



2015

Extralegal Supreme Court Policy Making

Joelle A. Moreno

Florida International University College of Law, joelle.moreno@fiu.edu

Follow this and additional works at: https://ecollections.law.fiu.edu/faculty_publications



Part of the [Constitutional Law Commons](#)

Recommended Citation

Joelle A. Moreno, *Extralegal Supreme Court Policy Making*, 24 Wm. & Mary Bill Rts. J. 451 (2015).
Available at: https://ecollections.law.fiu.edu/faculty_publications/236

This Article is brought to you for free and open access by the Faculty Scholarship at eCollections. It has been accepted for inclusion in Faculty Publications by an authorized administrator of eCollections. For more information, please contact lisdavis@fiu.edu.

EXTRALEGAL SUPREME COURT POLICY-MAKING

Joëlle Anne Moreno*

The Colbert Report aired its final episode on December 18, 2014.¹ Nine years earlier, on the first episode, Stephen Colbert coined the word “truthiness.”² Truthiness satirized contemporary disinterest in empirical information in a country increasingly “divided between those who think with their head and those who know with their heart.”³ Truthiness was not just the Merriam-Webster word of the year.⁴ Over the past decade, it has been the unspoken mantra of reporters who give equal time to climate science denialists, faith healers, and vaccine refusers.⁵ When Justices of the Supreme Court decide questions of scientific or empirical fact—such as whether an IUD prevents or terminates a pregnancy—they increasingly employ fact-finding strategies that equate the empirical evidence (they think with their heads) with the unsubstantiated beliefs (they feel with their hearts).⁶ Jurisprudential epistemic relativism (or

* Associate Dean for Faculty Development & Professor of Law, Florida International University College of Law.

¹ *The Colbert Report: Sign Off—From Eternity* (Comedy Central television broadcast Dec. 18, 2014), <http://thecolbertreport.cc.com/videos/p2s8rc/sign-off---from-eternity>.

² *The Colbert Report: The Word—Truthiness* (Comedy Central television broadcast Oct. 17, 2005), <http://thecolbertreport.cc.com/videos/63ite2/the-word---truthiness>.

³ *Id.*

⁴ *2006 Word of the Year*, MERRIAM-WEBSTER, <http://www.merriam-webster.com/word-of-the-year/2006-word-of-the-year.htm> [<http://perma.cc/N2GB-5AFF>] (naming “truthiness” Merriam-Webster’s number one Word of the Year for 2006).

⁵ See Chris Mooney & Matthew C. Nisbet, *Undoing Darwin*, COLUM. JOURNALISM REV., Sept.–Oct. 2005, http://www.math.wichita.edu/~pparker/personal/mooney_esp.html [<http://perma.cc/HM3K-C5SM>] (describing how “an entirely lopsided debate within the scientific community” can be “transformed into an evenly divided one in the popular arena”). However, there is evidence of more recent backlash to balanced media coverage of some science policy debates. In *Another Outbreak of False Balance*, New York Times reporter Margaret Sullivan described increased reader frustration with false balance “on the subjects of teaching evolution [and] the reality of climate change” because the media practice of giving “equal weight to both sides . . . [does not] clearly acknowledge established truths.” Margaret Sullivan, Opinion, *Another Outbreak of “False Balance”?*, N.Y. TIMES (Feb. 7, 2015), <http://www.nytimes.com/2015/02/08/opinion/sunday/another-outbreak-of-false-balance.html>.

⁶ *Burwell v. Hobby Lobby Stores, Inc.*, 134 S. Ct. 2751, 2759 (2014) (upholding the right of three closely held corporations to refuse to provide health-insurance coverage for methods of contraception under the Religious Freedom Restoration Act of 1993 (RFRA), 107 Stat. 1488, 42 U.S.C. §§ 2000bb–2000bb-4, based—not on the medical evidence—but solely on their “beliefs the four contraceptive methods at issue are abortifacients”); see also *Tummino v. Hamburg*, 936 F. Supp. 2d 162, 164–65 (E.D.N.Y. 2013) (finding that Plan B emergency contraception “interferes with prefertilization events” and has “not been shown

truthiness) often produces the wrong answer to questions of fact. Issues of law and natural science or human behavior shape many Supreme Court cases, including important recent decisions on death by lethal drug cocktail⁷ and the psychological benefits of marriage for same-sex families.⁸ At the micro level, decisions that contradict the

to cause a postfertilization event—a change in the uterus that could interfere with implantation of a fertilized egg”).

⁷ On June 29, 2015, in *Glossip v. Gross*, 135 S. Ct. 2726 (2015), the Supreme Court ruled that Oklahoma’s lethal injection protocol does not violate the Eighth Amendment. Justice Alito, writing for the majority, affirmed the district court’s finding of fact that the drug “midazolam is highly likely to render a person unable to feel pain during an execution.” *Id.* at 2739. Although the majority cautioned that “federal courts should not ‘embroil [themselves] in ongoing scientific controversies beyond their expertise,’” *id.* at 2740 (alteration in original) (quoting *Baze v. Ky. Dep’t of Corr.*, 128 S. Ct. 1520, 1531 (2008)), the Court relied upon the finding that “a 500-milligram dose of midazolam would make it a ‘virtual certainty’ that any individual would be ‘at a sufficient level of unconsciousness to resist the noxious stimuli which could occur from application of the . . . [additional] drugs’ used in the Oklahoma protocol,” *id.* at 2741 (quoting app. 302). The Court also specifically rejected critique of this factual finding based on the expert’s own admission “that his findings were based on ‘extrapolat[ions]’ from studies done about much lower therapeutic doses of midazolam.” *Id.* (alteration in original). In addition, Justice Alito rejected the scientific argument that midazolam’s “ceiling effect” makes it unlikely that the dose administered in Oklahoma would make an inmate insensate to pain. *Id.* (quoting app. 243). Writing in dissent, Justice Sotomayor made very different findings of medical fact. She noted that three experts had “agreed that midazolam is from a class of sedative drugs known as benzodiazepines (a class that includes Valium and Xanax), and that it has no analgesic—or pain-relieving—effects.” *Id.* at 2783 (Sotomayor, J., dissenting). Critical scientific testimony, in the dissenters’ view was provided by Dr. Lubarsky who opined that

this ceiling on midazolam’s sedative effect is reached before full anesthesia can be achieved. . . . [So] while ‘midazolam unconsciousness is . . . sufficient’ for ‘minor procedure[s],’ it is incapable of keeping someone ‘insensate and immobile in the face of [more] noxious stimuli,’ including the extreme pain and discomfort associated with administration of the . . . [additional] drugs in Oklahoma’s lethal injection protocol.

Id. at 2783 (second, third, and fourth alterations in original) (citations omitted). According to Justice Sotomayor, these findings have significant evidentiary weight because they are based on medical studies and pharmacology textbooks, rather than unsupported speculation. *Id.* Finally, the dissenters objected to the fact that “the Court sweeps aside substantial evidence showing that, while midazolam may be able to *induce* unconsciousness, it cannot be utilized to *maintain* unconsciousness in the face of agonizing stimuli . . . [and] finds comfort in Dr. Evans’ wholly unsupported claims that 500 milligrams of midazolam will ‘paralyz[e] the brain.’” *Id.* at 2785–86 (third alteration in original); *see also* *Baze v. Rees*, 553 U.S. 35 (2008) (upholding the constitutionality of Kentucky’s lethal injection protocol and holding that any challenge to lethal injection must include a showing that a state’s drug protocol presents a “substantial” or “objectively intolerable” risk of serious harm).

⁸ On June 26, 2015, in *Obergefell v. Hodges*, 135 S. Ct. 2584 (2015), the Supreme Court held that the Fourteenth Amendment requires every state to issue a marriage license to same-sex couples. According to Justice Kennedy, who wrote for the majority, marriage arises “from

empirical evidence are inaccurate and unfair to the parties. At the macro level, when judges balance substantiated data against truthiness-based claims, courts distort social perceptions by creating a false epistemic relativism that models poor decision-making and yields bad public policy.

INTRODUCTION	454
A. <i>Judicial Fact-Finding</i>	456
B. <i>Modern Epistemic Relativism: The Anti-Evolution and Anti-Abortion Debates</i>	458
C. <i>Why and How: The Goals and Roadmap</i>	462
D. <i>Two Disclaimers</i>	464
I. SCIENCE, SCIENCE POLICY, AND LAW: THE PROBLEM OF EVIDENCE HEGEMONY	465
A. <i>The Daubert Trilogy</i>	466
B. <i>Science and Law Is Not an Evidence Problem</i>	467
II. THE SCIENCE OF NATURE AND THE NATURE OF SCIENCE	469
A. <i>Legitimate, False, and Manufactured Science Controversies</i>	469
B. <i>The Settled Science of Evolution and Natural Selection</i>	471
C. <i>The “Monkey” Trial: Tennessee v. Scopes</i>	472
D. <i>The Supreme Court Weighs In: Epperson v. Arkansas</i>	474
1. Epistemic Relativism and Secular Humanism	475
2. Epistemic Relativism and Academic Freedom	475
E. <i>Redefining “Scientific Theory” and “Scientific Critique”: Edwards v. Aguillard</i>	476
1. Skepticism from the Lower Courts	476
2. Academic Freedom	477

the most basic human needs” and “is essential to our most profound hopes and aspirations.” *Id.* at 2594. The Court’s fact-finding about the psychological importance of marriage includes the majority’s endorsement of the conclusion that “[c]hoices about marriage shape an individual’s destiny . . . because ‘it fulfils yearnings for security, safe haven, and connection that express our common humanity, civil marriage is an esteemed institution, and the decision whether and whom to marry is among life’s momentous acts of self-definition.’” *Id.* at 2559 (quoting *Goodridge v. Dep’t of Pub. Health*, 798 N.E.2d 941, 955 (Mass. 2003)). Marriage is, in the Court’s view, “a coming together for better or for worse, hopefully enduring, and intimate to the degree of being sacred. It is an association that promotes a way of life, not causes; a harmony in living, not political faiths; a bilateral loyalty, not commercial or social projects.” *Id.* (quoting *Griswold v. Connecticut*, 381 U.S. 479, 486 (1965)). Through the “enduring bond” of marriage, “two persons together can find other freedoms, such as expression, intimacy, and spirituality.” *Id.* Finally, the Court engaged in fact-finding about the positive psychological benefits parental marriage confers on children. “By giving recognition and legal structure to their parents’ relationship, marriage allows children ‘to understand the integrity and closeness of their own family and its concord with other families in their community and in their daily lives’ . . . [and] affords the permanency and stability important to children’s best interests.” *Id.* at 2600 (quoting *Windsor v. United States*, 133 S. Ct. 2675, 2694–95 (2013)).

3.	Advancing Scientific Knowledge	478
4.	Ignoring the Scientific Evidence and the Scientists	479
5.	Ignoring Relevant Cases	480
6.	Justice Scalia's Dissent: Creation Science <i>Is</i> Science	481
7.	The Scientists Respond	483
III.	THE <i>EDWARDS EFFECT</i>	484
A.	<i>Copycat "Scientific Theories" and "Scientific Critique" from the Anti-Abortion Movement</i>	486
1.	The Medical Science of Fetal Viability	487
2.	The Psychological Effects of Unwanted Pregnancy and Abortion	488
3.	The Post- <i>Roe</i> Decade	489
4.	The <i>Roe</i> Backlash	490
B.	<i>"Partial-Birth Abortion"</i>	492
C.	<i>Medical Fact-Finding on Partial-Birth Abortion: Stenberg v. Carhart</i>	495
IV.	EXTRALEGAL JUDICIAL FACT-FINDING IN THE TWENTY-FIRST CENTURY	496
A.	<i>Recent Anti-Evolution Developments</i>	497
1.	Accurate Judicial Fact-Finding About Evolution: <i>Kitzmiller v. Dover Area School District</i>	497
2.	Understanding the New Judicial Approach	498
3.	Judicial Policy-Making Advances Accurate Science and Science Policy	499
4.	Anticipating Consequences	500
B.	<i>Recent Anti-Abortion Developments</i>	503
1.	Inaccurate Judicial Fact-Finding About Abortion: <i>Gonzales v. Carhart</i>	503
2.	Understanding the New Judicial Approach	505
a.	<i>The Medical Evidence</i>	507
b.	<i>The Psychological Evidence</i>	509
C.	<i>Judicial Policy-Making Undermines Science and Science Policy</i>	509
1.	Anticipating Consequences	510
CONCLUSION:	A BETTER PATH FORWARD	512
A.	<i>Four Recent Decision-Making Insights</i>	512
1.	The Role of the Media	512
2.	Incomplete Information	515
3.	Logical Fallacies	516
4.	The Science of Science Communication	518

INTRODUCTION

The Supreme Court routinely explores the science of nature while ignoring the nature of science. A half century ago, Justice Stewart claimed to know pornography

when he saw it,⁹ but the modern Supreme Court believes that real science is equally easy to spot. As society becomes more science dependent, the Justices increasingly opine on critical public policy questions ranging from global climate change¹⁰ to the social benefits of a racially diverse college campus,¹¹ to the most intimate psychological and medical details of birth control¹² and abortion.¹³

Decisions about natural or social science are extralegal. They do not involve “judging,” because members of the Court cannot rely on jurisprudential acumen or familiar methods of legal interpretation. Questions about the natural world and human behavior also invariably involve fact-finding beyond the individual circumstances of a particular case. They differ from questions about the law because they do not involve interpretation of legal sources, but instead must be answered with what Justice Brandeis famously referred to as “general facts.”¹⁴ Kenneth Culp Davis, describing the same predicate extralegal information, coined the term “legislative facts,”¹⁵ because in his view these facts “inform[] a court’s legislative judgment on questions of law and policy.”¹⁶

Extralegal decisions set and alter public policy. In her recent work, Professor Allison Orr Larsen described the Supreme Court’s increased reliance on legislative facts outside the pleadings and amicus briefs, opining that a “plausible explanation for this shift is that the change in access to information has increased judicial reliance on legislative facts, period.”¹⁷ Professor Larsen’s trend spotting is well supported by her empirical research, but judges have always engaged in policy-making about the natural world and human behavior. Throughout history, courts have engaged in extralegal fact-finding. “[I]t only makes sense to provide courts with data to assist in their law-making function if one sees courts as having such a function, as distinguished from a function of discovering law that is dictated by text, precedent, and principle.”¹⁸

⁹ *Jacobellis v. Ohio*, 378 U.S. 184, 197 (1964) (Stewart, J., concurring).

¹⁰ *Util. Air Regulatory Grp. v. EPA*, 134 S. Ct. 2427 (2014); *see also Massachusetts v. EPA*, 549 U.S. 497, 528 (2007) (rejecting the EPA’s argument that the Clean Air Act is not applicable to carbon fuel emissions and the link between emissions and global climate change).

¹¹ *Schuetz v. BAMN*, 134 S. Ct. 1623 (2014); *see also Fisher v. Univ. of Tex. at Austin*, 133 S. Ct. 2411 (2012).

¹² *Burwell v. Hobby Lobby Stores, Inc.*, 134 S. Ct. 2751 (2014).

¹³ *Id.*

¹⁴ Ann Woolhandler, *Rethinking the Judicial Reception of Legislative Facts*, 41 VAND. L. REV. 111, 115 (1988).

¹⁵ Kenneth Culp Davis, *An Approach to Problems of Evidence in the Administrative Process*, 55 HARV. L. REV. 364, 407 (1942).

¹⁶ *Id.* at 404.

¹⁷ Allison Orr Larsen, *Confronting Supreme Court Fact Finding*, 98 VA. L. REV. 1255, 1308 (2012).

¹⁸ Woolhandler, *supra* note 14, at 115; *see also* Larsen, *supra* note 17, at 1267 (noting that “[l]egislative facts can be—but do not have to be—the subject of expert testimony in the trial court”).

A. Judicial Fact-Finding

Unfortunately, judges are not especially skilled fact finders. There is “no good reason to conclude that, by virtue of qualities, training, or experience . . . [that] judges should be considered experts at weighing evidence or at fact-finding.”¹⁹ Judging, unlike policy-making, almost never requires the assessment of competing factual claims, data analysis, or evaluations of critiques of settled natural or social science. Even in bench trials where judges act as “finders of fact,” their purview is restricted to the specific “adjudicative facts” necessary to the resolution of the pending legal question.²⁰

Concerns about judicial aptitude are compounded by the fact that the essential methodology of accurate fact-finding must be evidence-based and transparent. Decision-making about the world requires open access to information because transparency enables other researchers to identify errors and make improvements. In *The Wisdom of Crowds*, James Surowiecki explained the importance of transparency to optimizing accuracy, using the example of the discovery of the SARS virus, a serious form of pneumonia first identified in 1993.²¹

The discovery of the SARS virus was, by any measure, a remarkable feat. And when we’re faced with a remarkable feat, our natural inclination is to ask: Who did it? Who actually discovered the cause of SARS? But the truth is, that’s an impossible question to answer. We know the name of the person who first spotted the coronavirus. She was an electron microscopist named Cynthia Goldsmith, who worked in the Centers for Disease Control and Prevention lab in Atlanta. But you can’t say she discovered what caused SARS, since it took weeks of work by labs all over the world to prove that the coronavirus actually made people sick.²²

Scientific inquiry, like law, is a fact-finding social enterprise conducted by human investigators. Although obviously imperfect, the *sine qua non* of all legitimate inquiry is integrity. Professor Susan Haack concisely defined “scientific integrity” as “the epistemological values of evidence-sharing and respect for evidence.”²³ When

¹⁹ Barbara A. Spellman, *On the Supposed Expertise of Judges in Evaluating Evidence*, 156 U. PA. L. REV. 6–7 (2007).

²⁰ Woolhandler, *supra* note 14, at 113–14 (defining case-specific “adjudicative facts” as facts about what the parties did, what the circumstances were, and what the background conditions were).

²¹ JAMES SUROWIECKI, *THE WISDOM OF CROWDS* 160 (2004).

²² *Id.* (describing how every lab involved in the project shared data with all other labs every morning).

²³ Susan Haack, *The Integrity of Science: What it Means, Why it Matters*, 11 COLECCAO BIOETICA 9, 10 (2006) (Port.), http://www.cneqv.pt/admin/files/data/docs/1415203323_Livro%20bioetica_11_etica%20e%20investigaco.pdf [<http://perma.cc/B9M7-2AD2>].

Justices select information from amicus briefs²⁴ or other disclosed or undisclosed outside sources²⁵ to answer empirical questions, these same epistemological values should guide their analyses. When courts balance pseudoscientific claims against sound scientific explanations, they endorse a false epistemic relativism that lacks scientific integrity by failing to respect the evidence.

Judicial fact-finding is traditionally opaque. During confirmation hearings, nominated Justices increasingly stonewall, arguing that any response would “undermine the impartiality of the judiciary.”²⁶ Once on the Court, the Justices remain secretive about their decision-making methods even in cases of significant public import and long after decisions have been issued.²⁷ Following a December 2014 investigation of Supreme Court secrecy in a range of significant cases, *New Yorker* reporter Jill Lepore concluded, “[T]here’s no reason to believe that historians will ever really know how the Court arrived at these decisions.”²⁸ The fact that the Supreme Court—the *least* democratic branch—regularly engages in policy-making has been a topic of significant long-standing interest and debate, inside and outside the legal academy.²⁹ But testing the accuracy of opaque Supreme Court decisions is difficult because “reliable feedback as to the appropriate weighing of evidence does not exist—[so] the ground truth of cases is never known.”³⁰

²⁴ Allison Orr Larsen, *The Trouble with Amicus Facts*, 100 VA. L. REV. 1757, 1758 (2014) (noting that “[a]micus curiae briefs filed at the U.S. Supreme Court are on the rise—up 800% over 50 years” and that “the most influential type of amicus brief . . . is one that adds new facts to the record”).

²⁵ In her excellent article, *Confronting Supreme Court Fact Finding*, Professor Allison Orr Larsen demonstrates that in the Supreme Court, “in the last decade or so, questions of legislative fact are being researched ‘in house’—that is, without reliance on the parties or amici—at an astonishing rate.” See Larsen, *supra* note 17, at 1262.

