PSYCHOL. 192, 229, 232, 198 (1975). Fillmore offers George Stephanopoulos as a better example of “bachelor” than the pope, although both fit the definition. Charles Fillmore, Towards a Descriptive Framework for Spatial Deixis, in SPEECH, PLACE, AND ACTION: STUDIES IN DEIXIS AND RELATED TOPICS 31 (Robert J. Jarvella & Wolfgang Klein eds., 1982).
55 Id. (citing Vicki Smith, When Prior Knowledge and Law Collide: Helping Jurors Use the Law, 17 LAW & HUM. BEHAV. 507 (1993)).
56 Id. (citing G. Moran, B. Cutler, & A. DeLisa, Attitudes Toward Tort Reform, Scientific Jury Selection, and Juror Bias: Verdict Inclination in Criminal and Civil Trials, 18 LAW & PSYCH. REV. 309 (1994)).
60 See MARTHA CHAMALLAS, INTRODUCTION TO FEMINIST LEGAL THEORY 222-36 (1999) (discussing prototypes of rape). Marge Piercy’s poem “the gray flannel sexual harassment suit” alludes to the difficulties faced by a victim of harassment who does not present as a central member of the victim category, i.e. chaste, white, Christian, upper-class, attractive, etc., concluding that a woman other than that described in the poem
scientists’ understanding of the importance of prototypes to the model penal code to suggest revisions.61 Neal Feigenson examines jurors’ reliance on prototypes and other heuristics and explores how such cognitive models shape jurors’ assessment of responsibility in accidents, as well as how attorneys cater to and manipulate those prototypes in their arguments.62 Skeem and Golding determined three prototypes for insanity and found that the one to which a juror subscribes predicts the way he will interpret and judge an insanity case.63 Lawrence Solan uses categorization problems as examples when he highlights the way so many cases rest on the interpretation of a single word:64 “Does a minister's work count as ‘labor’?”65 Should an airplane... count[] as a ‘vehicle’ for purposes of a federal statute outlawing the transportation of stolen vehicles across state lines?66 Has one ‘used a firearm’ when one has traded a gun for cocaine?”67

Few have devoted equal attention to the process by which jurors make sense of and attorneys explain evidence, perhaps because social heuristics strike theorists as more determinative of decisions than nonsocial ones. But if jurors’ naïve conceptions of criminals impact their assessments of guilt or innocence, naïve conceptions of categories of proof likely also impact how jurors assign weight to evidence they encounter at trial. Imagine a juror believes, for example, that a) polygraphs are completely unreliable; b) fingerprints cannot be faked; c) DNA is the best way for police officers to frame a suspect, and they regularly do; and d) expert testimony from social scientists is unscientific and merits little weight. The outcome of a trial might then rest on one question for that juror: Into which basket should he place the evidence before him?68 The semantic tug-of-war surrounding the classification of Brain Fingerprinting and its depiction by members of the press suggests that many understand intuitively how prototype functions, and would gladly venture to answer our hypothetical


61 Stuart P. Green, supra note 53.
63 Skeem & Goulding, supra note 55 at 584.
65 Id. at 244 (referring to Church of the Holy Trinity v. United States, 143 U.S. 457 (1892)).
66 Id. at 245 (citing McBoyle v. United States, 283 U.S. 25 (1931)).
67 Id. at 245 (citing Smith v. United States, 508 U.S. 223 (1993)).
68 Mnookin raises another example of categorizing evidence, photographs as words vs. photographs as images, asking why judges didn’t treat a photograph as “more like a deed than a diagram.” She alludes to to judges’ inclination to value words over images in the courtroom, which might have motivated them to treat photographic evidence in a way that would preserve that hierarchy of proofs. Jennifer Mnookin, The Image of Truth: Photographic Evidence and the Power of Analogy, 10 YALE J.L. & HUMAN 1, 54 (1998).
basket question in the manner that best supports his ends. By naming one
technology after another, or classifying one in terms of the other, experts
and journalists seek not to lessen the effects of cognitive heuristics by
making them explicit, but to capitalize on them by playing directly into
them.

C. ANALOGY: TOAD, THE NEW CHIHUAHUA, OR TOAD, THE NEXT
CAVIAR?

The dictionary defines analogy as a) a similarity between two
things; b) any comparison based on that similarity; and c) a “form of logical
inference or an instance of it, based on the assumption that if two things are
known to be alike in some respects, then they must be alike in other
respects.” Analogy is closely related to metaphor and prototype, but the
latter two may be easier to spot, making analogy sneakier and thus more
insidious. Prototype asks, “does this toad belong in the group called
‘animals to play with and keep as pets’ or ‘animals to order in fancy
restaurants?’” Analogy posits a simpler connection between one member of
a category and another, based on resemblance: It tells you the proffered toad
belongs in your fish tank with your turtle, or it tells you that toad, with a
little butter sauce, is a delicacy superior even to escargot.

DNA evidence and its component pieces have been analogized to a
wide spectrum of objects and processes, including blood samples,70
hair
analysis,71 fingerprint identification,72 a bar code,73 a photograph,74 a nut,75
a building,76 a business card,77 baking a cake,78 and the law of gravity.79

69 AMERICAN HERITAGE DICTIONARY (4th ed. 2004), available at
71 Id.
72 See, e.g., United States v. Kincade, 379 F.3d 813, 857 n.15 (9th Cir. 2004); United
States v. Kincad, 345 F.3d 1095, 1000 (9th Cir. 2003); Jean L. Marx, DNA Fingerprinting
73 Janet Hoeffel, Note, The Dark Side of DNA Profiling: Unreliable Scientific Evidence
74 Id. at 513 (citing Andrews v. State, 533 So.2d 841 (Cir. Ct., Fla. 1988) (upholding for
the first time that DNA typing evidence was admissible on appeal)).
75 Id. at 512 (“You can think of DNA as kind of like a nut locked within a shell” (citing
Record, at 420-21, Andrews, 533 So.2d 841 (reporting the direct testimony of Alan Giusti,
Forensic Scientist, Lifecodes)).
76 Id. at 512 (citing Andrews, 533 So.2d 841)
77 Ricki Lewis, DNA Fingerprints: Witness for the Prosecution, DISCOVER, June 1988,
at 44, 52 (quoting Dr. Michael Baird of Lifecodes, “If you're a criminal, [leaving behind
your DNA is] like leaving your name, address, and social security number at the scene of
the crime”).
78 Hoeffel, supra note 74 at 512 (“You can almost think of [DNA testing] like cooking,
so a reagent would be butter or eggs or flour” citing Record, Vol. III, at 510, Andrews, 533
So.2d 841).
Federal judges have likened voice identification to blood samples,\(^8\) urinalysis,\(^8\) handwriting exemplars,\(^8\) gunbarrel striations,\(^8\) and fingerprints.\(^8\) Polygraphy has been compared to DNA, handwriting, ballistics, toxicology, and fingerprint evidence;\(^8\) fingerprints to DNA\(^8\) and handwriting analysis;\(^8\) handwriting analysis to fingerprint,\(^8\) DNA,\(^8\) and blood samples.\(^8\) Scent\(^9\) and hair samples\(^9\) have been analogized to fingerprints.