²⁶ Erwin Chemerinsky, *Making Confirmation Hearings Meaningful*, YALE L.J. (THE POCKET PART), Jan. 2006, <http://yalelawjournal.org/forum/making-confirmation-hearings-meaningful> [<http://perma.cc/AW6Q-KPXS>] (noting that “[t]his was John Roberts’s repeated answer to questions throughout his confirmation hearings and it followed the pattern of recent nominees who refused to answer anything that might give an inkling as to how the nominee might vote on specific issues”).

²⁷ See, e.g., Jill Lepore, *The Great Paper Caper*, NEW YORKER (Dec. 1, 2014), <http://www.newyorker.com/magazine/2014/12/01/great-paper-caper> [<http://perma.cc/6RZ3-WMCV>].

²⁸ *Id.*

²⁹ See, e.g., David E. Wilkins, *The “Actual State of Things”: Teaching About Law in Political and Historical Context*, 82 N.D. L. REV. 903, 912 (2006) (noting that the Supreme Court “is first and most fundamentally a profoundly political institution and crafts important policy pronouncements, otherwise known as judicial opinions, as one of three co-equal branches of government”); see also Eric Black, *How the Supreme Court Has Come to Play a Policymaking Role*, MINNPOST (Nov. 20, 2012), <https://www.minnpost.com/eric-black-ink/2012/11/how-supreme-court-has-come-play-policymaking-role> [<http://perma.cc/E562-W6J4>] (“When they impose their policy preferences in the guise of defending the Constitution—or even when they are perceived to be doing so—the credibility of the whole system takes a hit.”).

³⁰ Spellman, *supra* note 19, at 7 (describing why judges are rarely experts at assessing empirical evidence).

Given the investigative constraints, it is tempting to simply conclude that the Justices advance favored policy objectives. This explanation would add to the cacophony of speculation about the Court's uncertain legitimacy.³¹ In many cases these fears are warranted. The Court is not immune to front-page science-policy controversies³²—even when partisan debates do not divide neatly along party lines.³³ But, in other cases, well-intentioned Justices seeking accurate information about how the world works may find it increasingly difficult to distinguish science from its counterfeits.³⁴

B. Modern Epistemic Relativism: The Anti-Evolution and Anti-Abortion Debates

Epistemic relativism equating scientific facts with faith is at least as old as Galileo's heliocentrism debate with Pope Urban VII in the early 1600s.³⁵ Four centuries later,

³¹ See, e.g., James L. Gibson & Michael J. Nelson, *The Legitimacy of the US Supreme Court: Conventional Wisdom and Recent Challenges Thereto*, 10 ANN. REV. L. & SOC. SCI. 201 (2014); Eric Segall, *Supreme Court Puts Its Legitimacy at Risk*, CNN (May 12, 2014, 2:09 PM), <http://www.cnn.com/2014/05/12/opinion/segall-supreme-court-political> [<http://perma.cc/MR6Q-56J3>].

³² Jeremy W. Peters & Richard Pérez-Peña, *Measles Proves Delicate Issue to G.O.P. Field*, N.Y. TIMES (Feb. 3, 2015), http://www.nytimes.com/2015/02/03/us/politics/measles-proves-delicate-issue-to-gop-field.html?_r=0 (noting that “[t]he vaccination controversy is a twist on an old problem for the Republican Party: how to approach matters that have largely been settled among scientists but are not widely accepted by conservatives,” that politicians “hedge their answers about whether evolution should be taught in schools,” and that “the fight over global warming [is] . . . a liability” for politicians who deny climate change).

³³ *Id.* (“The debate does not break entirely along right-left lines. The movement to forgo vaccinations has been popular in more liberal and affluent communities where some parents are worried that vaccines cause autism or other disorders among children.”).

³⁴ These problems are compounded by the advent of organizations like the American Association of Physicians and Surgeons (AAPS). AAPS, which regularly files amicus briefs and appears to be a medical organization, is instead a partisan group advancing a political “agenda [that] opposes government intervention in medical practice,” which takes public positions “at odds with mainstream medical organizations . . . on childhood vaccines” and other science policy questions. See Jeremy W. Peters & Barry Meier, *Paul Is Linked to Group of Doctors Supporting Vaccination Challenges*, N.Y. TIMES (Feb. 4, 2015), <http://www.nytimes.com/2015/02/05/us/politics/rand-paul-linked-to-association-of-american-physicians-and-surgeons.html>.

³⁵ For a very interesting summary of the life and work of Galileo Galilei (1564–1642), see Albert Van Helden & Elizabeth Burr, *The Galileo Project*, GALILEO PROJECT, <http://galileo.rice.edu> [<http://perma.cc/R2BJ-9QWR>] (last updated 1995). In brief, it was Galileo's vocal advocacy of the Copernican proposition that the sun is located at the center of the universe that aroused the ire of the Catholic Church and the perception that these ideas were heresy that made him an Inquisition target. Galileo was warned by Cardinal Bellarmine (under order of Pope Paul V), that he should not advance Copernican theories. See *Galileo Timeline*, GALILEO PROJECT, <http://galileo.rice.edu/chron/galileo.html> [<http://perma.cc/UP8F-EXBB>]. Galileo was

instant internet access to pseudoscientific misinformation has been a game changer.³⁶ But the modern Supreme Court bears significant responsibility for further distorting many current science policy debates and for adding its imprimatur of legitimacy to specious empirical claims.

Edwards v. Aguillard,³⁷ the contemporary Court's seminal examination of science and science policy, involved a Louisiana statute requiring public schools to provide equal time for "Creation Science."³⁸ Justice Brennan, who wrote for the *Edwards* majority, had little trouble concluding that Creation Science was religion because it was a transparent effort "to restructure the science curriculum to conform to a particular religious viewpoint."³⁹ But the Court notably failed to decide whether Creation Science was—or could be—science.⁴⁰ By focusing all of its attention on the "creation" of Creation Science,⁴¹ and none on the "science,"⁴² Justice Brennan elided

called to Rome in 1633 to face the Inquisition, found guilty of heresy, and spent the remainder of his life under house arrest. *See id.*

³⁶ *See, e.g.*, Milton Rothman, *Pseudoscience on the Internet*, SKEPTICAL INQUIRER (Dec. 1996), http://www.csicop.org/sb/show/pseudoscience_on_the_internet/ [<http://perma.cc/3N7M-SCJY>]; *see also* Trine Tsouderos & Robert Goldberg, *Avoiding Internet Pseudoscience: Live Health Chat*, CHI. TRIB. (Apr. 19, 2011, 12:00 PM), <http://www.chicagotribune.com/lifestyles/health/ct-health-chat-pseudoscience-htmlstory.html>.

³⁷ 482 U.S. 578 (1987).

³⁸ *Id.* at 591.

³⁹ *Id.* at 593. The *Edwards* Court relied on the three-pronged *Lemon* test, which requires that: (1) the legislature had a secular purpose when it adopted the statute; (2) the statute's primary effect does not inhibit or advance religion; and (3) the statute does not create excessive entanglement between government and religion to hold that the Louisiana law ran afoul of the Establishment Clause. *Id.* at 585, 597; *see* *Lemon v. Kurtzman*, 403 U.S. 602, 612–23 (1971).

⁴⁰ The district court had also been disinclined to address the issue of the "science" of Creation Science. *See* *Aguillard v. Treen*, 634 F. Supp. 426 (E.D. La. 1985) (granting summary judgment on Establishment Clause grounds).

⁴¹ The *Edwards* Court held that the state law was unconstitutional, because "[t]he preeminent purpose of the Louisiana Legislature was clearly to advance the *religious* viewpoint that a supernatural being created humankind" and to "advance[] a *religious* doctrine by requiring either the banishment of the theory of evolution from public school classrooms or the presentation of a religious viewpoint that rejects evolution in its entirety." 482 U.S. at 591, 596 (emphasis added).

⁴² Journalist Margaret Talbot has speculated that judges rarely endeavor to explore the science of evolution because they are "reluctant to engage in the heady question of what constitutes science" and perhaps more to the point "few working scientists have been willing to testify against evolutionary theory." Margaret Talbot, *Darwin in the Dock*, NEW YORKER, Dec. 5, 2005, at 66. However, it was certainly possible for a mid-1980s court to address these epistemological matters. In fact, just five years before *Aguillard*, a federal district court in *McLean v. Arkansas Board of Education*, 529 F. Supp. 1255 (E.D. Ark. 1982), faced with a similar "Balanced Treatment for Creation-Science and Evolution-Science Act," had held that the law "lacks legitimate educational value because 'creation science' . . . is *simply not science*." *Id.* at 1267 (emphasis added).

the epistemological questions at the heart of the vitriolic policy debate.⁴³ But, toward the end of the opinion, the majority included an open invitation to future evolution opponents.⁴⁴ Unconstitutional efforts to seek equal classroom time for “Creation Science” could be replaced with new laws “requir[ing] that scientific critiques of prevailing scientific theories be taught.”⁴⁵ Justice Scalia, who had joined the Court the previous fall, used his dissent to elaborate his view that Creation Science had already established itself as “scientific” theory and critique, because it relied on a “body of scientific evidence supporting creation science [that] is as strong as that supporting evolution.”⁴⁶

The *Edwards* Court redefined “scientific critique” as a critique *of* science, rather than a critique based *in* science. Five years later, by the time the Supreme Court first addressed the epistemology of science in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,⁴⁷ the anti-evolution movement was already following Justice Brennan’s advice. It was abandoning its religious rhetoric and embracing a new “scientized” approach. Rebranding Creation Science as Intelligent Design⁴⁸ signaled evolution opponents’ new effort to “carefully distinguish themselves from creation scientists . . . [and] use only the language of science.”⁴⁹ This strategy would transform the public and legal debate from a religious quest to a seemingly scientific disagreement over competing explanations and evidentiary uncertainty.

Over the last decade of the twentieth century, *Edwards* would catalyze copycat legal policy shifts in the anti-abortion movement. A comparison of origins and effects

⁴³ Legal philosopher Susan Haack offers the following concise definition of core epistemology of science questions:

The core epistemological values of science are rooted in the central, defining concern of inquiry generally: finding things out. A scientific inquirer starts with a question about what might explain this or that natural or social phenomenon; makes an informed guess; and assesses how well his conjecture stands up to whatever evidence is already available, or can be obtained: i.e., how firmly it is anchored in experimental results and experiential evidence generally; how well it interlocks with the whole explanatory mesh of the body of thus-far well-warranted claims and theories; whether relevant evidence might have been overlooked; and what else could be done to get hold of evidence not presently available.

Haack, *supra* note 23, at 11.

⁴⁴ *Edwards*, 482 U.S. at 593.

⁴⁵ *Id.*

⁴⁶ *Id.* at 623 (Scalia, J., dissenting).

⁴⁷ 509 U.S. 579 (1993).

⁴⁸ Robert T. Pennock, *Creation-Science and Intelligent Design: Different Names for Religious Theory*, U.S. NEWS (Feb. 10, 2009, 2:14 PM), <http://www.usnews.com/opinion/articles/2009/02/10/creation-science-and-intelligent-design-different-names-for-religious-theory> [<http://perma.cc/7UWC-N29Z>] (“Following the Supreme Court decision [in *Edwards*] in 1987, creationists regrouped and rebranded their views as ‘Intelligent Design (ID) Theory.’”).

⁴⁹ See Mooney & Nisbet, *supra* note 5.

of the anti-evolution and anti-abortion movements is inexplicably absent from the legal literature. But these dual social and public policy movements, with their contemporaneous trajectories, overlapping constituencies, and near-identical legal strategies, offer significant insight into modern extralegal Supreme Court policy-making.

Edwards's definition of "scientific critique" continues to shape current cases. Just last year in *Burwell v. Hobby Lobby Stores, Inc.*, the Supreme Court changed health law policy under Obamacare by advancing the scientific-sounding argument that four forms of contraception (two Plan "B" emergency pills and two types of IUDs) are abortifacients.⁵⁰ Although the specific question before the Court involved corporate religious "beliefs" under the Religious Freedom Restoration Act of 1993,⁵¹ the majority ignored an extensive record of evidence-based medicine, establishing that these birth control methods prevent, but do not terminate, a pregnancy.⁵² As the Court confronts new and more complex questions about the natural world and human behavior, these decisions should not be based on "facts" the Justices "know with their hearts."⁵³

Edwards's effects are present, but less obvious, in other current science and law controversies. For example, measles infected millions of Americans before vaccines became widely available in 1963, and four to five hundred people died of the disease each year.⁵⁴ In 2000, the Centers for Disease Control and Prevention (CDC) announced that measles had been eradicated from the United States because a year had passed without a single transmission of the disease.⁵⁵ More recently, as pseudoscientific fears about childhood vaccines and autism continue to increase, measles has returned.⁵⁶ The problem of unvaccinated children is generally blamed on state legislatures, who are

⁵⁰ 134 S. Ct. 2751, 2762–63 (2014).

⁵¹ *Id.* at 2759.

⁵² Brief for Physicians for Reproductive Health et al. as Amici Curiae Supporting Petitioners, *Hobby Lobby*, 134 S. Ct. at 2751 (No. 13-354), 2013 WL 5740263 ("[T]here is a scientific distinction between a contraceptive and an abortifacient and the scientific record demonstrates that none of the FDA-approved contraceptives covered by the Mandate are abortifacients.").

⁵³ The fact that the Court engages in policy-making regularly attracts the attention of commentators inside the legal academy, *see, e.g.*, Wilkins, *supra* note 29, at 912 (noting that the Supreme Court "is first and most fundamentally a profoundly political institution and crafts important policy pronouncements, otherwise known as judicial opinions, as one of three co-equal branches of government"), and outside, *see, e.g.*, Black, *supra* note 29 ("When they impose their policy preferences in the guise of defending the Constitution—or even when they are perceived to be doing so—the credibility of the whole system takes a hit.").

⁵⁴ Frank Bruni, Opinion, *The Vaccine Lunacy: Disneyland, Measles and Madness*, N.Y. TIMES (Jan. 31, 2015), <http://www.nytimes.com/2015/02/01/opinion/sunday/frank-bruni-disney-land-measles-and-madness.html>.

⁵⁵ *Measles History*, CENTERS FOR DISEASE CONTROL & PREVENTION, <http://www.cdc.gov/measles/about/history.html#elimination> [<http://perma.cc/33HJ-JE8T>] ("Measles was declared eliminated (absence of continuous disease transmission for greater than 12 months) from the United States in 2000.").

⁵⁶ *See* Bruni, *supra* note 54.

responsible for the recent proliferation of school vaccine exemptions.⁵⁷ But the Supreme Court played an important, if unrecognized, role. In 2011, in *Bruesewitz v. Wyeth LLC*,⁵⁸ the Court addressed claims made by parents alleging that vaccines had harmed their children. Although the specific question before the Court involved pre-emption of civil lawsuits by the National Childhood Vaccine Injury Act, the case arose against a backdrop of thousands of pending autism injury claims.⁵⁹ The *Bruesewitz* majority ignored this factual context, failing to even mention the extensive empirical evidence disproving a causal connection between vaccines and autism.⁶⁰ In fact, Justice Sotomayor added fuel to the anti-vaccine fire by specifically suggesting that injury claims have presumptive scientific merit.⁶¹ Four years later, after nearly 650 new measles transmissions in 2014, the CDC had retracted its finding that measles had been eradicated.⁶² The 2014 Disneyland outbreak⁶³ caused the CDC to project even higher measles transmission rates for 2015.⁶⁴

C. Why and How: The Goals and Roadmap

The goal of this Article is to expose and compare the origins and effects of the anti-evolution and anti-abortion movements on extralegal Supreme Court policy-making about the natural world and human behavior. Any analysis of science, science

⁵⁷ *Id.*; Meghan Hoyer & Steven Reilly, *Low Vaccination Rates at Schools Put Students at Risk*, USA TODAY (Feb. 24, 2015, 11:54 AM), <http://www.usatoday.com/story/news/2015/02/04/schoolvaccinationrates/22840549> [<http://perma.cc/C2PR-G6WG>] (as of 2015, nearly 50% of public schools students in some cities are unvaccinated); Saad B. Omer, Opinion, *How to Handle the Vaccine Skeptics*, N.Y. TIMES (Feb. 6, 2015), http://www.nytimes.com/2015/02/06/opinion/how-to-handle-the-vaccine-skeptics.html?_r=0 (noting that thirty-one proposed bills introduced between 2009 and 2012 were aimed at making vaccine exemptions easier to obtain and that most exemptions are based on “misplaced skepticism [that] is not really principled but premised, rather, on false notions like that of a link between autism and the measles vaccine”).

⁵⁸ 562 U.S. 223 (2011).

⁵⁹ *Id.*

⁶⁰ *See id.*

⁶¹ In fact, Justice Sotomayor, who was joined by Justice Ginsburg in her dissent, opined that if civil suits were not preempted, “the possibility of a torrent of meritless lawsuits bankrupting manufacturers and causing vaccine shortages seems remote at best.” *Id.* at 1101 n.25 (Sotomayor, J., dissenting). Because the Act at issue was created to address autism injury claims (along with other injury claims), the dissenters were clearly aware of the thousands of lawsuits pending against vaccine manufacturers for autism-related claims, suggesting that Justices Sotomayor and Ginsburg believe these cases have scientific “merit.” *See id.*

⁶² *See* Bruni, *supra* note 54.

⁶³ Mike Stobbe, *US Measles Count Rises to 121; Most Linked to Disneyland*, ASSOCIATED PRESS (Feb. 9, 2015, 3:49 PM) http://www.apnewsarchive.com/2015/US_measles_count_rises_to_121%3B_most_linked_to_Disneyland/id-093373b622c7434882a56d8fc4e3b332 [<http://perma.cc/3P7U-9B9N>].

⁶⁴ *Id.*

policy, and law presents questions of theory and practice. This Article, which is the first of a two-part project,⁶⁵ addresses the theoretical question: How did we get here? The methodology is to trace the effective post-*Edwards* deployment of empirically unwarranted “scientific theories” and “scientific critiques.” This research demonstrates that for the last two decades of the twentieth century, the anti-abortion movement tracked the anti-evolution movement.⁶⁶ Starting in the twenty-first century, the anti-abortion movement has achieved significant legal and extralegal success with “scientized” arguments involving “partial-birth abortion,”⁶⁷ “post-abortion trauma,”⁶⁸ and the medical risks of nonhospital abortion procedures.⁶⁹ A decade after *Kitzmiller v. Dover Area School District*⁷⁰ rejected anti-evolutionists’ scientific claims, Intelligent Design has retained or regained public traction with 2014 Gallup polls revealing that 31% of Americans believe in Intelligent Design and 44% believe in Creationism and new research indicating that Intelligent Design sponsored “scientific critique” is reentering our public schools.⁷¹

This Article proceeds in four parts. Part I explains the problem of evidence hegemony on questions of science and law. Part II examines the distorting impact of seminal science education cases on the judicial epistemology of science. Part III explores the advent of pseudoscientific anti-evolution and anti-abortion strategies inside and outside the courts. Part IV analyzes divergent twentieth-century developments. Finally, the conclusion incorporates decision-making insights from communications, behavior economics, and cognitive science. Ex ante, these insights could improve

⁶⁵ In a forthcoming article, I tackle the practical implications with a systematic review of extralegal judicial fact-finding in all Supreme Court cases involving natural and social science over the past five terms.

⁶⁶ See *infra* Part III.

⁶⁷ See *infra* Part III.B.

⁶⁸ See *infra* Part III.A.2.

⁶⁹ See *State Policies in Brief: An Overview of Abortion Laws*, GUTTMACHER INST. (Nov. 1, 2015), http://www.guttmacher.org/statecenter/spibs/spib_OAL.pdf?wptouch_preview_theme=enabled [<http://perma.cc/6Q64-HMWV>]. As of November 1, 2015, most current and pending abortion restrictions purport to advance natural/medical science interests by: (1) requiring abortions to be performed by a licensed physician; (2) in a hospital; (3) with the involvement of a second physician; or (4) only to protect the woman’s life or health. *Id.* Additionally, some states purport to advance social science/psychological interests by mandating pre-abortion counseling on: (1) the purported link between abortion and breast cancer; (2) fetal pain; and/or (3) maternal mental health consequences. *Id.*

⁷⁰ 400 F. Supp. 2d 707 (M.D. Pa. 2005).