Analogy is regarded as legal reasoning’s “most characteristic way of proceeding,”\(^9\) its dominance demonstrated endlessly in precedential decision-making, legislation, the case method, and the common law system. Analogy is thought inescapable in the realm of innovation, “the only real road map for courts when technological change leaves them in unknown legal territory.”\(^9\) Because navigating technological forms of evidence is as critical in some cases as understanding the litigation’s scientific subject matter, the role of analogy in explaining and comprehending scientific evidence mandates close examination.

In his pre-Daubert work on Biotechnology and Law, Vincent Brannigan describes technico-legal revolutions as occurring “when a given technological advance cannot be clearly analogized to existing legal structures” and consisting of “a series of stages in the legal response to the

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79 Id. at 465 (“disputing the technology is like disputing the law of gravity” (citing Debra Cassens Moss, DNA -- The New Fingerprints, A.B.A. J., May 1, 1988, at 66, 69-70)).
81 Nat’l Treasury Employees Union v. Von Raab, 816 F.2d 170, 181 (5th Cir. 1987).
82 Loyd, 10 M.J. at 714; United States v. Williams, 583 F.2d 1194, 1199 (2d Cir. 1978); United States v. Dioniso, 410 U.S. 1, 3-4 (1973).
83 Williams, 583 F.2d at 1199.
84 Dioniso, 510 U.S. at 3-4.
86 United States v. Kincade, 379 F.3d. 813, 842 (9th Cir. 2004).
91 Goldstein v. Allstate, 1998 U.S. Dist. LEXIS 18288, 4 (comparing the probative value of evidence from human-sniffing dogs to that from dogs trained to suss out ignitable liquids; disparaging the former by distinguishing it from fingerprints).
92 United States v. Massey, 549 F.2d 676, 13 (8th Cir. 1979) (describing hair samples as only slightly less reliable indicators of identity than fingerprints).
novel developments in technology. He identifies four categories of such revolutions, the fourth of which is evidentiary, and four distinct phases of the technico-legal revolution that occur in fixed order: “1) autonomy; 2) conflict; 3) determination; and 4) resolution.” The four phases map onto technological evidence in the following way: In the “autonomy” phase, the inventor uses the novel form of evidence in a legal proceeding; in the “conflict” phase, the opponent objects to the technological evidence and asserts his right to prevent its use; in the “determination” phase, experts duel; and at “resolution,” the judge determines the admissibility and the jury assesses the weight of the evidence. “False analogy” often dominates the “conflict” and “determination” phases:

Since technico-legal revolutions are defined as situations in which no exact analogy is possible, the false analogy involves comparing some of the attributes of a new technology to those of a preexisting technology with a legal structure favorable to that party, while ignoring those which would lead to a different conclusion. The analogies are false in the sense that they are not exact as well as in the sense that the divergence from the prior situation is often overlooked or minimized.

Although Brannigan writes in the Frye era, his criticism that evidentiary analogy in the courtroom rings doubly false applies as well to judge and jurors’ analogy as it does to that of experts and attorneys, and as well to the first and fourth phase he describes as the second and third. Brannigan blames technological complexity, rather than manipulation, for spurring various players to create and present false analogies. Disappointingly, Brannigan later retreats from his aggressive claim that “no exact analogy is possible,” concluding with optimism that “[t]he concept of a technico-legal revolution can be used to put all the facts and claims into

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96 *Id.* at 550-51. The first three types of technico-legal revolution are proprietary rights, personal injury risk, and risk to other protected interests. *Id.* at 550-51. A “first-order” revolution spans more than one of the four categories, while a “second-order” revolution occurs only within a single category. *Id.* at 551.
97 *Id.* at 553.
98 The difference between technology and science is that “[s]cience essentially defines what we know, while technology defines what we can use.... [I]t is the utility of the knowledge, not its exactness, that makes it usable as technology. [citation omitted.]” *Id.* at 547.
99 *Id.* at 555.
100 *Id.* at 556-57.
101 “Since the technological portion of the analogy is complex, there is a tendency to emphasize the technological similarities while ignoring the underlying factual differences.” *Id.* at 557.
proper perspective and provide proper past analogies to current technological developments."

Brannigan uses a simplistic model to cover the “full range” of possible prior legal analogies, all of which he deems false because they fail to account for all of the technology’s attributes. If a given technico-legal revolution possesses three attributes [A, B, C], the target analogy may substitute a different attribute [A, B, X], elide an attribute [B, C], or add an extra attribute [A, B, C, Z]. While Brannigan’s model provides a useful jumping-off point, he fails to take into account the nuances false analogies necessarily convey. His model may suffice to show what elements are added, subtracted, or substituted in his example of extending a particular rule of law, but it falls short in a discussion of evidentiary analogy. Most importantly, it neglects to explore the value judgments and stereotypes linked with each attribute of the target evidence or with the target’s overall cultural significance. If a new and little-known form of technological evidence, such as thermography, is compared with a widely known form like DNA identification, supplanting [A, B, Th] with [A, B, D, N, A] may be the least of our worries. Analogy may lead a jury or judge with little exposure to thermography and extensive exposure to DNA to turn [A, B, Th] into [A, B, unknown, unpublicized, unfamiliar] comparing it not to the naked elements of DNA matching, but to a set of loose associations like [A, B, D, reliable, scientifically valid, well-established, incontrovertible, O.J. Simpson, crime lab, Nobel Prize]. Conversely, an opposing counsel allowed to compare thermography to tarot card fortune-telling [A, B, T] may do so to foreground a set of associations [unscientific, inadmissible, fraudulent, fake, entertainment] for the sheer purpose of discrediting the novel evidence. Brannigan can hope for future “proper analogies” because he is able to separate subject and target of the analogy into its objective elements, but perhaps the subjective elements exert an even stronger influence on evidentiary analogy’s audience.

What is a “proper analogy,” or when is analogy in legal reasoning both harmless and efficient? Hardy differentiates between legal problems that are “new” and those that are not, so that if a scenario in cyberspace truly presents no differences between it and the existing law applied to

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102 Id. at 581.
103 Id. at 557 n.42.
104 Brannigan’s example is that of assigning responsibility for oil spills by extending the rule that shipowners needed insure their own cargoes but were immune from damages. Id. at 556.
105 For example, ACLU’s Barry Steinhardt dismisses Brain Fingerprinting as “pure snake oil. …It’s the 21st century version of the lie detector test, which also doesn’t work very well.” Steinhardt capitalizes on the value judgment associated with the objects of his analogy as a form of shorthand, instead of actually analyzing Brain Fingerprinting technology to understand how it differs from other forms of proof. TalkLeft.com, “Brain Fingerprinting” to Solve Crimes?, Feb. 11, 2003, http://talkleft.com/new_archives/001752.html.
comparable scenarios outside of the Internet, the law may be applied unproblematically to the scenario because it is not in fact “new,” and the law need not be complicated by adding to it:

Some of the legal problems of cyberspace are indistinguishable from those that arise in real space. For the most part, these situations are characterized by the use of cyberspace as merely another means of transmission from individuals directly to other individuals. Defamatory e-mail messages from “A” to “B” in regard to “C” are no different from defamatory letters or phone calls.\textsuperscript{106}