⁷¹ See Emma Green, *Intelligent Design: Slowly Going out of Style?*, ATLANTIC (June 9, 2014, 4:11 PM), <http://www.theatlantic.com/national/archive/2014/06/intelligent-design-slowly-going-out-of-style/372454/> [<http://perma.cc/NX5V-JEZZ>] (noting that a 2014 Gallup poll found that only 19% of Americans said they believe in evolution, while 31% said they believe in Intelligent Design and 44% said they believe in Creationism); see also Jon D. Miller et al., *Science Communication: Public Acceptance of Evolution*, 313 SCIENCE 765 (2006) (finding that 40% of surveyed Americans accept the idea of evolution).

judicial decisions by increasing accuracy and transparency. Ex post, they could inform new transdisciplinary⁷² analyses of science, science policy, and law.

D. Two Disclaimers

First, in this Article, the bulk of the “science v. faith” questions will be relegated to the theologians and philosophers.⁷³ Perhaps religion is itself a type of adaptation by groups of people, as David Sloan Wilson has posited.⁷⁴ Evolution may be the only possible explanation for the natural world, as Richard Dawkins believes.⁷⁵ It is, of course, impossible to falsify Francis S. Collins’s “big tent” hypothesis that God initiated the Big Bang.⁷⁶ In any event, believe whatever you like, these fascinating questions are far beyond the scope of this Article.

Second, the Article acknowledges, but will not answer, Linda Greenhouse’s concern that the current Supreme Court has devolved into “a collection of politicians in robes.”⁷⁷ The Justices may be politicians. Undoubtedly they are politically savvy,

⁷² Although most legal commentators speak of interdisciplinarity, a transdisciplinary approach differs by connoting that the problems of science and law are not *limited* to the two fields. Contemporary media theorist Nolan Bazinet offers the following helpful explanation of the definitional distinction:

A denotative analysis of the prefix ‘inter-’ in any online dictionary leads us to a list of synonyms among which ‘between’, ‘among’, ‘mutually’, ‘reciprocally’, and ‘together’ appear. The prefix ‘trans-’, however, reveals synonyms such as ‘across’, ‘beyond’ and ‘through’. Both lists of synonyms are similar but are also different in very important ways. Inter- has the connotations of ‘cooperation’ and ‘reciprocity’, whereas trans- can be said to have a connotation of ‘beyond the known limits.’

Nolan Bazinet, *Inter-Disciplinary or Trans-Disciplinary?*, ALAN-SHAPIRO.COM (June 13, 2012), <http://www.alan-shapiro.com/inter-disciplinary-or-trans-disciplinary-by-nolan-bazinet/> [<http://perma.cc/K23N-8V8U>].

⁷³ As Professor Susan Haack has noted, the evaluation of scientists and science inevitably involves some sort of epistemological inquiry:

When we ask about the integrity of the scientist, however, the primary concern is likely to be his adherence to *epistemological* values; for inquiry, investigation, is the defining business of a scientist. So when we ask about the integrity of science *qua* institution, the primary concern is likely to be how successfully the institution ensures that everyone involved behaves as nearly as possible in accordance with those epistemological values.

Haack, *supra* note 23, at 11.

⁷⁴ See generally DAVID SLOAN WILSON, *DARWIN’S CATHEDRAL* (2002).

⁷⁵ See generally RICHARD DAWKINS, *THE BLIND WATCHMAKER* (1986).

⁷⁶ FRANCIS S. COLLINS, *THE LANGUAGE OF GOD* 67 (2006).

⁷⁷ Linda Greenhouse, Opinion, *Law in the Raw*, N.Y. TIMES (Nov. 12, 2014), http://www.nytimes.com/2014/11/13/opinion/law-in-the-raw.html?_r=0; see also Stephen M. Feldman, *Supreme Court Alchemy: Turning Law and Politics into Mayonnaise*, 12 GEO. J.L. & PUB.

having survived an increasingly polarized nominating process.⁷⁸ Although Ms. Greenhouse's concern is too important to omit from any serious discussion of the current Court, it is not easy to answer. This Article responds, in part, by focusing on the Justices's individual and collective policy-making responsibilities. Greater transparency, neutrality, and more accurate fact-finding informed by new insights into communication, behavior, and cognition are the most effective antidotes to the poison of a political judiciary.⁷⁹

I. SCIENCE, SCIENCE POLICY, AND LAW: THE PROBLEM OF EVIDENCE HEGEMONY

Two decades ago, in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, the Supreme Court addressed scientific epistemology for the first time.⁸⁰ *Daubert* embodied the Court's conclusion that a brave new world of science-based legal decisions would need "gatekeeping" judges who could operate the tools of science to evaluate scientific evidence.⁸¹ The "revolution" of *Daubert* was that judges should evaluate scientific "principles and methodology, not on the conclusions that they generate."⁸² The manifesto of the *Daubert* science and law revolution was fleshed out over the next few

POL'Y 57, 61 (2014) (explaining that the current Justices are "simultaneously correct and incorrect when they insist that they decide cases by focusing on the law and not contemplating politics" because "politics is always part of legal interpretation and, therefore, judicial decision-making" and "politics is so deeply embedded in the judicial process that, in most cases, the justices do not consciously consider their political preferences").

⁷⁸ Geoffrey R. Stone, *Our Politically Polarized Supreme Court?*, HUFFINGTON POST, http://www.huffingtonpost.com/geoffrey-r-stone/our-politically-polarized_b_5879346.html [<http://perma.cc/TAF4-UQK4>] (last updated Nov. 25, 2014, 5:59 AM).

⁷⁹ Of course, these concerns are not limited to the judiciary. As Professor Marci Hamilton recently and astutely opined:

Transparency in lawmaking increases the accountability of representatives to the public, encourages frank debate about specifics, reveals hidden lobbyist agendas, and reduces unintended consequences. Neither representatives primarily motivated by a desire to stay in power nor special interests embrace transparency, making it an elusive goal but still a measure of a good public policy process.

Marci A. Hamilton, *The Case for Evidence-Based Free Exercise Accommodation: Why the Religious Freedom Restoration Act Is Bad Public Policy*, 9 HARV. L. & POL'Y REV. 129 (2015).

⁸⁰ 509 U.S. 579 (1993).

⁸¹ *Id.* at 589 (explaining that the trial judge must now ensure that scientific testimony is scientifically reliable); *see also* *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 147 (1999) (extending the *Daubert* requirement that judges assess the reliability of scientific evidence to evidence involving technical expertise and specialized knowledge).

⁸² *Daubert*, 509 U.S. at 595. However, four years after *Daubert*, the Court acknowledged that the task of distinguishing principles, methods, and conclusions might not be simple. *See* *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997) (concluding that, in science, "conclusions and methodology are not entirely distinct from one another").

years in the now famous trilogy of cases that includes *General Electric Co. v. Joiner*⁸³ and *Kumho Tire Co. v. Carmichael*.⁸⁴

A. The Daubert Trilogy

Justice Blackmun, who wrote for the *Daubert* majority, offered future judges four flexible factors they could use to assess science on its own terms: (1) testability; (2) peer review and publication; (3) error rates; and (4) general acceptance within the relevant scientific community.⁸⁵ The *Daubert* Court sought to eliminate a century of deference to the scientific community under *Frye v. United States*⁸⁶ and to avoid a future of epistemic relativism on empirical questions of scientific evidence. Justice Blackmun also reminded judges that they must ensure that the proffered expert evidence “fit” the facts at issue.⁸⁷ Justice Rehnquist was the first to express reservations: “I defer to no one in my confidence in federal judges; but I am at a loss to know what is meant when it is said that the scientific status of a theory depends on its ‘falsifiability,’ and I suspect some of them will be, too.”⁸⁸ Judge Alex Kozinski of the Ninth Circuit, to whose court *Daubert* was remanded, shared Justice Rehnquist’s

⁸³ 522 U.S. 136. In *Joiner*, the plaintiff claimed that exposure to polychlorinated biphenyls (PCBs) caused his lung cancer. *See id.* at 139–40. In support, the plaintiff offered four epidemiological studies establishing a link between PCBs and cancer. *See id.* at 145. After reviewing plaintiff’s evidence, the district court concluded that: (1) the first study did not actually find that PCBs had caused lung cancer among the workers they had examined; (2) the second study found only a statistically insignificant increase in cancer rates among workers at a PCB plant; (3) the third study did not involve PCBs; and (4) the fourth study’s subjects had been exposed to numerous potential carcinogens. *See id.* at 145–46. Moreover, according to the Supreme Court, the Eleventh Circuit had improperly used a “stringent standard of review” when reversing the district court’s decision to exclude the plaintiff’s scientific evidence. *Id.* at 140–43.

⁸⁴ 526 U.S. 137.

⁸⁵ *Daubert*, 509 U.S. at 593–94. Although “reliability” is the term used most frequently by the courts, this term of art refers specifically to the ability of a second scientist to reproduce the results of an earlier experiment. The difference between “reliability” and “validity” can be defined as follows: “As a term of art in science and statistics, *reliability* refers to the reproducibility of data. A reliable test can be repeated under identical circumstances and yield the same results. The results may be consistently *wrong*, but that is an issue of validity, not reliability.” KENNETH R. FOSTER & PETER W. HUBER, *JUDGING SCIENCE: SCIENTIFIC KNOWLEDGE AND THE FEDERAL COURTS* 11 (1997) (second emphasis added).

⁸⁶ 293 F. 1013, 1014 (D.C. Cir. 1923) (holding that scientific evidence should be admitted when it is “sufficiently established to have gained general acceptance in the particular field in which it belongs”).

⁸⁷ The “fit” requirement was defined by the *Daubert* Court as follows: the “scientific knowledge . . . will assist the trier of fact to understand or determine a fact in issue.” *Daubert*, 509 U.S. at 592. This is essentially identical to the Federal Rule of Evidence 702 requirement that an expert testifying to “scientific . . . knowledge will help the trier of fact to understand the evidence or to determine a fact in issue.” FED. R. EVID. 702.

⁸⁸ *Daubert*, 509 U.S. at 600 (Rehnquist, C.J., dissenting).

dim view of *Daubert*, bemoaning judges' ability "to resolve disputes among respected, well-credentialed scientists about matters squarely within their expertise, in areas where there is no scientific consensus as to what is and what is not 'good science,' and occasionally to reject such expert testimony because it was not 'derived by the scientific method.'"⁸⁹

Four years later in *General Electric Co. v. Joiner*, the Court clarified that abuse of discretion was the appropriate review standard for *all* evidence decisions, including the exclusion of scientific testimony,⁹⁰ and added that "nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert."⁹¹ Finally, in 1999, *Kumho Tire Co. v. Carmichael* refined *Daubert* in three ways: (1) judges would now be required to "gatekeep" testimony from experts with technical and other specialized knowledge;⁹² (2) judges should seek to admit testimony from experts who employ "the same level of intellectual rigor" in the courtroom as in their fields of study,⁹³ and (3) judges must ensure "fit" between the expert opinion and the specific facts at issue.⁹⁴

B. Science and Law Is Not an Evidence Problem

Two decades after *Daubert*, traditional conceptualizations of science and law as a problem of junk science and evidence rules continue to dominate the legal literature. But law professors who echo the complaint that courts just cannot handle the science fail to understand that *Daubert* and the ensuing two decades of evidence

⁸⁹ *Daubert v. Merrell Dow Pharm., Inc.*, 43 F.3d 1311, 1316 (9th Cir. 1995).

⁹⁰ 522 U.S. 136, 143 (1997).

⁹¹ *Id.* at 146.

⁹² 526 U.S. 137, 148 (1999); *see also* Edward J. Imwinkelried, *The Taxonomy of Testimony Post-Kumho: Refocusing on the Bottomlines of Reliability and Necessity*, 30 CUMB. L. REV. 185, 209 (2000) (noting that prior to *Kumho*, "[t]he objective validity of a non-scientific expert's premises was essentially exempt from any scrutiny"). According to Professor Imwinkelried, "*Kumho* not only establishes that *Daubert* is still good law; it also expands the scope of the *Daubert* doctrine . . . [,] [extending] *Daubert*'s reliability/validation standard . . . to all types of expert testimony . . ." *Id.* at 211.

⁹³ *Kumho*, 526 U.S. at 152.

⁹⁴ *Id.* at 153–54. Justice Breyer, writing for the *Kumho* majority, modeled the appropriate emphasis on "fit" when he admonished that "the specific issue before the [district] court was not the reasonableness *in general* of a tire expert's use of a visual and tactile inspection . . . [but] the reasonableness of using such an approach . . . to draw a conclusion regarding *the particular matter to which the expert testimony was directly relevant*." *Id.* I have emphasized elsewhere my view that *Kumho* reflected the Supreme Court's effort to clarify *Daubert* by emphasizing "fit" in an effort to simplify the new gatekeeping role and correct the earlier decision's inherent structural problems. *See generally* Joëlle Anne Moreno, *Beyond the Polemic Against Junk Science: Navigating the Oceans That Divide Science and Law with Justice Breyer at the Helm*, 81 B.U. L. REV. 1033, 1049–57 (2001).

hegemony were never up to the challenge. There are (at least) three critical, but overlooked, problems with the pervasive academic approach to science and law.

First, the *Daubert* trilogy viewed science and law as a question of trial evidence and crafted a solution designed to enhance the trial process. In fact, the *Daubert* Court explicitly assumed that “[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof”⁹⁵ would help judges identify specious science. As of February 2015, a snapshot of current non-evidence science and law controversies includes new “scientific” critiques of evolution poised to restructure public school biology curricula,⁹⁶ current restrictions in twenty-eight states limiting public school sex education to the “scientific” theory of abstinence,⁹⁷ and pending abortion restrictions in seventeen states purportedly based on a range of “scientific” theories of maternal risk and “scientific” critique of current medical procedures.⁹⁸ Thus, *Daubert* may provide generally useful insights about scientific integrity or the scientific method, but the Court did not create decision-making tools that could operate outside the adversarial process.

Second, a *Daubert*-focused approach to judges as “gatekeepers” minimizes the policy-making significance of the judicial role. Gatekeepers have one responsibility—to monitor what comes *in* the gate, but what goes *out* of the courthouse gate is equally, if not more, important. Law does not happen in a vacuum. Thus, as Justice Breyer has observed: “The importance of scientific accuracy in the decision of cases reaches well beyond the case itself.”⁹⁹ When judges opine on the state of the natural world, they must “search for law that reflects an understanding of the relevant underlying science.”¹⁰⁰

Third, a narrow focus on evidence rules and standards cannot accommodate the depth of our scientific ignorance¹⁰¹ or our collective misperception of risk across the full

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

⁹⁶ *Senators File Bill for Teaching Theories on Controversial Scientific Subjects*, CRUX (Jan. 21, 2015), <http://www.cruxnow.com/church/2015/01/21/senators-file-bill-critic-says-permits-teaching-creationism/> [<http://perma.cc/HQ8T-WNCG>].

⁹⁷ Kevin Freking, *States Reject Abstinence-Only Funding from Federal Government*, HUFFINGTON POST, http://www.huffingtonpost.com/2008/06/24/states-reject-abstinence_n_109002.html [<http://perma.cc/6ZFW-G47S>] (last updated May 25, 2011, 12:35 PM).

⁹⁸ For an updated list of states introducing abortion-regulating legislation, see *Monthly State Update: Major Developments in 2015*, GUTTMACHER INST., <http://www.guttmacher.org/statecenter/updates/> [<http://perma.cc/3JNS-5S9D>] (last updated Nov. 1, 2015); Paige Winfield Cunningham, *The Coming Wave of Anti-Abortion Laws*, POLITICO (Nov. 28, 2014, 8:07 AM), <http://www.politico.com/story/2014/11/the-coming-wave-of-anti-abortion-laws-113196.html> [<http://perma.cc/VN38-6VKF>].

⁹⁹ Stephen Breyer, *Introduction to FED. JUDICIAL CTR., REFERENCE MANUAL ON SCIENTIFIC EVIDENCE* 1, 4 (3d ed. 2011).

¹⁰⁰ *Id.*

¹⁰¹ Christine Armario, “*Wake-Up Call*”: *U.S. Students Trail Global Leaders*, NBCNEWS.COM, http://www.nbcnews.com/id/40544897/ns/us_news-life/t/wake-up-call-us-students-trail-global-leaders/#.VNkXz1PF9XZ [<http://perma.cc/2SNG-5NN6>] (last updated Dec. 7, 2010,

range of transdisciplinary science and law questions. We are generally unsophisticated and poorly informed about basic science: 43% of Americans believe that humans once lived among dinosaurs,¹⁰² and 20% believe that the sun revolves around the earth.¹⁰³ We are equally bad at judging risk, an essential component of accurate decision-making. Perceptions of risk, which are “the intuitive judgments that people make about the hazards of their world . . . can be stubbornly resistant to the evidence of experts.”¹⁰⁴ People “do not tend to be afraid of the things that are most likely to harm us. We drive around in cars, a lot; we drink alcohol; we ride bicycles; we sit too much. And we harbor anxiety about things that, statistically speaking, pose little danger.”¹⁰⁵ For example, “[w]e fear sharks, while mosquitoes are, in terms of sheer numbers of lives lost, probably the most dangerous creature on earth.”¹⁰⁶ Given these shortcomings, a better understanding of evidence rules will do little to address the full spectrum of current and future science and law questions.

II. THE SCIENCE OF NATURE AND THE NATURE OF SCIENCE

A. Legitimate, False, and Manufactured Science Controversies

Some scientific controversies are real; some are false. Challenges to the existence of global warming and the fear that childhood vaccines cause autism are false controversies because there is near consensus in the global scientific community on these questions.¹⁰⁷ Near consensus in science means, as with all legitimate scientific research, that there may be unresolved questions that merit future investigation and

7:17 PM) (noting that American high school students rank seventeenth out of thirty-four countries in science).

¹⁰² George F. Bishop et al., *Americans' Scientific Knowledge and Beliefs About Human Evolution in the Year of Darwin*, 30 REP. NAT'L CTR. FOR SCI. EDUC. 16 (2010), [http://ncse.com/ncse/30/3/americans-scientific-knowledge-beliefs-human-evolution-year-
\[http://perma.cc/7AZW-AKSA\]](http://ncse.com/ncse/30/3/americans-scientific-knowledge-beliefs-human-evolution-year-); see also Miller et al., *supra* note 71, at 25. Miller's report makes for grim reading for adherents of evolutionary theory. Although the average American has more years of education than when Miller began his surveys twenty years ago, the percentage of people in the country who accept the idea of evolution has declined from 45% in 1985 to 40% in 2005. *Id.*

¹⁰³ See Nicholas D. Kristof, Opinion, *The Hubris of the Humanities*, N.Y. TIMES, Dec. 6, 2005, at A27 (describing the results of a recent study of basic scientific knowledge).

¹⁰⁴ EULA BISS, ON IMMUNITY 36 (2014) (quoting historian Michael Willrich).

¹⁰⁵ *Id.*

¹⁰⁶ *Id.*

¹⁰⁷ See generally Leah Ceccarelli, *Manufactured Scientific Controversy: Science, Rhetoric, and Public Debate*, 14 RHETORIC & PUB. AFF. 195 (2011) (discussing the false “manufactured” controversies of global warming skepticism, dissent over AIDS being caused by HIV, and intelligent design); *Vaccines Do Not Cause Autism*, CENTERS FOR DISEASE CONTROL & PREVENTION, <http://www.cdc.gov/vaccinesafety/concerns/autism/Index.html> [<http://perma.cc/BJE4-2LZH>] (last updated Nov. 23, 2015) (discussing the false “scientific controversy” regarding whether childhood vaccines can cause autism).

reasonable experts may differ over select issues, but these unresolved matters do not threaten core settled scientific foundations. As Professor Susan Haack has observed:

At any time there is a whole continuum of scientific ideas, claims, and theories: some so well-warranted by such strong evidence that it is most unlikely they will have to be revised; some not quite so well-warranted but still pretty solidly established; some promising but as yet far from certain; some new and exciting but highly speculative and as yet untested; and some so wild that few mainstream scientists are willing even to listen to them. (The proportion of the well-warranted to the highly-speculative varies, obviously, across fields and sub-fields.) A few of the exciting but as yet untested ideas, and a very, very few of the wildest ideas, will eventually turn out to be warrantable, but most will not.¹⁰⁸

In contrast, false scientific controversies have been fabricated to encourage courts, legislators, and the public to ignore or reject scientifically sound information in favor of purported “truthiness” claims that cannot be empirically supported.¹⁰⁹ Proponents of false or manufactured controversies typically “exploit[] a popular conception that science advances only when heroic dissidents push at the frontiers of normal science to initiate a paradigm change”¹¹⁰ and “orient themselves as critics of the world-defining hegemony of scientific discourse”¹¹¹ in the hope of “bringing the scientific establishment down a notch or two.”¹¹²

False and manufactured controversies are a form of denialism. Denialism, according to Michael Specter, “comes in many forms,” but typically “draw[s] direct relationships where none exist” and “conflate[s] similar but distinct issues.”¹¹³ Unless the “data fits neatly into an already formed theory, a denialist doesn’t really see it as data at all. That enables him to dismiss even the most compelling evidence as just another point of view.”¹¹⁴ In her excellent new work on “manufactured” controversies

¹⁰⁸ Susan Haack, *Of Truth, in Science and in Law*, 73 BROOK. L. REV. 985, 996 (2008).

¹⁰⁹ Martin McKee & Pascal Diethelm, *How the Growth of Denialism Undermines Public Health*, 341 BRIT. MED. J. 1309, 1311 (2010) (noting that false scientific controversies are a form of “denialism” in the medical arena and are characterized by several features including: (a) “[i]dentification of conspiracies”; (b) “[u]se of fake experts”; (c) “[s]electivity of citation”; (d) “[c]reation of impossible expectations of research”; (e) “[m]isrepresentation and logical fallacies”; and (f) “[m]anufacture of doubt”).

¹¹⁰ Ceccarelli, *supra* note 107, at 209.

¹¹¹ *Id.* at 199.

¹¹² *Id.*

¹¹³ MICHAEL SPECTER, DENIALISM: HOW IRRATIONAL THINKING HINDERS SCIENTIFIC PROGRESS, HARMS THE PLANET, AND THREATENS OUR LIVES 3 (2009).

¹¹⁴ *Id.*

and settled science, Professor Leah Ceccarelli explains that “[a] scientific controversy is ‘manufactured’ . . . when an arguer announces there is an ongoing scientific debate in the technical sphere about a matter for which there is actually overwhelming scientific consensus.”¹¹⁵ To help avoid the problems of epistemic relativism between a manufactured controversy and sound science, Professor Ceccarelli identifies common features to help non-scientists identify manufactured controversies, including: (1) the use of mercenary scientists; (2) the use of cherry-picked data and manipulation of statistical methods; (3) the manufacture and promotion of doubt and uncertainty; and (4) the use of rhetoric to manufacture controversy in addition to uncertainty.¹¹⁶

B. The Settled Science of Evolution and Natural Selection

Charles Darwin published *On the Origin of Species* in 1859.¹¹⁷ The theory of evolution developed as “the first serious challenge to traditional beliefs in divine creation” and “Darwinism ‘shattered’ the notion that species had unchanging characteristics, ‘and with it the view that humans are a distinct species, a special creation of God.’”¹¹⁸

Almost 150 years later, modern science continues to amass empirical support for natural selection, which is the idea that certain organisms are better equipped to survive than others.¹¹⁹ The scientific evidence to support natural selection now extends far beyond the fossil record to include “advances in genetics and molecular biology [which] have now shown how heredity actually works, as well as explained the nature of chance mutation . . . [and] DNA [which] now provides perhaps the single best piece of evidence supporting the theory of evolution.”¹²⁰ The National Academy of Sciences has identified “further evidence for evolutionary theory from such diverse arenas as . . . comparative anatomy (which reveals structural similarities in related organisms . . .), species distribution (showing, for instance, that island species are often distinct but closely related to mainland relatives), and embryology,”¹²¹ and refers to evolution as “the central unifying concept of biology.”¹²²

¹¹⁵ Ceccarelli, *supra* note 107, at 196.

¹¹⁶ *Id.* at 197.

¹¹⁷ CHARLES DARWIN, *THE ORIGIN OF SPECIES* (Oxford Univ. Press 1996) (1859).

¹¹⁸ Todd R. Olin, Note, *Fruit of the Poison Tree: A First Amendment Analysis of the History and Character of Intelligent Design Education*, 90 MINN. L. REV. 1107, 1112–13 (2006) (quoting Derek H. Davis, *Kansas Versus Darwin: Examining the History and Future of the Creationism-Evolution Controversy in American Public Schools*, 9 KAN. J.L. & PUB. POL’Y 205, 210 (1999)).

¹¹⁹ *Natural Selection*, MERRIAM-WEBSTER, <http://www.merriam-webster.com/dictionary/natural%20selection> [<http://perma.cc/Y72R-XNU5>].

¹²⁰ Mooney & Nisbet, *supra* note 5.

¹²¹ *Id.*

¹²² *Id.* (quoting the National Academy of Sciences).

Recent developments provide additional scientific support from other fields. In January 2014, Jeremy England, a young MIT professor, used well-accepted principles of physics to demonstrate that “the origin and subsequent evolution of life follow from the fundamental laws of nature and ‘should be as unsurprising as rocks rolling downhill.’”¹²³ According to Professor England,

[w]hen a group of atoms is driven by an external source of energy (like the sun or chemical fuel) and surrounded by a heat bath (like the ocean or atmosphere), it will often gradually restructure itself in order to dissipate increasingly more energy . . . [,] [which could prove] that under certain conditions, matter inexorably acquires the key physical attribute associated with life.¹²⁴

If physics provides an overarching principle of life and evolution, it may help answer questions (and anti-evolution critique) on the development of species characteristics, which would “liberate biologists from seeking a Darwinian explanation for every adaptation.”¹²⁵

Given the overwhelming empirical data, it is not surprising that Dr. Stephen J. Gould once described evolution as “one of the half dozen ‘great ideas’ developed by science.”¹²⁶ Yet by the mid-1990s, Dr. Gould had become increasingly concerned that the anti-evolution movement was gaining traction with ideas “that seemed kooky just a decade ago . . . [but were] reenter[ing] the mainstream.”¹²⁷ Challenges to the settled scientific foundations of evolution¹²⁸ did not arise within the relevant scientific community; they began in the courts.

C. *The “Monkey” Trial: Tennessee v. Scopes*

The modern history of the anti-evolution movement can be traced back ninety years to the *Scopes* “monkey trial,”¹²⁹ subsequently made famous by the play and movie, *Inherit the Wind*.¹³⁰ *Scopes* was the celebrity trial of the late 1920s. William

¹²³ Natalie Wolchover, *A New Physics Theory of Life*, QUANTA MAG. (Jan. 22, 2014) (quoting Professor Jeremy England), <https://www.quantamagazine.org/20140122-a-new-physics-theory-of-life/> [<http://perma.cc/3GVQ-NYMQ>].

¹²⁴ *Id.*

¹²⁵ *Id.*

¹²⁶ See STEPHEN JAY GOULD, HEN’S TEETH AND HORSE’S TOES 261 (1994).

¹²⁷ *Id.* at 253.

¹²⁸ See generally *Looking for Information on Controversies in the Public Arena Relating to Evolution?*, UNDERSTANDING EVOLUTION, http://evolution.berkeley.edu/evolibrary/controversy_faq.php [<http://perma.cc/Z6RV-ZCAU>] (discussing the false “scientific controversy” of intelligent design versus evolution).

¹²⁹ *Scopes v. State*, 289 S.W. 363 (Tenn. 1927).

¹³⁰ Playwrights Jerome Lawrence and Robert E. Lee wrote *Inherit the Wind* in 1950. Douglas O. Linder, *Notes on Inherit the Wind*, SCOPES TRIAL (2008), <http://law2.umkc.edu>

Jennings Bryan¹³¹ prosecuted John Scopes (a twenty-four-year-old public high school science teacher).¹³² Clarence Darrow represented the defendant.¹³³ H.L. Mencken covered the trial in the press, which also had radio coverage.¹³⁴ The country was riveted. In fact, recent commentators have suggested that media coverage of the evolution “debate” in *Scopes* established the “symbols and themes” that continue to dominate the scientific, legal, and public policy questions today.¹³⁵

John Scopes was a public school teacher who, with support from the American Civil Liberties Union, taught the theory of evolution to his class.¹³⁶ This was a direct violation of a 1925 Tennessee statute that barred state public schools and universities from teaching any theory that contradicted the biblical story of the creation.¹³⁷ Dudley Field Malone, a New York attorney who joined the defense team, famously argued to the jury that evolution and natural selection were the truth because they were based on sound and settled science.¹³⁸ According to Malone,

[t]here is never a duel with the truth. The truth always wins and we are not afraid of it. The truth is no coward. The truth does not need the law. The truth does not need the force of government. The truth does not need Mr. Bryan. The truth is imperishable, eternal and immortal and needs no human agency to support it. We are ready to tell the truth as we understand it and we do not fear all

/faculty/projects/ftrials/scopes/SCO_INHE.HTM [http://perma.cc/N69X-T7HQ]. A very useful website devoted to famous trials in history created by Douglas O. Linder of the University of Missouri–Kansas City School of Law contains extensive information about numerous trials. See, e.g., Douglas O. Linder, *State v. John Scopes (“The Monkey Trial”)*, SCOPES TRIAL (2008), <http://www.law2.umkc.edu/faculty/projects/FTrials/scopes/evolut.htm> [http://perma.cc/43BW-L3VD].

¹³¹ See generally SUSAN JACOBY, *THE AGE OF AMERICAN UNREASON* 78 (2008) (noting that Bryan was a champion of early anti-evolutionists’ “war against godless science” and suggesting that Bryan’s repeated reference during the *Scopes* trial to a 1914 science textbook discussing eugenics (rather than natural selection) indicated that he may not have been especially familiar with Darwin’s work).

¹³² See Linder, *supra* note 130.

¹³³ *Id.*

¹³⁴ *Id.*

¹³⁵ Jay D. Wexler, *The Scopes Trope*, 93 GEO. L.J. 1693, 1697 (2005) (book review) (quoting LARRY A. WITHAM, *WHERE DARWIN MEETS THE BIBLE: CREATIONISTS AND EVOLUTIONISTS IN AMERICA* 227 (2002)).

¹³⁶ See Jana R. McCreary, *This Is the Trap the Courts Built: Dealing with the Entanglement of Religion and the Origin of Life in American Public Schools*, 37 SW. U. L. REV. 1, 35 (2008).

¹³⁷ *Scopes v. State*, 289 S.W. 363, 363 (Tenn. 1927).

¹³⁸ *Malone Argues for Admission of Expert Testimony (5th Day)*, SCOPES TRIAL (2008), <http://www.law2.umkc.edu/faculty/projects/ftrials/scopes/day5.htm> [http://perma.cc/ZZR3-J3E3].

the truth that they can present as facts. We are ready. We are ready.
We feel we stand with progress. We feel we stand with science.¹³⁹

Hoping to encourage the Tennessee Supreme Court to advance the “truth” of evolution on appeal, Darrow and Malone asked jurors to convict their client.¹⁴⁰ Although the jury obliged, the defense plan was thwarted when the Tennessee Supreme Court reversed Scopes’s conviction, not on constitutional grounds, but because the judge, rather than the jury, had set the amount of Scopes’s \$100 fine.¹⁴¹ After *Scopes*,¹⁴² the debate between creationism and evolution continued to rage outside the courts for the next forty years.

D. The Supreme Court Weighs In: Epperson v. Arkansas

After forty years of debate, 1968 was a busy year in natural science. Among other discoveries and developments, the first heart and bone marrow transplants were performed,¹⁴³ and maternal and fetal healthcare saw the establishment of amniocentesis (the chemical assessment of amniotic fluid) as a new and effective diagnosis tool for prenatal assessment.¹⁴⁴ That same year, in *Epperson v. Arkansas*,¹⁴⁵ the Supreme Court heard its first evolution case. *Epperson* invalidated an Arkansas statute prohibiting “a teacher in any state-supported school or university ‘to teach the theory or doctrine that mankind ascended or descended from a lower order of animals,’ or ‘to adopt or use in any such institution a textbook that teaches’ this theory.”¹⁴⁶ In a clear and concise opinion for a unanimous Court, Justice Fortas found that the law was in “conflict with the constitutional prohibition of state laws respecting an establishment of religion or prohibiting the free exercise thereof,”¹⁴⁷ because “Arkansas’ law selects from the body of knowledge a particular segment which it proscribes for the sole reason that it is deemed to conflict with a particular religious doctrine; that is, with a particular interpretation of the Book of Genesis by a particular religious group.”¹⁴⁸

¹³⁹ *Id.* (quoting Dudley Field Malone as defense counsel).

¹⁴⁰ Linder, *supra* note 130.

¹⁴¹ *See id.*

¹⁴² *Id.*

¹⁴³ *See Heart Transplant Program*, CLEV. CLINIC, <http://my.clevelandclinic.org/services/transplant-center/transplant-programs/heart-transplant-program> [<http://perma.cc/WA6Z-2QK5>]; Theodore Moore, *Bone Marrow Transplantation*, MEDSCAPE, <http://emedicine.medscape.com/article/1014514-overview> [<http://perma.cc/3T66-AA4Y>] (last updated Nov. 7, 2014).

¹⁴⁴ *See* T. Lind, *Diagnostic Uses of Amniocentesis in Late Pregnancy*, 64 PROC. ROYAL SOC’Y MED. 1140, 1140–41 (1971), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1812058/?page=1> [<http://perma.cc/4BMD-GEKA>].

¹⁴⁵ 393 U.S. 97 (1968).

¹⁴⁶ *Id.* at 98–99 (quoting Initiated Act No. 1, 1929 Arks. Acts; ARK. STAT. ANN. §§ 80-1627, 80-1628 (1960 Repl. Vol.)).

¹⁴⁷ *Id.* at 103.

¹⁴⁸ *Id.*

The Tennessee statute at issue four decades earlier in *Scopes* had explicitly limited public school science curriculum to the biblical story of creation.¹⁴⁹ Although the Arkansas law contained no overt references to religious doctrine, the *Epperson* Court easily inferred a legislative motive “to suppress the teaching of a theory which, it was thought, ‘denied’ the divine creation of man.”¹⁵⁰ Justice Fortas avoided the epistemological questions and instead based the decision on: (1) inquiry into the law’s purpose and effects;¹⁵¹ (2) expert opinion that the law’s goals were ideological;¹⁵² and (3) the statute’s explicit “Bible or Atheism?” campaign advertisements.¹⁵³ This evidence easily convinced a unanimous Court that Arkansas had violated the Establishment Clause by seeking to “require that teaching and learning must be tailored to the principles or prohibitions of a religious sect or dogma.”¹⁵⁴ Anti-evolutionists were on notice that direct prohibitions on teaching evolution would fail and they began looking for alternative approaches.

1. Epistemic Relativism and Secular Humanism

After *Epperson*, orthodox Creationists continued to advance patently theistic arguments (i.e., that school children should be instructed that Noah’s flood had created the Grand Canyon).¹⁵⁵ But prescient anti-evolutionists were starting to reconsider. If the choice between evolution and Creation Science could be reformulated as a decision between competing origin “beliefs,” new laws might succeed.

Starting in the 1970s, anti-evolutionists seeking epistemic equipoise initially sought to recast evolution teachers (and their supporters) as adherents of the competing faith of “secular humanism.”¹⁵⁶ This rhetorical retrofit might distract the Supreme Court from the mounting empirical evidence, but nascent efforts to recharacterize the ongoing public debate as a “battle of faiths” were quickly stymied in the federal courts and ultimately abandoned.¹⁵⁷

2. Epistemic Relativism and Academic Freedom

A decade later, Louisiana would try a different approach. The State’s new “Balanced Treatment for Creation-Science and Evolution-Science in Public School

¹⁴⁹ *Scopes v. State*, 289 S.W. 363, 363 (Tenn. 1927).

¹⁵⁰ *Epperson*, 393 U.S. at 109.

¹⁵¹ *Id.*

¹⁵² *Id.* at 107–08 n.15.

¹⁵³ *Id.* at 108 n.16.

¹⁵⁴ *Id.* at 106.

¹⁵⁵ See CHRIS MOONEY & SHERIL KIRSHENBAUM, UNSCIENTIFIC AMERICA: HOW SCIENTIFIC ILLITERACY THREATENS OUR FUTURE 98–99 (2010).

¹⁵⁶ See, e.g., *Wright v. Hous. Indep. Sch. Dist.*, 366 F. Supp. 1208 (S.D. Tex. 1972), *aff’d per curiam*, 486 F.2d 137 (5th Cir. 1973) (rejecting the anti-evolutionist argument that teaching evolution advances the faith of secular humanism).

¹⁵⁷ See, e.g., *id.*

Instruction Act” required every public school or university that taught evolution to provide equal time for Creation Science.¹⁵⁸ According to the state legislature, this law served a wholly secular educational purpose.¹⁵⁹ Appropriating the language of academic freedom, the drafters claimed that their goal was to create parity in the presentation of different *scientific* information in the public schools.¹⁶⁰ This required mandating that public schools provide “whatever information and instruction in both creation and evolution models the classroom teacher determines is necessary and appropriate to provide insight into both theories.”¹⁶¹

E. Redefining “Scientific Theory” and “Scientific Critique”: Edwards v. Aguillard

1. Skepticism from the Lower Courts

Unsurprisingly, after *Epperson*, the Louisiana Balanced Treatment Act was challenged on both state and federal constitutional grounds.¹⁶² After the state issues were resolved, the Fifth Circuit remanded the case to the district court for resolution of the Establishment Clause questions.¹⁶³ The district court, well aware that the case raised contentious policy issues, noted that the defendants had already filed “well over one thousand pages of memoranda and summaries thereof and affidavits”¹⁶⁴ on what the court referred to as “collateral issues.”¹⁶⁵ Confronted by a potential political maelstrom, the district court decided not “to put the people of Louisiana to the very considerable [and] needless expense (including fees of attorneys on both sides) of a protracted trial.”¹⁶⁶ Instead, the court granted the plaintiffs’ motion for summary judgment finding that, as a matter of law, the statute “violates the establishment clause . . . [b]ecause it promotes the beliefs of some theistic sects to the detriment of others . . . [which] violates the fundamental First Amendment principle that a state must be neutral in its treatment of religions.”¹⁶⁷

¹⁵⁸ See *Edwards v. Aguillard*, 482 U.S. 578, 580–81 (1987) (citing LA. STAT. ANN. §§ 17:286.1–17:286.7 (West 1982)).

¹⁵⁹ *Id.* at 581.

¹⁶⁰ *Aguillard v. Treen*, 634 F. Supp. 426, 429–30 (E.D. La. 1985).

¹⁶¹ *Id.* at 429 (quoting LA. STAT. ANN. § 17:286.3 (West 1981)).

¹⁶² The United States District Court for the Eastern District of Louisiana initially held that the statute violated the state constitution. On appeal, the Fifth Circuit certified the state constitutional question to the Louisiana Supreme Court. *Id.* at 426 (citing *Aguillard v. Treen*, 720 F.2d 676 (5th Cir. 1983)). After the state supreme court found no violation of the Louisiana Constitution, *id.*, the case was reversed and remanded by the Fifth Circuit so that the district court could consider the Establishment Clause challenge. *Id.*

¹⁶³ *Id.*

¹⁶⁴ *Id.* at 427.

¹⁶⁵ *Id.*

¹⁶⁶ *Id.*

¹⁶⁷ *Id.* at 429.

The district court decision was affirmed by the Fifth Circuit, which agreed that the Establishment Clause was violated because, despite the lack of overt religious objectives, the statute lacked a genuine secular purpose.¹⁶⁸ According to the federal appellate court, the Louisiana legislature had clearly intended to “discredit evolution by counterbalancing its teaching at every turn with the teaching of creationism.”¹⁶⁹

Louisiana appealed to the Supreme Court. When *Edwards v. Aguillard* reached the Court, the threshold issue was whether the Louisiana legislature had genuinely secular objectives.¹⁷⁰ Two purposes advanced by the state would be considered: (1) promoting academic freedom in the public schools; and (2) expanding the state’s science curriculum.¹⁷¹ Either of these overlapping objectives could satisfy the Establishment Clause under the “secular purpose” prong of the three-pronged *Lemon* test.¹⁷² But under *Lemon*, even if the act’s purpose was secular, the Court would also need to find that the law: (1) did not advance or inhibit religion; and (2) would not result in an excessive entanglement of government with religion.¹⁷³

2. Academic Freedom

Justice Brennan wrote for a seven-Justice majority. The Court began by noting that “the Act’s stated purpose is to protect academic freedom.”¹⁷⁴ The *Edwards* Court was skeptical. According to Justice Brennan, “the Court is normally deferential to a State’s articulation of a secular purpose, [but] it is required that the statement of such purpose be sincere and not a sham.”¹⁷⁵

In the Court’s view, the Louisiana Balanced Treatment Act did not protect academic freedom. According to the majority, it did “not grant teachers a flexibility that they did not already possess to supplant the present science curriculum with the presentation of theories, besides evolution, about the origin of life.”¹⁷⁶ As Justice Brennan

¹⁶⁸ *Aguillard v. Edwards*, 765 F.2d 1251 (5th Cir. 1985).