He identifies “[n]ewness” where “some sort of legal solution tailored to the cyberspace problem will bring clarity and predictability to the rules attending cyberspace conduct, the benefits of which outweigh the additional complexity thereby added to the legal system....”\textsuperscript{107} For example, the question of how system administrators function in cyberspace, whether most like “bookstores,” “telephone companies,” “publishers,” or “like none of these,” is a problem Hardy considers “worth addressing.”\textsuperscript{108} Analogy is thus inappropriate where “the underlying policy concerns of ‘real space’ law are inappropriate when applied to activities in cyberspace.”\textsuperscript{109} Johnson and Marks draw a similar conclusion about the lack of any “proper” or “best” analogy for electronic data communications: “Since the inception of networked data communications systems, commentators have...map[ped] the systems against existing relationships in order to try to pick the ‘right’ metaphor. These attempts, however, presuppose...some ‘best fit,’ some metaphor that will accurately characterize all the activities involved in these systems.”\textsuperscript{110} Reviewing two books on the information age and copyright law, one critic wryly observes the prevalence of metaphor in Internet literature and the quest for the perfect metaphor:

Despite differences between the two books, they have at least one pervasive theme in common. Both authors are deeply concerned about the disabling consequences likely to attend hanging on to metaphors of the waning era. Both are in search of enabling metaphors suitable to the new era. Each has, of course, a different metaphor to offer as \textit{bete noire}.”\textsuperscript{111}

\textsuperscript{107} Id. at 1053.
\textsuperscript{108} Id. at 1054.
\textsuperscript{109} Id. at 1053.
\textsuperscript{110} David R. Johnson & Kevin A. Marks, \textit{Mapping Electronic Data Communications onto Existing Legal Metaphors: Should We Let Our Conscience (and Our Contracts) Be Our Guide?} 38 VILL. L. REV 487, 487 (1993) (citations omitted).
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Jennifer Mnookin’s work on forensic evidence draws many connections among once-novel forms of evidence and the process by which each came to be considered admissible or even infallible. She notes that despite a number of challenges to fingerprint evidence in recent years, and the fact that fingerprint identification never passed any real empirical test to determine the validity of its claims, judges and petitioners often hold up fingerprint as the ultimate form of incontrovertible proof. While analogy from fingerprint to palm print or footprint evidence may be logical, if unqualified, Mnookin notes that justifying admission of tool mark identification by comparing it to fingerprint represents “an even greater analogical stretch.” She cites a 1930 decision that epitomizes such a rhetorical move:


For a detailed discussion of how fingerprint evidence fails under the Daubert standard, see Robert Epstein, Fingerprints Meet Daubert: The Myth Of Fingerprint “Science” Is Revealed, 75 S. CAL. L. REV. 605 (2002). For a discussion of how fingerprints gained cultural and judicial acceptance as infallible evidence despite a lack of proof of reliability, see Mnookin, supra note 69; see also Margaret A. Berger, Procedural Paradigms for Applying the Daubert Test, 78 MINN. L. REV. 1345, 1354-56 (1994); Michael J. Saks, Merlin and Solomon: Lessons from the Law’s Formative Encounters with Forensic Identification Science, 49 HASTINGS L.J. 1069, 1085-86 (1998). For a rebuttal, see Andre A. Moenssens, Palmprint and Handwriting I.D. Satisfy Daubert Rule: A Brief Analysis of the Case of United States v. Crisp (2003) and Some Musings About Its Dissenting Opinion, http://www.Forensic-Evidence.com (last visited Apr. 16, 2006), noting that no appellate court has ever held either fingerprint identification evidence nor handwriting comparison evidence inadmissible. Moenssens asserts that trade journals and scientific articles provide scores of validation research by specialists for fingerprint and handwriting matching, but that research “has simply been ignored or deprecated by the lay critics who have set themselves up as the extreme authorities on... forensic science....” Id. He criticizes law reviews and the “erudite and articulate” legal scholars who compose a vocal majority of critics to fingerprint and handwriting under Daubert, noting that one or two voices may be disproportionately amplified because “[l]egal authors tend to accept uncritically what is asserted in the same type of publication in which they publish” and frequently ignore scientists’ evaluation of forensic evidence conducted in laboratories and accepted within the scientific community. Id.


Id. at 22 n.29.
Courts are no longer skeptical that by the aid of scientific appliances the identity of a person may be established by fingerprints. . . The edge on one blade differs as greatly from the edge on another blade as the lines on one human hand differ from the lines on another. This is a progressive age. The scientific means afforded should be used to apprehend the criminal.116

Elsewhere Mnookin looks to the acceptance of photographic evidence as representative of the process by which new technologies gain acceptance, describing competing and contradictory views of photograph as both objective “machine-made truth”117 and subjective “artifice”118 or artistic representation. She finds that judges tended to draw analogies between photography and forms of representation like diagrams, maps, and drawings, revealing “both the power and the limits of analogic reasoning as a judicial strategy for coping with novelty.”119 While this article looks forward to assess the role analogy currently plays and will continue to play in cultural understanding of a new technology, Mnookin’s looks backward to explore similar claims about the power of analogy to shape perception and legal understandings, tracing the use of analogy in the rise of photographic evidence. Analogizing Brain Fingerprinting to DNA rather than polygraphy makes it more palatable because less apt to usurp the jury’s role and appear to answer the trial’s ultimate question.120 Likewise, Mnookin observes that while photography appeared uncontestable and overpowering at first, “the analogy…provided judges with a form of domestication, a way to tame the new technology by linking it to already existing representational forms....”121

116 Id. (citing State v. Clark, 287 P. 18, 20 (Wash. 1930)).
117 Mnookin, supra note 69 at 20.
118 Id. at 20.
119 Id. at 14.
120 Id.
121 A good deal of criticism levied against admission of polygraph evidence plays on the fear that such evidence would in effect replace the jury members, supposed to serve as human “lie detectors.” See, e.g., State v. Porter, 241 Conn. 57, 117-18 (1997) (“[T]he importance of maintaining the role of the jury...justifies the continued exclusion of polygraph evidence....[P]olygraph evidence so directly abrogates the jury’s function that its admission is offensive to our tradition of trial by jury.”); see also United States v. Scheffer, 523 U.S. 303 (1998); Aetna Life Ins. Co. v. Ward, 147 U.S. 76 (1981); United States v. Barnard, 490 F.2d 790 (9th Cir. 1973).
121 Mnookin, supra note 69 at 6.
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Mark McCormick’s frequently cited\(^{122}\) revised approach to determining the admissibility of scientific evidence identifies eleven factors the court might use as criteria relevant to admissibility.\(^{123}\) His fourth factor proposes “analogy to other scientific techniques whose results are admissible.” The *Daubert* opinion cites the same McCormick article as one of four that provide “variations” on the Court’s approach with a different set of factors, and though it does not endorse any of the criteria offered, it grants that they “may well have merit.”\(^{124}\) Assessing the admissibility of spectrographic voice identification evidence prior to *Daubert*, the court in *United States v. Williams* articulated five factors to consider in determining the reliability of a given technique, one of which was reliability as compared to analogous traditional techniques, the admissibility of which would not be questioned.\(^{125}\) *Williams’* and McCormick’s proposed reliance on analogy as tool for evaluation seems to this author both misguided and tautological.\(^{126}\)


\(^{123}\) Mark McCormick, *Scientific Evidence: Defining a New Approach to Admissibility*, 67 IOWA L. REV. 879 (1982). The eleven factors are: (1) the potential error rate in using the technique; (2) the existence and maintenance of standards governing its use; (3) presence of safeguards in the characteristics of the technique; (4) analogy to other scientific techniques whose results are admissible; (5) the extent to which the technique has been accepted by scientists in the field involved; (6) the nature and breadth of the inference adduced; (7) the clarity and simplicity with which the technique can be described and its results explained; (8) the extent to which the basic data are verifiable by the court and the jury; (9) the availability of other experts to test and evaluate the technique; (10) the probative significance of the evidence in the circumstances of the case; and (11) the care with which the technique was employed in the case. *Id.* at 911-12.