¹⁶⁹ *Id.* at 1257.

¹⁷⁰ 482 U.S. 578 (1987).

¹⁷¹ *Id.* at 586.

¹⁷² *Lemon v. Kurtzman*, 403 U.S. 602, 612–13 (1971).

¹⁷³ *Id.*

¹⁷⁴ *Edwards*, 482 U.S. at 586 (quoting LA. STAT. ANN. § 17:286.2 (West 1982)). Justice Brennan analyzed the defendants’ academic freedom argument by exploring two possible definitions of academic freedom. The first, which the Court drew from “common parlance,” involved “enhancing the freedom of teachers to teach what they will.” *Id.* The second, which had been specifically advanced by the defendants during oral argument, was a more circumscribed “basic concept of fairness.” *Id.* This second form of academic freedom, the defendants had argued, included the right to teach public school students “‘all of the evidence’ with respect to the origin of human beings.” *Id.* Justice Brennan concluded that, under either definition, the law could not advance academic freedom. *See id.*

¹⁷⁵ *Id.* at 586–87.

¹⁷⁶ *Id.* at 587. According to the *Edwards* Court, Louisiana public school teachers did not need the Balanced Treatment Act because “[a]ny scientific concept that’s based on established

noted, “Even if ‘academic freedom’ is read to mean ‘teaching all of the evidence’ with respect to the origin of human beings, the Act does not further this purpose.”¹⁷⁷ Accordingly, the stated secular goal of “academic freedom” was deemed a sham.

3. Advancing Scientific Knowledge

Having disposed of the academic freedom argument, Justice Brennan addressed the state’s second secular “goal of providing a more comprehensive science curriculum . . . either by outlawing the teaching of evolution or by requiring the teaching of creation science.”¹⁷⁸ Put simply, was Louisiana seeking to include competing scientific perspectives to provide public school students with a more “comprehensive scientific education”?¹⁷⁹ If so, the statute was constitutional. If instead, evolution and natural selection were settled areas of science well substantiated by the empirical evidence, Creation Science arguments were religious critique that would not “maximize the comprehensiveness and effectiveness of science instruction.”¹⁸⁰ In the Court’s view, because the state offered no evidence that the law advanced science education, its purpose must have been “to advance the religious viewpoint that a supernatural being created humankind.”¹⁸¹

Unfortunately, Justice Brennan included two caveats that may have appeared inconsequential at the time, but would spawn a new jurisprudence of epistemic relativism on questions of settled science. First, he limited *Edwards* to its facts, ensuring that the decision would only control state efforts “to restructure the science curriculum to conform with a particular religious viewpoint.”¹⁸² Second, and more importantly, Justice Brennan assured future state legislators that public schoolhouse doors would remain open to any law mandating “teaching a variety of *scientific theories* about the origins of humankind to schoolchildren”¹⁸³ or the teaching of “*scientific critiques* of

fact can be included in [their] curriculum already, and no legislation allowing this is necessary.” *Id.* (first alteration in original) (quoting the Louisiana Science Teachers Association). Thus, “[t]he goal of providing a more comprehensive science curriculum is not furthered either by outlawing the teaching of evolution or by requiring the teaching of creation science,” *id.* at 586, and “requiring schools to teach creation science with evolution does not advance academic freedom,” *id.* Ironically, the Court found that the law did not even enhance the academic freedom of so-called Creation Science itself because under this law, Creation Science would only be taught when the curriculum already included evolution. *Id.* at 589.

¹⁷⁷ *Id.* at 586.

¹⁷⁸ *Id.*

¹⁷⁹ *Id.* at 587.

¹⁸⁰ *Id.* at 588.

¹⁸¹ *Id.* at 591. Louisiana was advancing religious doctrine “by requiring either the banishment of the theory of evolution from public school classrooms or the presentation of a religious viewpoint that rejects evolution in its entirety.” *Id.* at 596.

¹⁸² *Id.* at 593.

¹⁸³ *Id.* at 594 (emphasis added). Adding to the confusion about the *Edwards* Court’s intent, this description of a constitutionally permissible statute requiring that teachers explain

prevailing scientific theories.”¹⁸⁴ The *Edwards* Court’s failure to define “scientific theory” and “scientific critique” was a critical omission that ignored the extensive evidence provided to help the Court delineate science from pseudoscience.¹⁸⁵

4. Ignoring the Scientific Evidence and the Scientists

The National Academy of Sciences (NAS), concerned about the potential impact of *Edwards*, had filed an amicus brief urging the Court to confront the epistemological questions by recognizing that natural science questions of evolution and natural selection were sound and settled science.¹⁸⁶ NAS further urged the Court to define legitimate science as “grounded in observable facts.”¹⁸⁷ To support this conclusion, NAS argued that “[a] hallmark of a scientific proposition is that it is capable of disproof, [and] is subject to being falsified by empirical observation.”¹⁸⁸ Scientific critique was not simply any critique or alternative opinion. More specifically, the Court should not endorse the Creationists’s false “two-model approach,” which “requires

competing theories of the origins of life, occurs in the midst of a digression into why the Ten Commandments can be discussed in public schools even if they cannot be posted. *See id.* This *Edwards* dicta has been used by Intelligent Design proponents to argue that the Supreme Court did not “plac[e] its imprimatur on Darwinism,” but instead “defended the principle of openness in science education.” Jay D. Wexler, *Darwin, Design, and Disestablishment: Teaching the Evolution Controversy in Public Schools*, 56 VAND. L. REV. 751, 812 (2003) (quoting DAVID K. DEWOLF ET AL., INTELLIGENT DESIGN IN PUBLIC SCHOOL SCIENCE CURRICULA: A LEGAL GUIDEBOOK (1999) (suggesting that Intelligent Design will enhance science education)). Wexler suggests that

there are at least three problems with relying upon this general theory of science education as support for teaching students about intelligent design as an alternative to evolution. First, it is far from clear that schools are currently failing to teach students generally about the nature and process of science. . . .

Second, given that scientists overwhelmingly support the theory of evolution and reject the theory of intelligent design, the controversy over these theories would not be a very good example to use to teach students about the gradual progression of scientific knowledge and understanding. . . .

Finally, . . . teaching this one scientific controversy in isolation still would constitute an arbitrary choice that is radically underinclusive with respect to achieving the desired goal.

Id. at 809–10 (footnote omitted).

¹⁸⁴ *Edwards*, 482 U.S. at 593 (emphasis added).

¹⁸⁵ *See* DAVID L. FAIGMAN, LEGAL ALCHEMY: THE USE AND MISUSE OF SCIENCE IN THE LAW 25 (2000) (opining that “[i]n *Edwards*, the Court missed an invaluable opportunity to make a statement about its and the Constitution’s commitment to science”).

¹⁸⁶ Brief for the Nat’l Acad. of Scis. as Amicus Curiae Urging Affirmance, *Edwards*, 482 U.S. 578 (No. 85-1513), 1986 WL 727667.

¹⁸⁷ *Id.* at *6.

¹⁸⁸ *Id.*

that data inconsistent with the current formulation of one model be treated as evidence supporting the opposing model.”¹⁸⁹ According to NAS, this approach to “scientific theory” and “scientific critique” “bears no relation to scientific reasoning, and stifles scientific inquiry, for it denies the possibility that empirical observation may suggest new theories of even greater explanatory force.”¹⁹⁰ Unfortunately, the *Edwards* Court’s invitation to anti-evolution “scientific theories about the origins of humankind”¹⁹¹ and “scientific critiques of prevailing scientific theories”¹⁹² adopted the false dichotomy of the “two-model approach.”

A second amicus brief—filed by seventy-two Nobel Laureate scientists—sought a similarly definitive statement about natural science from the Court.¹⁹³ The Nobel scientists devoted eleven lengthy paragraphs to a discussion of basic scientific principles that the Court could use to explicitly distinguish science from pseudoscience.¹⁹⁴ The Justices should, in the view of the Nobel Laureates, clarify that science is inquiry “devoted to formulating and testing naturalistic explanations for natural phenomena”¹⁹⁵ that uses “a process for systematically collecting and recording data about the physical world, then categorizing and studying the collected data in an effort to infer the principles of nature that best explain the observed phenomena.”¹⁹⁶ Real scientific theories are proved, improved, or disproved using the “scientific method,” which “involves the rigorous, methodological testing of principles that might present a naturalistic explanation for . . . facts.”¹⁹⁷ A “legitimate scientific ‘hypothesis,’” according to the Nobel scientists, “must be consistent with prior and present observations and must remain subject to continued testing against future observations.”¹⁹⁸ These suggestions, like the NAS recommendations, were ignored by the *Edwards* Court.

5. Ignoring Relevant Cases

The Justices were also well aware that the lower courts had recently addressed similar science policy questions. Just five years earlier, in *McLean v. Arkansas Board of Education*,¹⁹⁹ Federal District Judge William R. Overton evaluated a nearly identical

¹⁸⁹ *Id.* at *16.

¹⁹⁰ *Id.*

¹⁹¹ *Edwards*, 482 U.S. at 588.

¹⁹² *Id.* at 593.

¹⁹³ See Brief for 72 Nobel Laureates et al. as Amicus Curiae in Support of Appellees, *Edwards*, 482 U.S. 578 (No. 85-1513), 1986 WL 727658.

¹⁹⁴ See *id.* at *22–26.

¹⁹⁵ *Id.* at *23.

¹⁹⁶ *Id.*

¹⁹⁷ *Id.*

¹⁹⁸ *Id.*

¹⁹⁹ 529 F. Supp. 1255, 1264 (E.D. Ark. 1982) (holding that examination of the text of the Arkansas statute, the stated sectarian legislative purpose, and the historical context of the statute’s enactment revealed that it “was simply and purely an effort to introduce the Biblical version of creation into the public school curricula”).

“Balanced Treatment for Creation-Science and Evolution-Science Act” and found that it violated the Establishment Clause.²⁰⁰

Judge Overton, unlike Justice Brennan, had refused to accept the possibility that evolution opponents might be advancing legitimate scientific theory or critique. Instead, he engaged in a lengthy and intellectually rigorous critique of the state’s science education claims. The epistemology of science mattered to Judge Overton, who opined that a theory is not “scientific” based on the say-so of its proponents.²⁰¹ Instead, it must have the following “essential characteristics” of legitimate science: “(1) It is guided by natural law; (2) It has to be explanatory by reference to natural law; (3) It is testable against the empirical world; (4) Its conclusions are tentative, i.e., are not necessarily the final words; and (5) It is falsifiable.”²⁰² Only after a thorough review of the predicate epistemological questions and an accurate and detailed delineation between a theory and a “scientific” theory, did the *McLean* Court hold that Creation Science “is simply not science.”²⁰³ But *McLean*, like the briefs filed by NAS and the Nobel Laureates, had no apparent impact on the *Edwards* Court.²⁰⁴

6. Justice Scalia’s Dissent: Creation Science *Is* Science

Justice Scalia, who joined the Court the same term that *Edwards* was decided, seized the opportunity to answer the epistemological questions avoided by the majority.

²⁰⁰ See generally *id.* Although *McLean*, like *Edwards*, ultimately relied on the Establishment Clause test from *Lemon v. Kurtzman*, the federal district court specifically linked the Arkansas Balanced Treatment Act to other unconstitutional religious fundamentalist efforts, such as laws requiring the daily recitation of prayer in the public schools, *id.* at 1258 (citing *Engel v. Vitale*, 370 U.S. 421 (1962)), and those requiring that the Ten Commandments be posted in public school classrooms, *id.* (citing *Stone v. Graham*, 449 U.S. 39 (1980)). According to the *McLean* Court,

[t]he religious movement known as Fundamentalism began in nineteenth century America as part of evangelical Protestantism’s response to social changes, new religious thought and Darwinism. Fundamentalists viewed these developments as attacks on the Bible and as responsible for a decline in traditional values. The various manifestations of Fundamentalism have had a number of common characteristics, but a central premise has always been a literal interpretation of the Bible and a belief in the inerrancy of the Scriptures. Following World War I, there was again a perceived decline in traditional morality, and Fundamentalism focused on evolution as responsible for the decline. One aspect of their efforts, particularly in the South, was the promotion of statutes prohibiting the teaching of evolution in public schools.

Id. at 1258–59 (footnote omitted).

²⁰¹ *Id.* at 1267.

²⁰² *Id.*

²⁰³ See generally *id.*

²⁰⁴ See FAIGMAN, *supra* note 185, at 25 (opining that “the [*Edwards*] Court seemed fearful of substantively evaluating the scientific merit of creation science” because of “the Justices’ insecurity in their knowledge of science”).

In a colorful dissenting opinion joined by Chief Justice Rehnquist, he argued his own brand of science law jurisprudence.²⁰⁵ After critiquing the majority's misapplication of the *Lemon* test and faulting the Justices in the majority for relying on "visceral knowledge" to discern legislative motive, Justice Scalia offered detailed approbation of the testimony that had supported the Louisiana Balanced Treatment Act.²⁰⁶

In Justice Scalia's view, the statute had been fully supported by "*scientific* lectures [that] touched upon, *inter alia*, biology, paleontology, genetics, astronomy, astrophysics, probability analysis, and biochemistry."²⁰⁷ This was illustrated by testimony including the following "scientific" evidence and critique:

- "There are two and only two explanations for the beginning of life— evolution and creation science."²⁰⁸
- "The body of scientific evidence supporting creation science is as strong as that supporting evolution. In fact, it may be *stronger*."²⁰⁹
- "Creation science is educationally valuable."²¹⁰
- "Although creation science is educationally valuable and strictly scientific, it is now being censored from or misrepresented in the public schools."²¹¹
- "The censorship of creation science . . . deprives students of knowledge of one of the two scientific explanations for the origin of life"²¹²

Justice Scalia opined that the majority's hostility to Creation Science was attributable to "an intellectual predisposition created by the facts and legend of *Scopes v. State*—an instinctive reaction that any governmentally imposed requirements bearing upon the teaching of evolution must be a manifestation of Christian fundamentalist repression."²¹³ In the dissenters' view, "we cannot say that on the evidence before us . . . that the scientific evidence for evolution is so conclusive that no one could be gullible enough to believe that there is any real scientific evidence to the contrary."²¹⁴ Accordingly, Louisiana residents "are quite entitled, as a secular matter, to have whatever scientific evidence there may be against evolution presented in their schools."²¹⁵

Finally, Justice Scalia noted that many of the statute's proponents "enjoyed academic credentials that may have been regarded as quite impressive by members

²⁰⁵ See generally *Edwards v. Aguillard*, 482 U.S. 578, 610 (1987) (Scalia, J., dissenting).

²⁰⁶ *Id.* at 621–26 (citation omitted).

²⁰⁷ *Id.* at 622 (first emphasis added).

²⁰⁸ *Id.* (footnote omitted).

²⁰⁹ *Id.* at 623.

²¹⁰ *Id.*

²¹¹ *Id.*

²¹² *Id.* at 624.

²¹³ *Id.* at 634 (citation omitted).

²¹⁴ *Id.*

²¹⁵ *Id.*

of the Louisiana Legislature.²¹⁶ For an eventual master of rhetorical clarity on this last point, Justice Scalia leaves readers to guess whether he intended to compliment the statute's advocates or insult its legislator opponents.

7. The Scientists Respond

Evolutionary biologist Stephen Jay Gould immediately recognized the risks posed by the *Edwards* Court's failure to acknowledge the sound and settled science and its acceptance of the potential scientific legitimacy of evolution critics and opponents. In a short essay published the following fall, Professor Gould argued that Justice Scalia, in particular, had misunderstood the facts.²¹⁷ In Gould's view, "Justice Scalia does not understand the subject matter of evolutionary biology . . . [and] has simply adopted the creationists' definition and thereby repeated their willful mistake."²¹⁸ In the dissenters' key statement describing "scientific" theories and critique, Gould believed they had mistakenly opined that "[t]he people of Louisiana, including those who are Christian fundamentalists, are quite entitled, as a secular matter, to have whatever scientific evidence there may be against evolution presented in their schools."²¹⁹ The fundamental problem was that science education policy was not treated as a legal dispute that "hinge[s] on a question of scientific fact."²²⁰ Instead, the dissenters rejected the data in favor of epistemic relativism when they "denie[d] that we have sufficient evidence to render this judgment."²²¹

On the key questions of what is science and which theories and critiques are genuinely scientific, Justice Scalia had argued that scientists could not say that the scientific evidence for evolution was "conclusive."²²² But, according to Professor Gould, "this is exactly what . . . all scientists, do say."²²³ Evolution, in Professor Gould's opinion, is settled science because it "is as well confirmed as anything we know—surely as well as the earth's shape and position."²²⁴ Justice Brennan's invitation to state lawmakers to base future science education policy on anti-evolutionist's self-described "scientific" theories and "scientific" critique ignored the empirical evidence. It also erased the distinction between critique and *scientific* critique. In

²¹⁶ *Id.* at 621.

²¹⁷ Stephen J. Gould, *Justice Scalia's Misunderstanding*, 5 CONST. COMMENT. 1 (1988), https://conservancy.umn.edu/bitstream/handle/11299/170842/05_01_Gould.pdf?sequence=1&isAllowed=y [<http://perma.cc/G5VM-BT85>].

²¹⁸ *Id.* at 8.

²¹⁹ *Id.* (quoting *Edwards*, 482 U.S. at 634 (Scalia, J., dissenting)).

²²⁰ *Id.* at 9.

²²¹ *Id.*

²²² *Edwards*, 482 U.S. at 634 (Scalia, J., dissenting).

²²³ See Gould, *supra* note 217, at 9.

²²⁴ *Id.*

Professor Gould's prescient view, a relativistic approach to judicial fact-finding about the natural world was unwarranted and unwise because it would raise problems in all areas of science—"we don't require equal time for flat earthers and those who believe that our planet resides at the center of the universe."²²⁵

III. THE *EDWARDS* EFFECT

The *Edwards* message was not just clear—it was effective.²²⁶ Shortly after the case was decided, the anti-evolution movement abandoned all vestiges of theistic rhetoric and embraced a new "scientized" approach. After *Edwards*, critiques of evolution and competing origin theories would be framed, not as matters of faith, but as questions of science.

The switch from Creation Science to Intelligent Design²²⁷ was directly responsive to Justice Brennan's call for "scientific critiques of prevailing scientific theories."²²⁸ *Of Pandas and People*, a fundamental Creation Science text then in draft form was quickly revised after *Edwards*.²²⁹ Intelligent Design was now defined as the scientific theory "that various forms of life began abruptly through an intelligent agency, with their distinctive features already intact."²³⁰ This definition replaced pre-1987 language stating that "Creation means that various forms of life began abruptly through the agency of an intelligent Creator with their distinctive features already intact."²³¹ The excising of any reference to a "Creator" coincided with the development of the "Theory of Irreducible Complexity."²³² Irreducible Complexity, a cornerstone of current Intelligent Design theory, posits a scientific basis for a supernatural designer, because

a single system composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease

²²⁵ *Id.*

²²⁶ See FAIGMAN, *supra* note 185, at 26 (opining that *Edwards* illustrates a Supreme Court trend of general reluctance "to delve too deeply into scientific matters" and this trend "has real costs" and "creates an assortment of doctrinal problems").

²²⁷ Pennock, *supra* note 48 ("Following the Supreme Court decision [in *Edwards*] in 1987, creationists regrouped and rebranded their views as 'Intelligent Design (ID) Theory.'").

²²⁸ *Edwards v. Aguillard*, 482 U.S. 578, 593 (1987). Intelligent Design claims to differ from Creationism in that Intelligent Design proponents profess not to identify the intelligent power that guides the development of the universe. Intelligent Design is also more specifically rooted in the premise that biological life is so "irreducibl[y] complex[]" that it cannot be the product of natural selection. See Pennock, *supra* note 48.

²²⁹ *Id.*

²³⁰ *Id.* (quoting OF PANDAS AND PEOPLE 99–100 (1989)).

²³¹ *Id.* (quoting OF PANDAS AND PEOPLE (draft pre-1987)).

²³² *Id.*

functioning . . . cannot be produced directly . . . by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition nonfunctional.²³³

After *Edwards*, “[i]ntelligent design’s proponents . . . [would] use only the language of science.”²³⁴

Contemporary anti-evolution legal strategies originated as a “creationist program to exploit language in the Supreme Court’s decision in *Edwards v. Aguillard*.”²³⁵ As Professor Richard B. Katskee has observed in the wake of *Edwards*, “the intelligent design movement has carefully (albeit superficially) crafted its beliefs to look like science, in an effort to distinguish them from creationism and so-called creation science—the precursors to intelligent design that the U.S. Supreme Court and the lower federal courts long ago recognized as religious views.”²³⁶

Three decades after *Edwards*, the anti-evolution movement continues to create a false controversy based on misstatements and misconceptions about science. *Edwards*’s effects were apparent two decades later when then-President George W. Bush announced that Intelligent Design should be taught in public school science classrooms, because “[b]oth sides ought to be properly taught . . . so people can understand what the debate is about.”²³⁷ More recently, Florida Senator Marco Rubio advocated a similar epistemic relativism regarding climate change when he said, “I’m not a scientist, man. . . . I can tell you what recorded history says, I can tell you what the Bible says,”²³⁸ as did Texas Senator Ted Cruz, Chair of the Senate Subcommittee on Space, Science, and Competitiveness, when he opined that climate change “data [does] not support[] what the advocates are arguing.”²³⁹

²³³ MICHAEL J. BEHE, *DARWIN’S BLACK BOX: THE BIOCHEMICAL CHALLENGE TO EVOLUTION* 39 (1996).

²³⁴ Mooney & Nisbet, *supra* note 5 (quoting Jeffrey Brown on *The News Hour with Jim Lehrer*).

²³⁵ Richard B. Katskee, *Why it Mattered to Dover that Intelligent Design Isn’t Science*, 5 *FIRST AMEND. L. REV.* 112, 119 (2006).

²³⁶ *Id.* at 114–15.

²³⁷ Peter Baker & Peter Slevin, *Bush Remarks on ‘Intelligent Design’ Theory Fuel Debate*, WASH. POST (Aug. 3, 2005), <http://www.washingtonpost.com/wp-dyn/content/article/2005/08/02/AR2005080201686.html> [<http://perma.cc/5WWQ-AN2F>] (second alteration in original).

²³⁸ Jake Miller, *Rubio on Earth’s Age: ‘I’m Not a Scientist, Man,’* CBS NEWS (Nov. 19, 2012, 5:30 PM), <http://www.cbsnews.com/news/rubio-on-earths-age-im-not-a-scientist-man/> [<http://perma.cc/6Q9T-MUQF>].

²³⁹ Dana Bash & Deirdre Walsh, *Cruz to CNN: Global Warming Not Supported by Data*, CNN: POLITICAL TICKER (Feb. 20, 2014, 6:10 PM), <http://politicalticker.blogs.cnn.com/2014/02/20/cruz-to-cnn-global-warming-not-supported-by-data/> [<http://perma.cc/H57S-L3EE>].

Questions of what is, and what is not, a scientific theory or critique continue to rankle school board elections,²⁴⁰ textbook modification debates,²⁴¹ and other efforts to set public school curricula.²⁴² When these questions inevitably result in legal challenges, judges must engage in fact-finding to distinguish legitimate science from false and manufactured controversies.

A. Copycat “Scientific Theories” and “Scientific Critique” from the Anti-Abortion Movement

During the last quarter of the twentieth century, extralegal judicial fact-finding about natural and social science would similarly transform the laws governing reproductive rights. Abortion had first reached the Supreme Court the previous decade in *Roe v. Wade*.²⁴³ Prior to *Roe*, in the early 1970s, much of the public and numerous state legislatures supported safe and legal abortion under certain circumstances.²⁴⁴ In 1967, for example, Colorado became the first state to decriminalize abortion, although only in cases of rape, incest, or if pregnancy would lead to permanent physical disability.²⁴⁵ In 1971, the Supreme Court upheld a Washington, D.C. abortion law, finding that the “health” of the mother included her “psychological as well as physical well-being,” which might be protected by providing access to safe and legal abortion.²⁴⁶ By the time *Roe* was decided two years later, twelve additional states had passed laws decriminalizing abortion.²⁴⁷

²⁴⁰ Jessica Brown, *Common Core Bill Sparks Creationism Debate in Ohio*, USA TODAY (Aug. 23, 2014, 7:01 PM), <http://www.usatoday.com/story/news/nation/2014/08/23/common-core-bill-sparks-creationism-debate-in-ohio/14507351/> [<http://perma.cc/KQ8V-UUV6>].

²⁴¹ Martha Kempner, *A Textbook Case: The Continuing Battle for Control over What Students Read*, REPROD. & SEXUAL HEALTH & JUST. (Dec. 19, 2014, 2:23 PM), <http://rhrealitycheck.org/article/2014/12/19/textbook-case-continuing-battle-for-control-over-students-read/> [<http://perma.cc/AY5U-WSZF>].

²⁴² Bruce Maiman, Opinion, *Using Schoolkids to Promote Religion Is a Shameless Ploy*, SACRAMENTO BEE (Dec. 29, 2014), <http://www.sacbee.com/opinion/op-ed/bruce-maiman/article5131995.html> [<http://perma.cc/48WS-GJBH>].

²⁴³ 410 U.S. 113 (1973).

²⁴⁴ See Linda Greenhouse & Reva B. Siegel, *Before (and After) Roe v. Wade: New Questions About Backlash*, 120 YALE L.J. 2028, 2081 n.183 (2010) (explaining that popular support for legal abortion was on the rise before *Roe*).

²⁴⁵ *Our History*, PLANNED PARENTHOOD ROCKY MOUNTAINS, INC., <http://www.plannedparenthood.org/planned-parenthood-rocky-mountains/who-we-are/our-history> [<http://perma.cc/4X44-FV84>].

²⁴⁶ *United States v. Vuitch*, 402 U.S. 62, 72 (1971).

²⁴⁷ See Greenhouse & Siegel, *supra* note 244, at 2047 (listing these states as Colorado, North Carolina, California, Maryland, Georgia, Arkansas, Delaware, New Mexico, Kansas, Oregon, South Carolina, and Virginia).

1. The Medical Science of Fetal Viability

The *Roe* Court's famous trimester framework would encourage future judicial fact-finding on questions of medical science.²⁴⁸ According to Justice Blackmun, given

the State's important and legitimate interest in the health of the mother, the "compelling" point, in the light of present medical knowledge, is at approximately the end of the first trimester . . . because of the now-established medical fact . . . that until the end of the first trimester mortality in abortion may be less than mortality in normal childbirth.²⁴⁹

Under *Roe*, these interests must sometimes cede to "the State's important and legitimate interest in potential life, [and] the 'compelling' point is at viability . . . because the fetus then presumably has the capability of meaningful life outside the mother's womb."²⁵⁰ As many historians have pointed out, Justice Blackmun's scientized approach may be attributable to his previous experience as legal counsel to the Mayo Clinic and the fact that he had returned to Minnesota the summer before deciding *Roe* to extensively research the medical questions.²⁵¹

A medical approach to reproductive legal rights issues was not inevitable. In Justice Ruth Bader Ginsburg's view, the *Roe* Court's medical science approach was both unnecessary and unfortunate.²⁵² According to Justice Ginsburg, the Court could have avoided fact-finding about medical science if the decision had instead rested on equal protection considerations of women's autonomy and equality.²⁵³ Professor Linda Greenhouse, upon the recent occasion of *Roe*'s fortieth anniversary, similarly opined that "[t]o read the actual opinion, as almost no one ever does, is to understand that the seven middle-aged to elderly men in the majority certainly didn't think they were making a statement about women's rights: women and their voices are nearly absent from the opinion."²⁵⁴ But Justice Blackmun's decision in *Roe* defined the

²⁴⁸ *Roe*, 410 U.S. at 149 (referencing "medical data indicating that abortion in early pregnancy, that is, prior to the end of the first trimester, although not without its risk, is now relatively safe" and that "[m]ortality rates for women undergoing early abortions, where the procedure is legal, appear to be as low as or lower than the rates for normal childbirth").

²⁴⁹ *Id.* at 163.

²⁵⁰ *Id.*

²⁵¹ JANICE SCHUETZ, *COMMUNICATING THE LAW: LESSONS FROM LANDMARK LEGAL CASES* 300 (2007).

²⁵² Ruth Bader Ginsburg, *Some Thoughts on Autonomy and Equality in Relation to Roe v. Wade*, 63 N.C. L. REV. 375, 382 (1985).

²⁵³ *See id.* at 385 (insisting the Court should have "acknowledged a woman's equality aspect, not simply a patient-physician autonomy constitutional dimension to the abortion issue").

²⁵⁴ Linda Greenhouse, *Misconceptions*, N.Y. TIMES: OPINIONATOR (Jan. 23, 2013, 9:00 PM), <http://opinionator.blogs.nytimes.com/2013/01/23/misconceptions/>.

shifting state interest in regulating abortion using pregnancy trimesters.²⁵⁵ With this medical framework in place, abortion opponents have found increasing traction for *Edwards*-style restrictions based on “scientific theories” and “scientific critique.”

2. The Psychological Effects of Unwanted Pregnancy and Abortion

Extralegal judicial fact-finding after *Roe* principally involved the medical evidence of fetal development.²⁵⁶ Even before *Roe*, however, the Court had also begun to consider the mental health implications of an unwanted pregnancy. In 1971, in *United States v. Vuitch*,²⁵⁷ the Supreme Court rejected a challenge to a Washington, D.C. law permitting abortions “necessary for the preservation of the mother’s life or health and [performed] under the direction of a competent licensed practitioner of medicine,”²⁵⁸ based on the alleged imprecision of the word “health.”²⁵⁹ According to the *Vuitch* Court, “the legislative history of the statute [gave] no guidance as to whether ‘health’ refers to both a patient’s mental and physical state,”²⁶⁰ but the term presented no problem of vagueness because an abortion could have been necessary to protect a “patient’s physical or mental health.”²⁶¹ In the Court’s progressive view, this was precisely the type of “judgment that physicians [were] obviously called upon to make routinely.”²⁶²

Two years later in *Roe*, Justice Blackmun engaged in similar extralegal judicial fact-finding about maternal mental health. The *Roe* Court found that “[t]he detriment that the State would impose upon the pregnant woman by denying this choice [of an abortion] altogether is apparent.”²⁶³ According to the Court,

[s]pecific and direct harm medically diagnosable even in early pregnancy may be involved. Maternity, or additional offspring, may force upon the woman a distressful life and future. Psychological harm may be imminent. Mental and physical health may be taxed by child care. There is also the distress, for all concerned, associated with the unwanted child, and there is the problem of

²⁵⁵ See *Roe*, 410 U.S. at 162–63 (describing how the trimester framework is directly related to the state’s interest in maternal health).

²⁵⁶ See, e.g., *Stenberg v. Carhart*, 530 U.S. 914, 921 (2000) (holding a law unconstitutional based on medical evidence of the fetal development).

²⁵⁷ 402 U.S. 62 (1971).

²⁵⁸ *Id.* at 68 (citing D.C. CODE ANN. § 22-201 (West 1967)).

²⁵⁹ *Id.*

²⁶⁰ *Id.* at 71.

²⁶¹ *Id.* at 72.

²⁶² *Id.*

²⁶³ *Roe v. Wade*, 410 U.S. 113, 153 (1973).

bringing a child into a family already unable, psychologically and otherwise, to care for it.²⁶⁴

The Court would continue to engage in fact-finding about human psychology and behavior in all subsequent abortion cases. But over time, American Citizens Concerned for Life and other abortion opponents would invert the argument. In subsequent cases, the courts rejected or ignored the deleterious psychological impact of unwanted pregnancy and focused instead on a range of scientifically unsubstantiated assumptions regarding post-abortion trauma.²⁶⁵

3. The Post-*Roe* Decade

Fact-finding about medical science has dominated Supreme Court abortion jurisprudence in the wake of the *Roe* Court's finding that "a State may properly assert important interests in safeguarding health [and] in maintaining medical standards."²⁶⁶ Three years later, in *Planned Parenthood of Central Missouri v. Danforth*,²⁶⁷ the Court explored whether specific restrictions were "reasonably directed to the preservation of maternal health."²⁶⁸ Abortion opponents had advanced various "scientific theories" to support new abortion restrictions. Justice Blackmun, writing again for the majority, took an erratic approach to the epistemic questions. He upheld an informed consent provision based on the empirically unsupported assumption that "[t]he decision to abort, indeed, is an important, and often a stressful one, and it is desirable and imperative that it be made with full knowledge of its nature and consequences."²⁶⁹ However, the Court rejected a statewide ban on saline amniocentesis after weighing the scientific evidence and concluding that the procedure was safe and widely used.²⁷⁰

²⁶⁴ *Id.*

²⁶⁵ See Caroline Mala Corbin, *Abortion Distortions*, 71 WASH. & LEE L. REV. 1175, 1175–76 (2014) (noting that despite the fact that "no reputable study supports" a causal link between abortion and depression, "this unfounded assertion has been used to justify laws requiring that women seeking abortion be provided with certain information lest they later suffer from postabortion trauma").

²⁶⁶ *Roe*, 410 U.S. at 154.

²⁶⁷ 428 U.S. 52 (1976).

²⁶⁸ *Id.* at 80.

²⁶⁹ *Id.* at 67. *But see* Harper Jean Tobin, *Confronting Misinformation on Abortion: Informed Consent, Deference, and Fetal Pain Laws*, 17 COLUM. J. GENDER & L. 111, 111 (2008) ("These laws abandon well-settled principles of informed consent—which give discretion to medical professionals to determine what information is crucial for patients—in favor of legislative judgments about what particular facts should be told to patients and how these facts should be shared.").

²⁷⁰ *Danforth*, 428 U.S. at 78–79 (holding that the ban on saline was not a reasonable regulation in light of the state's interest in maternal health).

In 1983, in *Planned Parenthood Association of Kansas City v. Ashcroft*,²⁷¹ abortion opponents had advanced the “scientific theories” that a second physician for post-viability abortions and pathology examinations was a necessary medical safeguard. In this case, Justice Powell, writing for the majority, took a more consistent approach to the epistemic questions.²⁷² The Court concluded that both restrictions advanced legitimate maternal health and safety interests.²⁷³ According to the majority, the second doctor could “be of assistance to the woman’s physician in preserving the health and life of the child,”²⁷⁴ and the pathology examination could be “‘useful and even necessary in some cases,’ because ‘abnormalities in the tissue may warn of serious, possibly fatal disorders.’”²⁷⁵ Later that same year, in *City of Akron v. Akron Center for Reproductive Health, Inc.*,²⁷⁶ Justice Powell, writing for the majority, rejected a twenty-four-hour delay and a requirement that all abortions after the first trimester be performed in a hospital.²⁷⁷ The medical fact-finding in this case included the Court’s rejection of the state’s assertion that “abortion is a major surgical procedure.”²⁷⁸ Following a review of the purported medical theories advanced by the state, the Court concluded that the empirical evidence had failed to establish that mandated hospitalization advanced maternal health and safety.²⁷⁹

4. The *Roe* Backlash

The immediate political backlash against *Roe* has been a frequent topic of academic debate.²⁸⁰ Richard Posner has described public outrage at the *Roe* Court’s overreaching to create a national abortion policy for deeply divided states.²⁸¹ Cass Sunstein has advanced the bolder claim that *Roe* “may well have created the Moral Majority, helped defeat the equal rights amendment, and undermined the women’s movement by spurring opposition and demobilizing potential adherents.”²⁸² But other commentators

²⁷¹ 462 U.S. 476 (1983).

²⁷² *Id.* at 477.

²⁷³ *Id.* at 485–86, 490.

²⁷⁴ *Id.* at 485.

²⁷⁵ *Id.* at 487 (quoting *Planned Parenthood Ass’n of Kan. City v. Ashcroft*, 655 F.2d 848, 870 (8th Cir. 1981)).

²⁷⁶ 462 U.S. 416 (1983).

²⁷⁷ *Id.* at 452.

²⁷⁸ *Id.* at 444 (quoting *Akron Ctr. for Reprod. Health, Inc. v. Akron*, 479 F. Supp. 1172, 1203 (N.D. Ohio 1979)).

²⁷⁹ *Id.* at 437, 450.

²⁸⁰ See, e.g., John Nivala, *Planned Parenthood v. Casey: The Death of Repose in Reproductive Decisionmaking*, 4 SETON HALL CONST. L.J. 47, 67 (1993) (“*Roe* predictably fueled reaction and resistance.”).

²⁸¹ See, e.g., RICHARD POSNER, *LAW, PRAGMATISM, AND DEMOCRACY* 124–25 (2003) (critiquing *Roe* for precluding a more democratic approach to abortion).

²⁸² Cass R. Sunstein, *Three Civil Rights Fallacies*, 79 CALIF. L. REV. 751, 766 (1991).

disagree, opining that the advent of the anti-abortion movement is not so easily explained. Reva Siegel has argued that *Roe* instead illustrates an academic debate with little immediate public consequence, noting that “jurisprudential objection by itself is rarely sufficient to inspire a political movement capable of altering the complexion of constitutional politics.”²⁸³ In Professor Siegel’s view, scholarly speculations overestimating the force and extent of a *Roe* backlash fail to “distinguish between claims that function as jurisprudential objections within professional debate and claims that function as political arguments within popular debate.”²⁸⁴

Roe would, of course, eventually mobilize abortion opponents. As discussed above, the Supreme Court decided several abortion cases over the post-*Roe* decade. But outside the courthouse, the contemporaneous anti-abortion movement had not yet divided the country along partisan lines. In the wake of *Roe*, anti-abortion strategic decision-making remained in the hands of religious groups less familiar with lobbying and marketing strategies than their political counterparts.²⁸⁵ In fact, two years after *Roe*, a Harris Survey reported that over half of the country favored legal abortions under any circumstances during the first trimester.²⁸⁶ Public support for access to legal abortion remained relatively steady from 1975 to 1990, and membership in the Republican or Democratic Party was not a good indicator of abortion views.²⁸⁷ As annual Gallup polls reveal, public support for legal first-trimester abortion under any circumstances fluctuated between 18%–29% among Republicans and 19%–34% among Democrats from 1975 to 1990.²⁸⁸

Fifteen post-*Roe* years of steady bipartisan support for legal abortion “under any circumstances” belie any immediate grassroots backlash.²⁸⁹ The fight over reproductive rights would not fully divide the country along partisan lines until two decades later—after pro-life Supreme Court nominee Robert Bork was defeated in 1987²⁹⁰ and pro-choice President Bill Clinton was elected in 1992.²⁹¹

Unlike the anti-evolution movement, the anti-abortion movement reflects a top-down effort to realign the strategic interests of the Republican Party,²⁹² with economics

²⁸³ Robert Post & Reva Siegel, *Roe Rage: Democratic Constitutionalism and Backlash*, 42 HARV. C.R.-C.L. L. REV. 373, 410 (2007).

²⁸⁴ *Id.*

²⁸⁵ *Id.* at 412–13.

²⁸⁶ Greenhouse & Siegel, *supra* note 244, at 2081 n.183 (citing Louis Harris, *Majority Supporting Abortion Laws Grows*, CHI. TRIB., May 26, 1975, at 7).

²⁸⁷ Lydia Saad, *Republicans’, Dems’ Abortion Views Grow More Polarized*, GALLUP (Mar. 8, 2010), <http://www.gallup.com/poll/126374/republicans-dems-abortion-views-grow-polarized.aspx>.

²⁸⁸ *Id.*

²⁸⁹ *Id.*; see also Mary Ziegler, *Beyond Backlash: Legal History, Polarization, and Roe v. Wade*, 71 WASH. & LEE L. REV. 969, 971 (2014).

²⁹⁰ LINDA GREENHOUSE & REVA B. SIEGEL, *BEFORE ROE V. WADE: VOICES THAT SHAPED THE ABORTION DEBATE BEFORE THE SUPREME COURT’S RULING* 260 (2012).