\(^{125}\) *United States v. Williams*, 583 F.2d 1194, 1199 (2d Cir. 1978) (“A further indication of the reliability of spectrographic analysis is its analogous relationship with other types of scientific techniques, and their results, routinely admitted into evidence.”).

\(^{126}\) To see how McCormick’s criterion is mere tautology, see Mnookin, *supra* note 69, at 5, arguing that analogy of photographs to maps, diagrams, and other visual aids was ultimately constitutive of the entire category of visual or demonstrative evidence, justifying admissibility of photographs through analogy to maps and diagrams and simultaneously justifying maps and diagrams through analogy to photographs. *See also* Mnookin, *supra* note 115, at 57 (highlighting the valuelessness of conferring legitimacy on DNA by linking
Comparing Brain Fingerprinting to a polygraph test or a DNA match is similar to categorizing it a *kind* of lie detector or a *type* of forensic proof, but analogy relies on a one-to-one equivalence, bestowing a faux familiarity on the new form of evidence based on some attribute it shares with an older form. Analogy can also create a false evolutionary chain of evidence when a new technology is touted as “the next” anything, connoting not only comparable authoritativeness but also superiority. Casting a form of evidence as the “next” version of its predecessor positions it as an advancement over the evidence it displaces or bests. As such, analogy may be more dramatic than prototype, where prototype suggests the new evidence takes its place alongside the similar older form as equally valuable, but not better.

**III. BRAIN FINGERPRINTING**

**A. PLANNING, EXECUTING, & RECORDING**

Brain Fingerprinting, an innovative technique for determining the presence or absence of “guilty knowledge” in criminal suspects, relies on electroencephalography to detect a response to stimuli related to the crime. Dr. Lawrence Farwell, Brain Fingerprinting’s inventor, emphasizes that in any crime “the brain is always there, planning, executing, and recording the crime.” That perpetual presence allows him to test a suspect and glean whether or not the suspect’s brain contains relevant information garnered by investigators, such as facts about the murder weapon, the victim, the events of the day or night in question, the location of the crime, and any other salient details known only to the investigators, the victim, and the perpetrator. Farwell uses EEG technology to evaluate brain responses to
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such probe stimuli and compares the responses to those elicited by target stimuli, which the test subject admits to knowing, and irrelevant stimuli, which appear crime-related but are actually fabricated to create a baseline. The subject emits a specific brainwave response when faced with a stimulus noteworthy in the context of the crime.

B. GRINDER & ME

Nineteen eighty-four might not have brought precisely the dystopia George Orwell foretold, but it proved a hard year indeed for twenty-five-year-old Julie Helton and her family. Three days after Helton was reported missing, investigators found her discarded body not too far from her home in Macon, Missouri. Someone in the town of five thousand had beaten, raped, and killed Julie Helton and left her body by the railroad tracks.

Police found a lead in woodcutter James “J.B.” Grinder and brought him and others in for questioning, but Grinder offered investigators a slew of alibis, each one different from the next. Over the fifteen years that followed, police invested more than ten thousand hours investigating the case. They were unable to obtain enough evidence on any suspect to stand a good chance of convicting him. Grinder changed his story repeatedly, sometimes admitting he had played a role in the events, sometimes implicating others, and sometimes denying any involvement or knowledge whatsoever.

After years of frustration, Macon County Sheriff Robert Dawson was close to abandoning the hunt for Helton’s killer when he heard about Brain Fingerprinting. Flipping television stations one evening at home, Dawson saw Farwell discussing Brain Fingerprinting on the Discovery Channel; Dawson’s first thought was of Grinder and his ever-changing alibis. Farwell has been featured in dozens of television shows, news articles, and journals throughout the world, but he has yet to become a household name. He holds several patents on the technology and processes that underlie Brain Fingerprinting. The press coverage Dawson saw touted a machine that uses electroencephalography to match unreleased details of a crime and crime scene to the record found in the perpetrator’s brain, or determine definitively that a suspect’s brain lacks a record of such details. Sheriff Dawson was no psychophysicologist, but he thought Farwell’s innovative application of EEG technology could potentially determine the extent of Grinder’s involvement in the crime and finally enable the state to determine Helton’s attacker. Dawson contacted Farwell in 1999 and Grinder, who was then serving time for an unrelated crime, agreed to take the test.

Successful administration of Brain Fingerprinting requires that some elements of the events in question remain ostensibly unknown to the subject. Sheriff Dawson, Chief Deputy Charles Muldoon, and Randy King of the Missouri Highway Patrol provided Dr. Farwell with the specific
details and background information that enabled him to create a test for Grinder. If Grinder had already learned everything the investigators knew about Helton’s murder through the media coverage of the case, the small-town rumor mill, and police interrogation, Farwell would have had no knowledge left for which to test. Investigators were able to provide relevant unreleased crime details of which Grinder claimed ignorance, and Farwell used those details to design Grinder’s test.

Brain Fingerprinting relies on a specific, measurable brainwave response known as a P300. The P300 is so called because it is a positive (hence, “P”) event-related potential that takes place within between three hundred (hence, 300) and eight hundred milliseconds following exposure to a stimulus that is familiar, noteworthy, or useful to the subject in performing a given task. The stimulus may be visual, aural, or olfactory: The sound of your mother’s voice, the smell of her perfume, a photograph of her face, or the text of her name will all produce a P300 response in the proper context. Conversely, an irrelevant stimulus, such as the address of someone you’ve never met, will not spark the conscious or subconscious “a-ha” instant that elicits a P300.