²⁹¹ Post & Siegel, *supra* note 283, at 428 n.243.

²⁹² Greenhouse & Siegel, *supra* note 244, at 2083.

playing an important role. The financial incentives have been revealed in new research demonstrating that, over the post-*Roe* decade, “[o]rganizations like the Moral Majority and Christian Voice had an impressive financial record,” but the National Right to Life Committee (NRLC), “the largest national pro-life organization, had debts.”²⁹³ Thus, a strategic alignment with “social conservatives promised to make the pro-life cause financially stable.”²⁹⁴

In June 1992, the Supreme Court decided *Planned Parenthood of Southeastern Pennsylvania v. Casey*.²⁹⁵ In a five-to-four opinion authored by Justices O’Connor, Kennedy, and Souter, *Casey* reaffirmed the “essential holding” of *Roe*, including the requirement that any abortion restrictions include an exception to accommodate post-viability abortions necessary to preserve the life or health of the mother.²⁹⁶ However, the Court rejected *Roe*’s trimester framework, replacing it with the requirement that state law not place an “undue burden on a woman’s constitutional right to decide to terminate a pregnancy.”²⁹⁷ The Court’s failure to overturn *Roe* disappointed the growing anti-abortion movement. But the new abortion framework would eventually prove useful to abortion opponents. After *Casey*, the anti-abortion movement, like the anti-evolution movement a decade earlier, “uncertain about the extent to which they can openly profess ideological grounds for abortion laws, . . . [would] instead present abortion restrictions as rooted in medical and scientific concerns.”²⁹⁸ Thus, *Casey*’s “undue burden test” would open the door to *Edwards*-style anti-abortion “scientific theories” and “scientific critiques” deployed by a growing coalition of religious, social, and political organizations.

B. “Partial-Birth Abortion”

Starting in the early 1990s, abortion opponents began to gain traction with the public, media, legislators, and courts. The National Right to Life Committee (NRLC), in particular, began to focus more closely on the science.²⁹⁹ Led by NRLC, abortion opponents quickly settled on a new strategy.³⁰⁰ In September 1992, Dr. Martin Haskell, a Cincinnati family practitioner and abortion provider, presented an

²⁹³ Ziegler, *supra* note 289, at 1008.

²⁹⁴ *Id.*

²⁹⁵ 505 U.S. 833 (1992) (invalidating the state’s spousal-notification requirement, but upholding: informed-consent requirements, a twenty-four-hour waiting period, a requirement that minors obtain parental consent of at least one parent, and extensive new state reporting requirements for all abortion-providing facilities).

²⁹⁶ *Id.* at 846.

²⁹⁷ *Id.* at 838.

²⁹⁸ Caitlin E. Borgmann, *Judicial Evasion and Disingenuous Legislative Appeals to Science in the Abortion Controversy*, 17 J.L. & POL’Y 15, 33 (2008).

²⁹⁹ Julie Rovner, ‘Partial Birth Abortion:’ *Separating Fact from Spin*, NPR, <http://www.npr.org/2006/02/21/5168163/partial-birth-abortion-separating-fact-from-spin> (last updated Aug. 1, 2012, 6:03 PM).

³⁰⁰ *Id.*

unpublished seminar paper at a National Abortion Federation meeting.³⁰¹ In this paper, Dr. Haskell

described in full medical detail a procedure he used for late second-trimester abortions that differed significantly from the standard second-trimester procedure of dilation and evacuation, or “D&E” [by] remov[ing] the fetus as intact as possible, and he introduced the new name dilation and extraction, or “D&X,” for his procedure.³⁰²

Dr. Haskell’s unpublished work came to the attention of the NRLC, which quickly recognized its marketing potential and “commissioned drawings to illustrate it and published them in booklet form, as well as placing them as paid advertisements in newspapers to build public opposition.”³⁰³ So-called “partial-birth abortion” presented the anti-abortion movement with a scientific-sounding argument that could be deployed to encourage new restrictions on this procedure and perhaps on other procedures as well. As then-NRLC Legislative Director Douglas Johnson explained afterwards, when “the public learns what a ‘partial-birth abortion’ is, they might also learn something about other abortion methods, and that this would foster a growing opposition to abortion.”³⁰⁴

Three years later, Florida Republican Representative Charles T. Canady introduced the federal Partial-Birth Abortion Ban Act of 1995.³⁰⁵ The law authorized up to two years in prison for any doctor performing an abortion who “partially vaginally delivers a living fetus before killing the fetus and completing the delivery.”³⁰⁶ Partial-birth abortion quickly became the signature “scientific” issue for abortion opponents and was featured prominently in national media coverage.³⁰⁷ Polling data revealed that “partial birth abortion” mobilized Republicans to oppose abortion³⁰⁸ and raised much-needed funds for anti-abortion organizations.³⁰⁹ The shift to an argument based on a

³⁰¹ See David J. Garrow, *Significant Risks: Gonzales v. Carhart and the Future of Abortion Law*, 2007 SUP. CT. REV. 1, 2 (describing Dr. Haskell’s paper presentation).

³⁰² See *id.*

³⁰³ See Rovner, *supra* note 299.

³⁰⁴ *Id.*

³⁰⁵ H.R. REP. NO. 104-267 (1995), <http://www.gpo.gov/fdsys/pkg/CRPT-104hrpt267/html/CRPT-104hrpt267.htm> [<http://perma.cc/UAS3-XE6S>]; see also Debra Rosenberg, *Chipping Away at Roe*, NEWSWEEK (Mar. 16, 2003, 7:00 PM), <http://www.newsweek.com/chipping-away-roe-133053> [<http://perma.cc/BS8U-A3T6>].

³⁰⁶ H.R. REP. NO. 104-267, § 1531(b) (1995).

³⁰⁷ Garrow, *supra* note 301, at 4 (noting that the phrase “partial-birth abortion” was immediately featured in newspapers throughout the United States).

³⁰⁸ See Greenhouse & Siegel, *supra* note 244, at 2011 (noting that, once Republicans voted against abortion in Congress, data began showing they opposed it more than Democrats).

³⁰⁹ See Ziegler, *supra* note 289, at 1008.

“scientific critique” of abortion mirrored recent Intelligent Design efforts focused on the “scientific critique” of irreducible complexity³¹⁰ and marked a “turning point in the abortion debate” that would soon “put the abortion-rights proponents . . . on the political defensive” on questions of medicine and maternal mental health.³¹¹

State efforts to ban partial-birth abortion procedures followed quickly—despite the fact that the late-term procedure was relatively uncommon, and, in some states seeking criminalization, had never once been performed.³¹² In 1997, the American College of Obstetricians and Gynecologists (ACOG)³¹³ and the American Medical Association (AMA)³¹⁴ issued public statements demanding that doctors maintain the legal discretion to use this procedure when it was in the patient’s best interest. Official pronouncements from leading medical organizations were intended to advance the mainstream medical view that intact dilation and extraction should not be outlawed.³¹⁵ But public attention from the ACOG and AMA paradoxically helped abortion opponents maintain their purported focus on this “scientific critique.” This strategy was designed to encourage judicial fact-finding based on epistemic relativism and deflect attention from partisan, normative, or theological objections.³¹⁶

³¹⁰ See Borgmann, *supra* note 298, at 26–27 (noting the comparison between the abortion debate and evolution debate).

³¹¹ Garrow, *supra* note 301, at 4.

³¹² John Gibeaut, *Strategic Adjustments: Abortion Opponents Focusing on Protection of the “Partially Born,”* 85 A.B.A. J. 26, 26 (1999).

³¹³ According to the ACOG, their members

could identify no circumstances under which this procedure [intact D & X] would be the *only* option to save the life or preserve the health of the woman[,] . . . [although it] may be the *best* or *most appropriate* procedure in a particular circumstance to save the life or preserve the health of a woman, and only the doctor, in consultation with the patient, based upon the woman’s particular circumstances can make this decision.

AM. COLL. OF OBSTETRICIANS & GYNECOLOGISTS, ABORTION POLICY (2011) [hereinafter ABORTION POLICY] (emphasis added).

³¹⁴ According to AMA, among the

scientific literature, there does not appear to be any identified situation in which intact D&X is the only appropriate procedure to induce abortion, and ethical concerns have been raised about intact D&X. The AMA recommends that the procedure not be used unless alternative procedures pose materially greater risk to the woman. The physician must, however, retain the discretion to make that judgment, acting within standards of good medical practice and in the best interest of the patient.

AM. MED. ASS’N, *H-5.982(2): Late-Term Pregnancy Termination Techniques*, in HEALTH AND ETHICS POLICIES OF THE AMA HOUSE OF DELEGATES, <http://www.ama-assn.org/ad-com/pol/find/Hlth-Ethics.pdf> [<http://perma.cc/ZTX7-BQTD>].

³¹⁵ *Id.*; see also ABORTION POLICY, *supra* note 313, at 2–3 (informing reader of the medical process of intact D&X).

³¹⁶ Rigel E. Oliveri, *Crossing the Line: The Political and Moral Battle over Late-Term Abortion*, 10 YALE J.L. & FEMINISM 397, 398 (1998) (noting the “intense lobbying efforts

C. Medical Fact-Finding on Partial-Birth Abortion: Stenberg v. Carhart

The Nebraska statute prohibiting “intact dilation and extraction” reached the Supreme Court in 2000 in *Stenberg v. Carhart*.³¹⁷ Justice Breyer, who wrote for the majority, immediately announced that scientific fact-finding about the safety and medical necessity of this particular abortion procedure would guide the Court’s legal analysis.³¹⁸ According to the Court,

[b]ecause Nebraska law seeks to ban one method of aborting a pregnancy, we must describe and then discuss several different abortion procedures. Considering the fact that those procedures seek to terminate a potential human life, our discussion may seem clinically cold or callous to some, perhaps horrifying to others. There is no alternative way, however, to acquaint the reader with the technical distinctions among different abortion methods and related factual matters, upon which the outcome of this case depends.³¹⁹

The issue was “whether Nebraska’s statute, making criminal the performance of a ‘partial birth abortion,’ violates the Federal Constitution, as interpreted in *Planned Parenthood of Southeastern Pa. v. Casey*,”³²⁰ by placing an “undue burden on a woman’s ability to choose an abortion.”³²¹ Following a detailed review of the extensive medical evidence regarding the safety and necessity of the intact dilation and extraction procedure, the Court concluded that the Nebraska law, which contained an exception to preserve the life of the mother but no exception to protect her health, “create[d] a significant health risk.”³²² The decision, according to Justice Breyer, was also based both on the empirical evidence and on fact-finding by the district court that intact dilation and extraction “significantly obviates health risks in certain circumstances

on the part of both proponents and opponents of the bill, resulting in a fierce ethical, medical, political, and social debate that shows no signs of diminishing”).

³¹⁷ 530 U.S. 914, 928–30 (2000).

³¹⁸ *Id.* at 923.

³¹⁹ *Id.*

³²⁰ *Id.* at 929–30.

³²¹ *Id.* at 916 (citation omitted). According to the majority, [c]onsequently, the governing standard requires an exception “where it is necessary, in appropriate medical judgment for the preservation of the life or health of the mother,” for this Court has made clear that a State may promote but not endanger a woman’s health when it regulates the methods of abortion.

Id. at 931 (citations omitted).

³²² *Id.* at 937–38.

[based on] a highly plausible record-based explanation of why that might be so.”³²³ The majority also noted that, “[w]ith one exception, the federal trial courts that have heard expert evidence on the matter have reached similar factual conclusions.”³²⁴

The *Stenberg* decision invalidated identical partial-birth abortion bans in thirty states, igniting a storm of anti-abortion protests.³²⁵ Heralded as the case that saved *Roe*, the Court’s reliance on medical fact-finding initially appeared to expand the scope of states’ responsibilities to protect women’s health.

In identifying an explicit statutory health exception as a sine qua non of abortion restrictions whenever substantial medical authority deemed one necessary, the *Stenberg* Court headed off a key strategy of abortion rights opponents, who have long sought to narrow the application of the health rationale and downplay the importance of access to abortion for women’s health.³²⁶

This possibility was not lost on Justice Thomas, who wrote for the four dissenters.³²⁷ Unsurprisingly, the dissenters had engaged in their own scientific fact-finding under *Casey*, reaching the conclusion that a complete ban was warranted.³²⁸ According to Justice Thomas, “[i]f there is a ‘significant body of medical opinion’ supporting this procedure, no one in the majority has identified it.”³²⁹ The dissenters expressed their specific concern that future abortion challenges would now fail whenever “any doctor could reasonably believe that the partial birth abortion procedure would best protect the woman,”³³⁰ or “because some doctors believe that partial birth abortion is safer.”³³¹ This would be the last word on abortion from the Court for the remainder of the century.

IV. EXTRALEGAL JUDICIAL FACT-FINDING IN THE TWENTY-FIRST CENTURY

For the last two decades of the twentieth century, the anti-evolution movement charted a path forward in the wake of *Edwards v. Aguillard*, which has transformed

³²³ *Id.* at 936.

³²⁴ *Id.* at 932.

³²⁵ Cynthia D. Lockett, *The Beginning of the End: The Diminished Abortion Right Following Carhart and Planned Parenthood*, 11 J. GENDER RACE & JUST. 337, 344–45 (2008).

³²⁶ Linda J. Wharton et al., *Preserving the Core of Roe: Reflections on Planned Parenthood v. Casey*, 18 YALE J.L. & FEMINISM 317, 347 (2006) (footnote omitted).

³²⁷ *Stenberg*, 530 U.S. at 1017 (Thomas, J., dissenting).

³²⁸ *Id.* at 1017–18.

³²⁹ *Id.* at 1017.

³³⁰ *Id.*

³³¹ *Id.* at 1012.

public debate on reproductive rights and other important science and law controversies. Recently, the anti-evolution and anti-abortion movements' paths have diverged. The "scientific theories" and "scientific critique" of Intelligent Design continue to amass significant public support.³³² However, a decade after these empirical claims were rejected in *Kitzmiller v. Dover Area School District*,³³³ there have been no new federal legal challenges. In contrast, the Supreme Court continues to advance "scientific theories" further restricting abortion access, most recently in 2007 in *Gonzales v. Carhart*.³³⁴ A comparison of twenty-first century extralegal judicial fact-finding provides insight for future cases in these and other science-focused legal debates.

A. Recent Anti-Evolution Developments

1. Accurate Judicial Fact-Finding About Evolution: *Kitzmiller v. Dover Area School District*

Kitzmiller v. Dover Area School District, decided in December 2005, is the only twenty-first-century anti-evolution challenge to reach the federal courts.³³⁵ In *Kitzmiller*, Judge John E. Jones, III, addressed the constitutionality of a Pennsylvania school board requirement that all public high school science teachers read a statement to their biology classes explaining that: (1) "Darwin's Theory is a theory . . . [that] continues to be tested as new evidence is discovered";³³⁶ (2) "The Theory is not a fact";³³⁷ (3) "Gaps in the Theory exist for which there is no evidence";³³⁸ (4) "Intelligent Design is an explanation of the origin of life that differs from Darwin's view";³³⁹ and (5) Students should read "[t]he reference book, *Of Pandas and People*, [which] is available for students who might be interested in gaining an understanding of what Intelligent Design actually involves."³⁴⁰

Kitzmiller, which attracted significant media attention, was the first time that

the intelligent-design movement as a whole stood trial on the claim that they were trying to pass off a religious view as though it were a scientific theory, so that they could market it to students in public-school science classrooms. They defended themselves by saying that they were doing nothing dishonest, much less

³³² See *infra* notes 363–70 and accompanying text.

³³³ 400 F. Supp. 2d 707 (M.D. Pa. 2005).

³³⁴ 550 U.S. 124 (2007).

³³⁵ 400 F. Supp. 2d at 707.

³³⁶ *Id.* at 708.

³³⁷ *Id.*

³³⁸ *Id.*

³³⁹ *Id.* at 708–09.

³⁴⁰ *Id.* at 709.

unconstitutional, because intelligent design is a scientific theory that belongs in science classes.³⁴¹

After an eight-week trial and application of the same *Lemon* test applied by the Supreme Court two decades earlier in *Edwards v. Aguillard*,³⁴² Judge Jones found that the school board policy violated the Establishment Clause.³⁴³

Edwards and *Kitzmiller* involved similar facts and identical Establishment Clause standards.³⁴⁴ But the scope and depth of the two courts' extralegal fact-finding about the natural world could not be more different. Judge Jones fully embraced the epistemology of science questions ignored by the *Edwards* Court, devoting a substantial portion of his fifty-nine page opinion to an explicit description of how and why Intelligent Design could *never* be legitimate science.³⁴⁵ Judge Jones's approach also acknowledged that the world outside the courthouse had changed—with “scientized” Intelligent Design arguments providing a model of apparent objectivity for other partisan, normative, or theistic debates.³⁴⁶ As Professor Richard Katskee persuasively argued, “[D]eciding whether intelligent design is science was critical to the *Kitzmiller* court's fulfilling its jurisprudential obligation both to the defendants and to the public at large.”³⁴⁷

2. Understanding the New Judicial Approach

The science law discussion embodied in *Kitzmiller* acknowledged the public's increasing difficulties distinguishing science from its counterfeits—especially when so many arguments on the internet and elsewhere sound scientific. To help delineate science from pseudoscience and avoid epistemic relativism on threshold questions

³⁴¹ Katskee, *supra* note 235, at 112.

³⁴² 482 U.S. 578, 585 (1987). The *Edwards* Court relied on the three-pronged *Lemon* test, which requires that: (1) the legislature had a secular purpose when it adopted the statute; (2) the statute's primary effect does not inhibit or advance religion; and (3) the statute does not create excessive entanglement between government and religion. *See Lemon v. Kurtzman*, 403 U.S. 602, 612–13 (1971).

³⁴³ *Kitzmiller*, 400 F. Supp. 2d at 765.

³⁴⁴ *See Edwards*, 482 U.S. at 578 (holding that Louisiana's “Creationism Act” violated the Establishment Clause); *Kitzmiller*, 400 F. Supp. 2d at 707–08 (holding that the school board provision violated the Establishment Clause).

³⁴⁵ *See Kitzmiller*, 400 F. Supp. 2d at 737.

³⁴⁶ *See id.* at 717–18. It is worth noting that at least one commentator, Jay Wexler, has suggested that, from a First Amendment perspective, Judge Jones should not have ventured into the “What is science?” debate. *See Jay D. Wexler, Kitzmiller and the “Is it Science?” Question*, 5 FIRST AMEND. L. REV. 90, 106 (2006) (“[A]ny judge who wants to engage in a demarcation inquiry should first explain why he or she is in fact competent to define science and to apply that definition. Certainly Judge Jones did not make this affirmative case before engaging in his own demarcation analysis.”).

³⁴⁷ Katskee, *supra* note 235, at 115.

of scientific evidence and fact, the court provided a lengthy discussion of the hallmarks of legitimate scientific inquiry.

Judge Jones began by explaining that real science is “limited to empirical, observable and ultimately testable data”³⁴⁸ and that science should never be mistaken for pseudoscience because pseudoscientific explanations “attribut[e] unsolved problems about nature to causes and forces that lie outside the natural world . . . [and are thus] a ‘*science stopper*.’”³⁴⁹ The court identified genuine areas of relevant scientific consensus and explained how peer review and publication in peer-review scientific journals can be indicia of scientific legitimacy.³⁵⁰ Judge Jones described the centrality of falsifiability to any legitimate scientific theory.³⁵¹ He also rejected the argument that Darwin’s theory of evolution is not perfect, noting “the fact that a scientific theory cannot yet render an explanation on every point should not be used as a pretext to thrust an untestable alternative hypothesis grounded in religion into the science classroom or to misrepresent well-established scientific propositions.”³⁵² Based on this extensive extrajudicial fact-finding, Judge Jones concluded that Intelligent Design could *never* be science because it is “not testable by the methods of science” and it “subordinate[s] observed data to statements based on authority, revelation, or religious belief.”³⁵³

The bulk of the *Kitzmiller* opinion reads like a primer on basic scientific principles. Judge Jones could have simply concluded, as the *Edwards* Court had, that the Establishment Clause had been violated under the *Lemon* test,³⁵⁴ and some commentators would have preferred that approach.³⁵⁵ Instead, the court went to great lengths to, in Judge Jones’s words, assure the world that “[i]n making this determination, we have addressed the seminal question of whether [Intelligent Design] is science.”³⁵⁶

3. Judicial Policy-Making Advances Accurate Science and Science Policy

Kitzmiller, decided in the spotlight of national media attention, illustrates Judge Jones’s commitment to presenting an accurate epistemology of science that did not falsely equate religious beliefs with “scientific theory” or “scientific critique.” In his view,

the defendants, the people of Dover, and the whole country had a right to expect him to issue a decisive ruling that would not

³⁴⁸ *Kitzmiller*, 400 F. Supp. 2d at 735.