The P300 was first discovered and documented over forty years ago, and is robust enough to be detected without the sophisticated system of analysis required to locate and analyze other brain responses. Its validity is well accepted among experts in the field. Farwell is indeed one of those experts, having relied on the P300 in his research at Harvard and the University of Illinois exploring ways to obtain information from a subject’s brain without any overt indications from the subject. In 1986, Farwell and colleague Ted Bashore created a system that allowed a young man named Mike to communicate despite near-total physical paralysis. Following an automobile accident twelve years earlier, the patient could move nothing on his entire body but his eyelids. Farwell and Bashore created a computer program that presented Mike with a matrix of words and ideas that he could

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130 Sue Goetinck Ambrose, Inside the Criminal Mind: Lawyers, Neuroscientists Grapple with Question: Is the Fault in Our Brains, or in Our Selves?, DALLAS MORNING NEWS, Feb. 11, 2001 (“[The P300] is widely accepted among scientists as able to distinguish what is familiar to a person, and what is unfamiliar”); Lance O. Bauer & Victor M. Hesselbrock, Brain Maturation and Subtypes of Conduct Disorder: Interactive Effects on P300 Amplitude and Topography in Male Adolescents, 42 J. AM. ACAD. CHILD ADOLESC. PSYCHIATRY, 106, 106-15 (2003); S. Kinoshita et al, Long-term Patterns of Change in ERPs Across Related Measurements, 60 PHYSIOL. BEHAV. 1087-92 (1993); Tracy Staedter, Brain Waves Guide Walking Robot, DISCOVERY NEWS, Jan. 10, 2007 (the P300 is a “well-known, well-characterized response”).
131 Prior to Farwell and Bashore’s invention, Mike communicated with his mother only with his eyes. She would recite the alphabet, and her son blinked when she got to the letter he chose. In that way, he could slowly spell out messages to her. E-mail from Dr. Lawrence Farwell, Chairman and Chief Scientist, Brain Fingerprinting Laboratories, Inc., to the author (Mar. 26, 2006) (on file with author).
choose among, and the program detected which words prompted Mike’s P300 response. Through a series of such choices, the patient was able to construct entire sentences that the computer then “spoke” through a synthesizer to his loved ones. This early success led Farwell to contemplate what else he and his colleagues could accomplish using the P300 to glean information, or the presence of information, from a silent subject’s brain.

Farwell turned his attention toward “guilty knowledge detection,” seeking to discover information in those actively attempting to conceal it. He found the P300 could be used to pick trained FBI agents out of a larger group by measuring subjects’ responses to certain training code words. He tested the theory on a group of undergraduates, several of whom had committed minor crimes; the P300 revealed accurately which students had participated in which events simply by exposing them all to the same set of stimuli and analyzing their brainwaves during participation. In another experiment, students participated in one of two mock espionage scenarios and were tested for their knowledge of both scenarios. Farwell continues to explore the ramifications of his P300 research for medical testing, marketing applications, and the identification of trained terrorists.

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132 Mike’s first words using the brain-computer interface were “Hello, Mom. How are you?” His mother, who was in another room at the time, heard the words and rushed to Mike’s bedside. Interview with Dr. Lawrence Farwell, Chairman and Chief Scientist, Brain Fingerprinting Laboratories, Inc. at in Seattle, WA. (Mar. 15 2006) (on file with author).


135 Id. at 533.

136 Specifically, the P300 and Brain Fingerprinting are uniquely situated to aid in the early detection of Alzheimer’s. Lawrence A. Farwell, Brain Fingerprinting Executive Summary: Medical Diagnostics, BRAIN FINGERPRINTING LABORATORIES, at http://www.brainwavescience.com/ExecutiveSummary.php (last visited May 1, 2007);

137 Unsurprisingly, this potential application has generated arguably the most buzz among both civil libertarians who oppose, and watchdog groups who advocate, the use of Brain Fingerprinting as a tool in the “war on terror.” First brain mapping lab in Bangalore,
Brain Fingerprinting can be administered accurately relying solely on the P300, but in the course of further research Farwell discovered that the P300 is only one piece of a larger response, which he labeled a MERMER (Memory and Encoding Related Multifaceted Electroencephalographic Response). The MERMER encompasses both the P300 peak and its subsequent valley. Though Farwell’s claims are not actively disputed, the MERMER lacks the level of recognition and acceptance that the P300 boasts; its status as the P300’s lesser-known cousin could affect its admissibility in court, especially in Frye states. Nonetheless, Farwell claims Brain Fingerprinting is 99.9% accurate using only the P300 and closer to 99.99% accurate using his patented MERMER. A Brain Fingerprinting test always provides separate results according to each technique, along with the respective statistical confidence level for a given finding according to each approach. No Brain Fingerprinting test has ever presented a different conclusion using the MERMER than it did relying on the P300 alone.

Farwell and his Brain Fingerprinting technology impressed and intrigued Sheriff Dawson, and in August of 1999 Farwell flew to Missouri to administer the test to J.B. Grinder. In my desire to better understand the process, I recently flew to Washington to experience Brain Fingerprinting firsthand.

Farwell administered Grinder’s test upstairs in the Sheriff’s office of a small brick prison-house. He administered my test in his own office in Seattle, overlooking Puget Sound. After preparing several spots on my scalp with conducting gel and fastening grounding clips onto my earlobes, Farwell secured a headband equipped with sensors tightly around my head,

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138 Farwell’s application of the MERMER has been published and peer reviewed. Farwell & Smith, supra note 134.

139 Harrington Transcript, supra note 15, at 19; Lawrence A. Farwell, Supplement to Forensic Science Report: Brain Fingerprinting Test on Terry Harrington, Re: State of Iowa vs. Terry Harrington in the Iowa District Court for Pottawattamie County at Council Bluff, http://www.brainwavescience.com/HarringtonSupplement.php (“Using the full MERMER doesn’t change the results; it only gives us more data to work with so we get a higher statistical confidence.”).
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just as he had fastened one to J.B. Grinder’s head more than six years earlier. I wore khakis and a black sweater; Grinder wore a prison-issued orange jumpsuit, and Farwell asked the guards to remove Grinder’s handcuffs. Grinder and I each sat facing a large blue screen. Farwell always positions himself out of his test subject’s line of vision, in front of another screen where he can watch stimuli and results in real-time.

Before the test, Farwell reminded me of what I already knew: Julie Helton was killed with some instrument, though I didn’t know what it was; one part of the crime took place in a trailer, though I didn’t know where it was located; some items were taken from the trailer, but I didn’t know what; one object was left by the road later on, and another discarded in bushes. Those facts would lead me to recognize the phrases trailer, by road, and in bushes: Those phrases served as targets for me in the context of the crime. Other words I saw were not foreign to me; I cut up a mango with a knife for breakfast the morning of the test, I played softball with a bat for years, and I’ve never held a gun but I’m certainly afraid of them and associate them more closely with crime than I do the other two objects. In the context of Helton’s murder, though, none of those words was any more or less noteworthy to me than any other.

Like me, Grinder claimed to know only limited facts about Helton’s death when he underwent Brain Fingerprinting. Before the test, he was reminded of both the elements of the crime he acknowledged knowing for various reasons, and those he allegedly did not know. Farwell provided him a list of every word that could flash before him, along with the descriptors those words matched, in order to contextualize the terms. The subject is always asked to read those words and phrases to himself, precluding any experimenter bias that might result if someone else read them to the subject. The subject is given every opportunity to “remember” something he forgot he knew, or object that a stimulus holds special significance for him before the test begins. That process precludes a subject from believably asserting after the test that he already knew about a probe for some reason

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140 Helton’s rape and her murder took place in two different locations. Letter from Dr. Lawrence Farwell, Chairman and Chief Scientist, Brain Fingerprinting Laboratories, Inc., to author (Mar. 26, 2006) (on file with author).

141 Once a subject reviews the targets and confirms that he can recognize them, he is given an alphabetical list of the targets, probes, and irrelevants he will see in a given block before viewing that block, without the test administrator differentiating among the three types of stimuli. He is also given the descriptions of the stimuli for that block; in my case and Grinder’s, that description was “In this test you will see where the crime took place, items that were thrown away after the crime, and where these items were thrown.” E-mail from Dr. Lawrence Farwell, Chairman and Chief Scientist, Brain Fingerprinting Laboratories, Inc., to author (Mar. 26, 2006) (on file with author).

142 For example, in the Harrington case, discussed infra, Terry Harrington identified to Farwell a name, designed to be an irrelevant, that was actually the name of someone Harrington knew. That stimulus was consequently removed from the test lest it skew the results.
or that the probe held special significance for him.\textsuperscript{143}

Three kinds of stimuli compose the Brain Fingerprinting test: 1) targets, 2) irrelevants, and 3) probes. Targets are designed to elicit a P300 or MERMER response. My targets consisted of the information that we both knew I knew: Helton was killed in a trailer, so when I saw the word *trailer*, my brainwaves revealed my recognition. Irrelevant stimuli look like they could be crime-related, but are actually fabricated details with which I would not be familiar whether or not I committed the crime in question, and which would never produce a P300 or MERMER response. In any test, whether mine or Grinder’s, the irrelevants will provide a baseline of how our respective brain responds to unfamiliar information, and the targets will provide a baseline of what our brains do when they recognize the stimulus presented as significant or revelatory in the context of the crime. Probes, then, consist of information that investigators have discovered but that is known only to them, the perpetrator, and the victim. If my brain’s responses to probes resembles my brain’s responses to irrelevant stimuli, then the Brain Fingerprinting will result in a finding of “information absent”: The crucial information that stands to prove my role in the crime is simply not recorded in my brain. If, on the other hand, the test reveals that I recognize the probes the same way I recognized the targets, the finding will be “information present,” indicating that I know salient details of the crime that I earlier denied knowing, such as the type of weapon used (*knife*) or the item the perpetrator stole from the crime scene (*camera*).

Magazine descriptions of Brain Fingerprinting often glamorize its ability to instantaneously expose “the truth” about how much a subject actually knows about a set of events. In reality, the process is extensive, unglamorous, and exhausting, and it was assuredly far more tedious for Grinder than for me. We each held a mouse in our hands and clicked the left button when we saw targets and the right button in response to all other prompts. That exercise maintains the subject’s engagement in the process and keeps her from staring at her own nose instead of the words on the screen. Words flash for three tenths of a second and then disappear, but they are repeated dozens of times.\textsuperscript{144} The computer randomized the order of the

\textsuperscript{143} E-mail from Dr. Lawrence Farwell, Chairman and Chief Scientist, Brain Fingerprinting Laboratories, Inc., to author (Mar. 26, 2006) (on file with author).

\textsuperscript{144} It is crucial for the reliability and accuracy of the Brain Fingerprinting test that each stimulus is repeated a large number of times and the responses averaged. This repetition is one of several factors that differentiates Farwell, Donchin, and Smith’s P300 research from that of Rosenfeld et al. J.P. Rosenfeld, M. Soskins, G. Bosh, & A. Ryan, Simple, Effective Countermeasures to P300-based Tests of Detection of Concealed Information, 41 PSYCHOPHYSIOLOGY 205 (2004). The two are sometimes compared, but Rosenfeld’s low level of success results from several key missteps in the testing process. The number of trials collected by Rosenfeld is one-tenth the number Farwell collected in the Harrington case, and about one-fifth the number collected for each subject in the Farwell and Donchin study; such a small number of trials will not produce accurate results, because extraneous brainwave signals contaminate the response and require a far higher signal-to-noise ratio.
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words that I saw before me, flashing the eighteen stimuli four times apiece in about four minutes for every seventy-two-stimulus block. My only set consisted of four blocks, so I saw probes like knife and targets like in bushes a total of sixteen times apiece. Grinder, on the other hand, saw many more stimuli in many more blocks. That deluge of stimuli ensures enough data for definite determinations with strong statistical confidence, since the computer averages responses to each stimulus to create a composite version of the subject’s response. My and Grinder’s electrical brain responses were amplified, digitized, and saved to a disk. At the end of the test, the computer analyzed the stored results, graphed our targets, irrelevants, and probes, generated a finding of “information present” or “information absent” for those telling probes, and calculated a statistical confidence figure.

My readout strongly suggested that I lacked a record of the key information that would be known to someone who killed Julie Helton, and my test’s finding was “information absent” with respect to the salient details of her murder. Grinder’s readout indicated, with a statistical confidence level of 99.9%, that crime-related information resided in his brain. Grinder’s EEG confirmed he knew the missing pieces: The knife with which he stabbed Helton, he later deposited in bushes; the stolen camera he tossed by the road; at least part of the crime took place in a trailer located on Lingo Road. Targets and probes alike elicited the telltale P300 response, suggesting Grinder’s earlier ignorance was feigned.

After my Brain Fingerprinting test, Farwell confronted me with its results. Staring intently at the computer screen gave me a nasty headache, the clips left indentations on my earlobes, and the gel for the electrodes had hardened in my hair. I took two aspirin and a hot shower. After Grinder’s Brain Fingerprinting test, Farwell confronted him with its results. Grinder subsequently confessed in detail to the murders of Helton and several other young women whose disappearances had been as yet unsolved. He is currently serving life in prison. Farwell describes Grinder as without affect or remorse during his confession, indicating investigators and members of a

In addition, Rosenfeld failed to use optimal digital filtering procedures in his data analysis generally and applied different mathematical criteria, notably neglecting to allow for any inconclusive findings and declaring subjects “guilty” or “innocent.” Brain Fingerprinting’s algorithm, on the other hand, uses bootstrapping to compute a statistical confidence for each determination of “information absent,” “information present,” or “indeterminate.” Rosenfeld relies on a parametric criterion for computing statistical confidence, while Farwell and his colleagues employ a non-parametric criterion. In other words, Rosenfeld’s “effective counter-measures” may be effective against his own technique for information detection, but remain untested against the technique employed in Brain Fingerprinting.

Lawrence Farwell, Scientific Differences Between the Brain Fingerprinting Technique and Rosenfeld’s Technique for Detection of Concealed Information 7 (2006) (unpublished manuscript, on file with author).


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jury would have been hard-pressed to read his sincerity by watching him testify. Grinder did not reveal “any recognition of how horrific the actions he described were.” Rather, he “described planning and committing a rape and a very violent murder as if he were talking about a trip to the grocery store.”

**C. BRAIN FINGERPRINTING GOES TO COURT**

Several years after his involvement in the Grinder case, Farwell received a request to design a Brain Fingerprinting test for Terry Harrington, a young black man serving life imprisonment for murdering a white policeman in the late nineteen-seventies. From the day of his arrest, Harrington unwaveringly maintained his innocence and swore that he had spent the night in question at a concert with friends. Several confirmed his alibi, but one witness, Kevin Hughes, testified that he and Harrington had driven together to a dealership to steal a car that night, and that Harrington had shot and killed the policeman who was working as a security guard at the lot.

Farwell traveled to the Iowa State Penitentiary and conducted two different Brain Fingerprinting tests on Harrington. The first test established with 99.9% confidence that, while the details of the crime known to Harrington from the trial and investigation produced a P300 response and established a baseline recognition despite having taken place in 1977, all tested salient details of the crime and crime scene that would be known only to the perpetrator and investigators were unfamiliar to Harrington: His test produced a finding of “information absent.” A week later, Farwell conducted a second test he designed based on elements of the concert that served as Harrington’s alibi: The finding was “information present” with the same 99.9% confidence level.

Confronted with the results of

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146 After the test, Grinder not only admitted his participation, he also described the crime in considerable detail to me. 

...[H]e seemed to lack any of the normal human emotions one would expect in such a situation. He did not seem to show any remorse, any concern for the suffering of the victim and her loved ones, or any recognition of how horrific the actions he described were. I remember that he said that after having been bound, raped, and beaten the victim was “bawling and wanting to go home.” Grinder’s demeanor and tone of voice were like what a normal person might use to describe an unruly two-year-old who was fussing because someone had snatched his candy, rather than a victim pleading for her life. He described planning and committing a rape and a very violent murder as if he were talking about a trip to the grocery store.

E-mail from Dr. Lawrence Farwell, Chairman and Chief Scientist, Brain Fingerprinting Laboratories, Inc., to author (Mar. 26, 2006) (on file with author).

147 The statistical confidence level was 99.99% using the MERMER, or 99% using the P300 alone. Lawrence A. Farwell, *Supplement to Forensic Science Report: Brain Fingerprinting Test on Terry Harrington, Re: State of Iowa vs. Terry Harrington in the*
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Harrington’s Brain Fingerprinting test, Kevin Hughes recanted his testimony and confessed to perjuring himself at the original trial. The appeals court treated the results of the Brain Fingerprinting test as admissible, but chose not to overturn its verdict, granting Harrington a new trial on the basis of a Brady violation.\(^{148}\) The Iowa Supreme Court did not address Brain Fingerprinting directly, but the State concluded it lacked adequate evidence to retry Harrington.

The Judge in Harrington ruled Brain Fingerprinting admissible under Daubert after conducting a day-long hearing featuring three expert witnesses, each renowned in his field. In addition to Farwell, the Defense called Dr. William Iacono on behalf of Harrington; the State called Emanuel Donchin for the Prosecution. Farwell and Iacono testified that the science underlying Brain Fingerprinting has been tested, peer reviewed, and published, citing Farwell’s patents\(^ {149}\) and several publications.\(^ {150}\) They testified that the science of Brain Fingerprinting is accurate and generally accepted in the scientific community. Donchin did not contest Farwell and Iacono’s assertions, concurring in the above and acknowledging “the P300 side is absolutely perfect...to the extent its scientific data are good. We know that if you get a P300 to a stimulus, the subject responded to it and the brain responded to it in a certain way.”\(^ {151}\) Donchin testified that he could not agree or disagree with Farwell’s conclusion because he lacked sufficient

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\(^{151}\) Harrington Transcript, supra note 15.

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information about the case and the stimuli, but agreed that Farwell’s publications demonstrated his skillful development of stimuli. Unable to resist the siren call of analogy, Donchin testified in the hearing that while sound science underlies Brain Fingerprinting, its administration relies on skill, “just like fingerprints.”

IV. PERCEPTION AND PRESENTATION

Media coverage of Brain Fingerprinting consistently characterizes it as the “next” or “new” form of some preexisting technology, whether in order to advance journalists’ own view of Brain Fingerprinting or simply to render something complex more understandable to lay readers. The most popular comparison journalists rely upon is that of polygraphy, characterizing Brain Fingerprinting as the newest lie detector or the next polygraph. Farwell decries such analogy as inaccurate and prefers to

152 Id. at 203.
153 Id. at 225.
154 Id. at 208.
156 Iacono, too, rejects the comparison of Brain Fingerprinting to polygraphy:
Q [H]ow would you say that Dr. Farwell’s extension to guilty knowledge test would differ from a conventional polygraph test?
A It’s very different...The only thing they share in common is that a conventional polygraph test and this extension both involve recording
tie Brain Fingerprinting rhetorically with DNA, highlighting similarities between the two; many writers have followed his lead.\textsuperscript{157} Obviously, the name “Brain Fingerprinting” draws a parallel between the technology and fingerprinting itself, “the very archetype of reliable expert testimony.”\textsuperscript{158} Others have construed Brain Fingerprinting as providing the government with greater potential to violate citizens’ privacy, comparing Farwell’s creation with wiretapping or surveillance. Still others, excited about Brain Fingerprinting’s ability to determine whether someone is a member of a controversial group or has been trained by a terrorist, equate Brain Fingerprinting with airport security measures like metal detectors and drug-sniffing dogs. One writer likens Brain Fingerprinting to the ability to predict future crimes exhibited by the “pre-cogs” of Steven Spielberg’s movie “Minority Report.”\textsuperscript{159} References to Orwell and “Big Brother” abound.\textsuperscript{160}

physiological signals from humans, but beyond that, they really deal with different topics. Dr. Farwell’s technique is intended to assess memory, in particular, recognition memory and whether or not people—recognize information that’s relevant to a crime. In conventional lie detection techniques, we are measuring particularly autonomic nervous system response; not brain responses, to determine whether or not people are lying or trying to deceive in their response to different questions. And the lie detector technology is very subjective and based on a number of assumptions that are made about how the procedure works that are not generally accepted in the scientific community.

\textit{Harrington Transcript, supra} note 15 at 180.

\textsuperscript{157} See, e.g., Beth Daley, \textit{Foolproof Forensics? Even Science May Not Make a Death Sentence Infallible}, \textit{BOSTON GLOBE}, June 8, 2004, at E1 (“By the late 1980s, DNA testing had been widely adopted, and today technology is still marching on: A new technique called ‘brain fingerprinting’; a kind of lie detector based on brain signals, was admitted into court in Iowa in 2003 in order to help free a man in prison for murdering a retired police officer.”); Abigail Johnson, \textit{Brain Analysis Tests Knowledge}, \textit{IND. LAW.}, Mar. 24, 2004, at 7 (“[B]rain fingerprinting will need to go through more proving in court….the same thing happened with DNA and fingerprinting analysis.”); Clark Kauffman, \textit{Inventor, State Aid Both Gone from Iowa; $125,000 for High-Tech Tool Yields Controversy, One Full-Time Job, DES MOINES REGISTER}, Sep. 5, 2004, at 1A (“Farwell’s…brain fingerprinter could represent the most significant advance in forensic science since DNA testing.”); Jean Prescott, \textit{Science on the Screen}, \textit{HOUSTON CHRON.}, Feb. 17, 2004 (“Brain Fingerprinting…could be the step beyond DNA analysis, the next innovation in crime detection.”); David Zizzo, \textit{Forensic Investigations Turning to Brain Waves}, \textit{SUNDAY OKLAHOMAN}, Mar. 14, 2004, at 5A (“[Brain Fingerprinting] is only another tool, such as DNA evidence, for courts to use to decide cases.”). See also Farwell’s testimony in Harrington:

[Brain Fingerprinting is] just like, say, DNA evidence. If there is no DNA at the scene of the crime, we will not be able to try to match the DNA with the suspect at the scene of the crime. If we can't discover any information from the crime that the subject would know, if and only if he's committed the crime, [Brain Fingerprinting will not be feasible].

\textit{Harrington transcript, supra} note 15, at 24.

\textsuperscript{158} United States v. Havward, 260 F. 3d 597 (7th Cir. 2001).

\textsuperscript{159} \textit{MINORITY REPORT} (Twentieth Century Fox & Dreamworks 2002); Barry Steinhardt, \textit{Privacy: Big Brother Is No Longer Fiction}, \textit{CHARLESTON GAZETTE}, Feb. 9, 2003, at 1.
Journalists often begin discussions of Brain Fingerprinting by distinguishing it from the modern polygraph, but such a distinction is always already founded upon the assumption that the two warrant comparison. Brain Fingerprinting is treated as, in turn, a new and improved polygraph by those who endorse it; a scarier, potentially more trusted and hence more dangerous polygraph by those who oppose it; a more valid and reliable polygraph by those who appreciate the science that supports it. Any such statement relies on analogizing Brain Fingerprinting to polygraphy, characterizing the purpose of Brain Fingerprinting as lie detection and suggesting its promises and pitfalls to be comparable to those of polygraphy until revealed otherwise.

Disavowing that metaphor and aligning Brain Fingerprinting instead with forensic evidence like fingerprinting may be a strategically wise move for those with a stake in Brain Fingerprinting’s admissibility. Many other evidentiary forms have succeeded in piggybacking on fingerprinting’s stellar reputation as incontestable proof, from tool mark identification to DNA. Farwell and his colleagues describe Brain Fingerprinting as able to determine a “match” between crime scene evidence and the record stored in an individual’s brain, just as fingerprinting and DNA seek a match. Such an analogy is also powerful because forensic evidence claims to be inconclusive as to the ultimate question, even though it often functions practically to guide a jury directly to decision. Where DNA or fingerprinting may declare that the defendant’s prints or blood or hair were found at the crime scene, the finders of fact remain free to determine that the defendant might have visited the scene but did not pull the trigger, or that a racist police officer or crafty accomplice planted the evidence. With true lie detection, a finder of fact has no facts to find if a trustworthy machine declares the defendant is lying when he testifies he didn’t do it. As such, placing Brain Fingerprinting in the category of fingerprinting-like things allows a jury to consider a finding of “information present” as merely a “match,” preserving the jury’s autonomy in enabling it to determine what weight it will place on the evidence. Media coverage of Brain Fingerprinting is peppered with mentions of DNA, although such a comparison ranks second in frequency to that of lie detection.

160 See, e.g., Bergstrom, supra note 156; Robin Marantz Henig, Looking for the Lie, N.Y. TIMES, Feb 5, 2006, at 47; Russ Kick, Gotcha! VILLAGE VOICE, Feb. 27, 2001, at 33; Steinhardt, supra note 160; David Streitfeld & Charles Piller, Response to Terror: A Changed America: Big Brother Finds Ally in Once-Wary High Tech, L.A. TIMES, Jan. 19, 2002, at A1. Many others allude to ALDOUS HUXLEY, BRAVE NEW WORLD (1932) or science fiction generally, fearing from Brain Fingerprinting “another weapon in the arsenal of those who want to put us into a surveillance society where every action, every deed and one’s very thoughts can be monitored, categorized and correlated.” Loviglio, supra note 156; Rodney J. S. Deaton, Neuroscience and the In Corpore-ted First Amendment, 4 FIRST AMEND. L. REV. 181, 204 (2006).

161 See Mnookin, supra note 115, at 22 n.29.
V. “PERSUASIVENESS & MANIPULATION”: IMPLICATIONS FOR NOVEL EVIDENCE

One theorist in the field of Visual Studies notes that fear of novel technology is marked by dual anxieties of “persuasiveness and manipulation.”\textsuperscript{162} We ought to fear the same phenomena when approaching analogy applied to that novel technology, whether a given analogy is painstakingly or haphazardly selected. The decision in \textit{Williams} weighs the danger that jurors will be “awed” by voice spectography’s “aura of mystic infallibility.”\textsuperscript{163} Scholars in the nineteenth century who opposed a new technology denounced its potential to “prejudice the jury and obscure the truth,” while advocates of the same technology “championed the way that its persuasiveness and manipulability made achieving the truth more pure.”\textsuperscript{164} The same ambivalence marks reactions to innovation today, and manifests itself in reactions to Brain Fingerprinting, which may one day seem as basic to judges and jurors as photography does now.

Cass Sunstein identifies analogical reasoning’s “four distinctive properties” as “a requirement of principled consistency, a focus on concrete particulars, incompletely theorized judgments, and the creation and testing of principles having a low or intermediate level of generality.”\textsuperscript{165} He adds that analogical reasoning may at times impede facts or progress, and laments that while it forms the basis of legal thought and boasts many “beneficial features,” it appears “at best primitive on the important issue of likely social consequences.”\textsuperscript{166} Indeed, a reliance on analogy in the courtroom too often provides immediate gratification and clarification, but later returns to haunt its architect or its adherents when the inappropriateness of the comparison becomes evident. What are the social consequences of analogy? By actively employing or passively allowing


\textsuperscript{164} Buccafusco, supra note 163, at 621.

\textsuperscript{165} Sunstein, supra note 94, at 790.

\textsuperscript{166} Id.
analogy as a shortcut to assimilate some unknown element, judges may forego adequate analysis of the novel thing analogized by adopting the already-analyzed characteristics of the target of analogy. In allowing experts and attorneys to present Brain Fingerprinting as like DNA, like fingerprints, like polygraphy, or like anything other than itself, a judge sets the standard in her courtroom of seeking not truth and justice, but like-truth and like-justice.

Despite sophisticated and nuanced analyses of rhetorical and cognitive trends in legal reasoning, the vast majority of sources cited conclude without value judgment, lamenting the havoc a good metaphor can wreak in a courtroom but weighing it evenly against the benefits the metaphor bears, or refusing to eschew analogy because the cost would be too great and the endeavor impossible. While such tropes will likely always have a place in legal reasoning, this paper advocates a more aggressive approach. If judges are to preside as keepers who open or shut the gates to scientific evidence, let the gatekeeper metaphor preclude any other metaphors that would sneak through those gates in disguise or as disguise, rather than standing trial honestly. Brain Fingerprinting seems to meet every standard of admissibility under Rule 702; scrutinize it according to its merits, not the merits of the thing it most closely resembles or the category into which it purports to fit. If journalists, scientists, and jurors understand and process novel evidence by comparing it to the familiar, *Daubert* asks judges to take on the more strenuous challenge of which perhaps only judges are capable. Examine the evidence on its own terms, from every angle, impartially and without analogy.