³⁴⁹ *Id.* at 736 (emphasis added).

³⁵⁰ *Id.* at 744–45.

³⁵¹ *Id.*

³⁵² *Id.* at 765.

³⁵³ *Id.* at 737.

³⁵⁴ *Edwards v. Aguillard*, 482 U.S. 578, 593 (1987).

³⁵⁵ *See, e.g.*, Wexler, *supra* note 346, at 106.

³⁵⁶ *Kitzmiller*, 400 F. Supp. 2d at 765.

only resolve the dispute in Dover, but also give guidance to other public-school officials elsewhere, and in the process forge a common understanding that would begin to heal the religiously based political and social divides that . . . the intelligent-design movement was attempting to export to other communities across the country.³⁵⁷

But the *Kitzmiller* court's approach to the "What is science?" question was not an unqualified success. The decision was quickly branded as judicial activism, a naked power grab by the "Neo-Darwinian paradigm."³⁵⁸ It was also condemned, using academic freedom language, as a judicial attempt to "define the boundaries of science . . . [to] hinder scientific progress."³⁵⁹ More temperate critics opined that the real issue "is not whether ID actually is science—a question that sounds in philosophy of science—but rather whether judges should be deciding in their written opinions that ID is or is not science as a matter of law." According to one such critic, "the answer is 'no.'"³⁶⁰

In subsequent interviews, Judge Jones has explained his objectives: "I understand the criticisms that were lodged against me, [but] [t]he decision seems to be holding up well. . . . No other school district has engaged in this kind of a battle. I hope that's a product of the decision and perhaps the way that I wrote the decision."³⁶¹ He has also expressed hope that *Kitzmiller* would deter future efforts to equate Intelligent Design with "scientific" theory or critique, because "if a school board anywhere in the country does want to consider adding intelligent design in the curriculum, they need only look at . . . [the] written decision."³⁶²

4. Anticipating Consequences

A decade after *Kitzmiller*, the decision's long-term effects are uncertain. Despite mounting scientific evidence, many Americans reject evolution.³⁶³ As of 2014, 31% believe in Intelligent Design and 46% believe in Creationism.³⁶⁴ Recent empirical

³⁵⁷ Katskee, *supra* note 235, at 116.

³⁵⁸ Brief for Biologists and Other Scientists as Amici Curiae in Support of Defendants at 9, *Kitzmiller*, 400 F. Supp. 2d 707 (No. 4:04-CV-2688), 2005 WL 3136712.

³⁵⁹ *Id.* at 1.

³⁶⁰ Wexler, *supra* note 346, at 93.

³⁶¹ Andrew Shaw, *After 5 Years, Dover Intelligent Design Ruling's Impact Still Felt*, YORK DISPATCH (Dec. 17, 2010, 10:46 AM), http://www.yorkdispatch.com/ci_16883908 [<http://perma.cc/2HFR-F4BP>] (third alteration in original).

³⁶² *Id.*

³⁶³ *See infra* note 364 and accompanying text.

³⁶⁴ *See Green, supra* note 71 (a 2014 Gallup poll found that only 19% of Americans said they believe in evolution, while 31% said they believe in Intelligent Design and 46% said they believe in Creationism); *see also* Miller et al., *supra* note 71, at 765 (finding that 40% of surveyed Americans accept the idea of evolution).

research and new anti-evolution efforts to alter science curricula suggest that it is only a matter of time before the next constitutional challenge.³⁶⁵

In an extensive study of public school science curricula published in 2011 in *Science* magazine, Michael B. Berkman and Eric Plutzer found that state curricular science standards have generally improved.³⁶⁶ But their research also revealed “that supporters of evolution, scientific methods, and reason itself are losing battles in America’s classrooms, where instruction in evolutionary biology ‘has been absent, cursory, or fraught with misinformation.’”³⁶⁷ Data gathered from nearly one thousand high school biology teachers “reveal a pervasive reluctance of teachers to forthrightly explain evolutionary biology”³⁶⁸ and “a cycle of ignorance in which community antievolution attitudes are perpetuated by teaching that reinforces local community sentiment.”³⁶⁹ Based on their research, the authors concluded that “[t]he next generation of adults is thus predisposed to share the antievolution views of their parents.”³⁷⁰

Kitzmiller initially appeared to deter anti-evolution curricular reforms. More recent developments in various states suggest, a decade later, that, the decision’s effects are eroding. In Ohio, two months after *Kitzmiller* was decided, the school board of education voted down a preexisting requirement that an Intelligent Design-style “critical analysis of evolution” be included in the state’s high school biology curriculum.³⁷¹ At the time, the school board “stripped the language from the curriculum partly out of fear of a lawsuit in the wake of [the *Kitzmiller*] . . . ruling by a federal judge that teaching intelligent design in the Dover, Pa., public schools was unconstitutional.”³⁷² Judge Jones’s decision had encouraged school board members to vote against the proposed “critical analysis of evolution,” because it would be “deeply unfair to the children of this state to mislead them about the nature of science.”³⁷³

More recently, a pending 2014 Ohio statute seems to reject *Kitzmiller* by “prohibit[ing] political or religious interpretation of scientific facts in favor of another.”³⁷⁴ This new law is specifically designed to allow the teaching of “Creationism along with evolution and global warming denial alongside climate science.”³⁷⁵ As the pending bill’s sponsors, state legislators Andy Thompson and Matt Huffman recently

³⁶⁵ See *infra* notes 366–70 and accompanying text.

³⁶⁶ Michael B. Berkman & Eric Plutzer, *Defeating Creationism in the Courtroom, but Not in the Classroom*, 331 SCI. 365, 404 (2011).

³⁶⁷ *Id.*

³⁶⁸ *Id.*

³⁶⁹ *Id.*

³⁷⁰ *Id.*

³⁷¹ Jodi Rudoren, *Ohio Board Undoes Stand on Evolution*, N.Y. TIMES (Feb. 15, 2006), <http://www.nytimes.com/2006/02/15/national/15evolution.html>.

³⁷² *Id.*

³⁷³ *Id.*

³⁷⁴ *Update on Ohio’s Antiscience Bill*, NAT’L CTR. FOR SCI. EDUC. (Aug. 20, 2014), <http://ncse.com/news/2014/08/update-ohios-antiscience-bill-0015817> [<http://perma.cc/9NXX-AYDC>].

³⁷⁵ *Id.*

explained, “[W]e want to provide them the flexibility to consider all perspectives, not just on matters of faith or how the Earth came into existence, but also global warming and other topics that are controversial.”³⁷⁶

Four years after *Kitzmiller*, the Texas State Board of Education adopted new science standards.³⁷⁷ The standards were “written by a group of scientists and educators,” “the proposal covered evolution fully,” and “[m]ore than 50 science organizations endorsed the original standards.”³⁷⁸ Recently, “creationists successfully amended them . . . [to] include loopholes that allow evolution to be attacked and creationism to be snuck into public school classrooms.”³⁷⁹ Texas standards currently encourage students to “analyze, evaluate, and critique” scientific theories and require exposure to “all sides of scientific evidence of those scientific explanations so as to encourage critical thinking.”³⁸⁰ As then-Governor Rick Perry explained during the 2012 presidential election: “In Texas we teach both creationism and evolution in our public schools.”³⁸¹

Texas (like many other states) uses public school dollars to support charter schools.³⁸² A recent investigative report revealed that Texas charter school students rely on classroom materials that ignore the scientific evidence.³⁸³ For example, Texas school children use biology textbooks that say “that the fossil record is ‘sketchy[,]’ [t]hat evolution is ‘dogma’ and an ‘unproved theory’ with no experimental basis[, and] . . . that leading scientists dispute the mechanisms of evolution and the age of the Earth.”³⁸⁴

New state efforts to incorporate “scientific critique” of evolution will also be couched in the language of academic freedom. In Louisiana, state legislators recently purported to advance “academic freedom” with a new “Science Education Act,” declaring it the right and responsibility of public school teachers to encourage “critical thinking” by students.³⁸⁵ As of February 2013, eleven similar “academic freedom” bills aimed at the science classroom had been introduced around the country.³⁸⁶

³⁷⁶ *Id.*

³⁷⁷ Zack Kopplin, *Showdown over Science in Texas*, SLATE (Sept. 20 2013, 3:48 PM), http://www.slate.com/articles/health_and_science/science/2013/09/texas_science_textbooks_creationists_try_to_remove_evolution_from_classrooms.html [<http://perma.cc/HFJ4-WA57>].

³⁷⁸ *Id.*

³⁷⁹ *Id.*

³⁸⁰ *Id.*

³⁸¹ *Id.*

³⁸² Zack Kopplin, *Texas Public Schools are Teaching Creationism*, SLATE (Jan. 16, 2014, 4:30 AM), http://www.slate.com/articles/health_and_science/science/2014/01/creationism_in_texas_public_schools_undermining_the_charter_movement.html [<http://perma.cc/CED5-DSFN>].

³⁸³ *Id.*

³⁸⁴ *Id.*

³⁸⁵ James Gill, *Family Forum Ties Itself in Knots Defending Creationist Law*, NOLA.COM, http://www.nola.com/opinions/index.ssf/2013/03/family_forum_ties_itself_in_kn.html [<http://perma.cc/NW4P-4RXL>] (last updated Mar. 20, 2013, 7:16 PM).

³⁸⁶ Joshua Youngkin, *State of the Union: An Academic Freedom Bill Roundup*, EVOLUTION

In 2014, the American Federation of Teachers (AFT) responded. The AFT resolution, “Against So-Called Academic Freedom Bills that Undermine the Accurate Teaching of Evolution,”³⁸⁷ seeks to prevent school boards from equating Intelligent Design with “scientific” theory or critique under the guise of academic freedom by opposing all new laws that: (1) require teaching “the full range of scientific views regarding biological and chemical evolution”;³⁸⁸ (2) “offer students ‘protection for subscribing to a particular position on views regarding biological or chemical evolution’”;³⁸⁹ (3) purport to “help students develop ‘critical thinking skills’ on ‘controversial issues’”;³⁹⁰ or (4) “direct teachers to discuss ‘the scientific strengths and scientific weaknesses of existing scientific theories.’”³⁹¹

B. Recent Anti-Abortion Developments

1. Inaccurate Judicial Fact-Finding About Abortion: *Gonzales v. Carhart*

Between 1995 and 2003, Congress repeatedly attempted to pass a federal partial-birth abortion ban.³⁹² The law was finally passed in 2003.³⁹³ After signing the bill, President Bush expressed his support: “For years . . . a terrible form of violence has been directed at children who are inches from birth while the law looked the other way.”³⁹⁴

The 2003 Act, which was found unconstitutional in various federal courts as it made its way to the Supreme Court,³⁹⁵ was a transparent legislative end run around *Stenberg* based on new congressional fact “findings” that the intact dilation and

NEWS & VIEWS (Feb. 11, 2013, 11:23 AM), http://www.evolutionnews.org/2013/02/state_of_the_un069091.html [<http://perma.cc/VR79-HQA8>].

³⁸⁷ *Against So-Called Academic Freedom Bills That Undermine the Accurate Teaching of Evolution*, AM. FED’N TEACHERS (2014), <http://www.aft.org/resolution/against-so-called-academic-freedom-bills-undermine-accurate-teaching-evolution> [<http://perma.cc/HH3Y-HE2L>].

³⁸⁸ *Id.*

³⁸⁹ *Id.*

³⁹⁰ *Id.*

³⁹¹ *Id.* (referencing the Louisiana Science Education Act of 2008).

³⁹² *See Gonzales v. Carhart*, 550 U.S. 124, 140–41 (2007) (“In 1996, Congress . . . acted to ban partial-birth abortion. President Clinton vetoed the congressional legislation, and the Senate failed to override the veto. Congress approved another bill banning the procedure in 1997, but President Clinton again vetoed it. In 2003, after this Court’s decision in *Stenberg*, Congress passed the Act at issue here.”).

³⁹³ Partial-Birth Abortion Ban Act of 2003, Pub. L. No. 108-105, 117 Stat. 1201 (2003).

³⁹⁴ Kelefa Sanneh, *The Intensity Gap: Can a Pro-life Platform Win Elections?*, NEW YORKER (Oct. 27, 2014), <http://www.newyorker.com/magazine/2014/10/27/intensity-gap> [<http://perma.cc/79FY-BS82>].

³⁹⁵ *See* Barbara Jean Bailey, *Congress Ignores the Parameters of the Health Exception*, 27 J. LEGAL MED. 71, 77 (2006) (citing *Planned Parenthood Federation of America v. Ashcroft*, 320 F. Supp. 2d 957 (N.D. Cal. 2004); *National Abortion Federation v. Ashcroft*, 330 F. Supp. 2d 436 (S.D.N.Y. 2004); and *Carhart v. Ashcroft*, 331 F. Supp. 2d 805 (D. Neb. 2004) as cases that “determined the Act to be unconstitutional because of Congress’s fundamental omission”).

extraction abortion procedure was *never* medically necessary.³⁹⁶ These included the findings that,

[r]ather than being an abortion procedure that is embraced by the medical community, particularly among physicians who routinely perform other abortion procedures, partial-birth abortion remains a disfavored procedure that is not only unnecessary to preserve the health of the mother, but in fact poses serious risks to the long-term health of women and in some circumstances, their lives.³⁹⁷

In a lengthy statement of medical “facts,” Congress also determined that

[t]here is no credible medical evidence that partial-birth abortions are safe or are safer than other abortion procedures. No controlled studies of partial-birth abortions have been conducted nor have any comparative studies been conducted to demonstrate its safety and efficacy compared to other abortion methods. Furthermore, there have been no articles published in peer-reviewed journals that establish that partial-birth abortions are superior in any way to established abortion procedures. Indeed, unlike other more commonly used abortion procedures, there are currently no medical schools that provide instruction on abortions that include the instruction in partial-birth abortions in their curriculum.³⁹⁸

Senator Barbara Boxer had complained that Congress was not qualified to address these medical questions.³⁹⁹ She also expressed a more general concern that by enacting the first congressional ban on an approved medical procedure,⁴⁰⁰ the federal

³⁹⁶ Wharton et al., *supra* note 326, at 347; *see also* Shannon L. Pedersen, *When Congress Practices Medicine: How Congressional Legislation of Medical Judgment May Infringe a Fundamental Right*, 24 *TOURO L. REV.* 791, 819 (2008) (noting that abortion opponents believed that the new law could survive *Stenberg* because Congress had “added findings of fact to the bill stating that the banned procedure was never medically necessary” because “overwhelming evidence . . . compiled at extensive congressional hearings . . . demonstrates that a partial-birth abortion is never necessary to preserve the health of a woman, poses significant health risks to a woman . . . and is outside the standard of medical care” (alterations in original) (quoting Partial-Birth Abortion Ban Act § 2(5), 117 Stat. at 1202)).

³⁹⁷ Partial-Birth Abortion Ban Act § 2(2), 117 Stat. at 1201.

³⁹⁸ *Id.* at § 2(14)(B), 117 Stat. at 1204.

³⁹⁹ Carol Jouzaitis, *Senate Bans Late Abortion Procedure*, *CHI. TRIB.* (Dec. 8, 1995), http://articles.chicagotribune.com/1995-12-08/news/9512080264_1_late-term-abortion-procedure-partial-birth-abortion-dilation-and-extraction [<http://perma.cc/58E5-WPC4>].

⁴⁰⁰ 149 *CONG. REC.* S11589-606, S11597 (2003) (statement of Sen. Barbara Boxer) (“This is the first time any Congress has ever outlawed a medical procedure that is supported by the medical community.”).

government was effectively telling American women that their health does not matter.⁴⁰¹ Other commentators expressed skepticism about the legitimacy and medical accuracy of the congressional fact-finding inquiry,⁴⁰² opining that the law was based on “skewed testimony”⁴⁰³ that ignored empirical evidence indicating that “ninety-one percent of the doctors with relevant experience in performing abortions actually oppose[d] the ban.”⁴⁰⁴

2. Understanding the New Judicial Approach

The Supreme Court granted certiorari in *Gonzales v. Carhart* on February 21, 2006, which was Justice Alito’s first day on the bench.⁴⁰⁵ Oral argument was held on November 8, 2006. Starting with Justice Breyer’s first question to Solicitor General Paul Clement, the focus of the Court’s inquiry was, once again, on the medical details.⁴⁰⁶ Justice Breyer asked complex questions about the potential impact of “prior surgery [and] pelvic inflammatory disease,” and Justice Kennedy pondered the complications that might ensue if “the uterine wall is compromised by cancer or some forms of preeclampsia.”⁴⁰⁷

These medical questions were likely drawn from the amicus briefs filed by a range of professional medical associations, including the American College of Obstetricians and Gynecologists,⁴⁰⁸ California Medical Association,⁴⁰⁹ and the Institute for Reproductive Health Access.⁴¹⁰ For example, the American Medical Women’s

⁴⁰¹ *Partial-Birth Abortion Ban Ready for Vote*, WASH. TIMES (Sept. 30, 2003), <http://www.washingtontimes.com/news/2003/sep/30/20030930-113018-1410r/?page=all> [<http://perma.cc/T34Q-J298>].

⁴⁰² Ames Grawert, *The Fundamental Meaning of “Medical Uncertainty”: Judicial Deference to Selective Science in Gonzales v. Carhart*, 12 N.Y.U. J. LEGIS. & PUB. POL’Y 379, 383–84 (2009).

⁴⁰³ *Id.* at 384.

⁴⁰⁴ *Id.*

⁴⁰⁵ *Gonzales v. Carhart*, 413 F.3d 791 (8th Cir. 2005), *cert. granted*, 546 U.S. 1169 (2006).

⁴⁰⁶ Transcript of Oral Argument at 4:5–15, *Gonzales v. Planned Parenthood Fed’n of Am., Inc.*, 547 U.S. 1205 (2006) (No. 05-1382) (“But the problem with this is that there—well, some doctors absolutely agree. . . . [There] is doctor after doctor who takes the other position, and they say: Look, all that we’re doing here is trying to remove the fetus in a single pass . . . and the reason we’re trying to do that is if we don’t, there may be bone fragments left inside the womb.”).

⁴⁰⁷ *Id.* at 7:19–20, 12:22–23.

⁴⁰⁸ Brief of the Am. Coll. of Obstetricians & Gynecologists as Amicus Curiae Supporting Respondents, *Gonzales v. Carhart*, 550 U.S. 124 (2007) (Nos. 05-380, 1382), 2006 WL 2867888.

⁴⁰⁹ Brief of Cal. Med. Ass’n as Amicus Curiae Supporting Respondents, *Gonzales*, 547 U.S. 1205 (No. 05-1382), 2006 WL 2725689.

⁴¹⁰ Brief of the Inst. for Reprod. Health Access et al. as Amici Curiae in Support of Respondents, *Gonzales*, 547 U.S. 1205 (Nos. 05-380, 1382), 2006 WL 2736633.

Association and the American Public Health Association had argued to the Court as amici that the *Stenberg* Court had accurately evaluated the empirical evidence and “correctly recognized that an intact approach to D&E offers safety advantages for women.”⁴¹¹ The federal ban, according to these amici, was a thinly disguised

attempt[] to justify a ban on safe abortion procedures by imposing an artificial and unrealistic standard for judging safety that the surgical community does not impose on itself, and that as a practical matter can never be the sole standard by which surgeons judge the safety and health benefits of new procedures.⁴¹²

The Court should recognize that disregarding the medical evidence to ban an approved and safe procedure “unquestionably jeopardizes women’s health, with a veiled pretense of concern for safety.”⁴¹³

On April 18, 2007, the Supreme Court upheld the federal Partial-Birth Abortion Act.⁴¹⁴ Abortion opponents immediately heralded *Gonzales v. Carhart* as a victory,⁴¹⁵ believing that, after thirty years, the Court was finally dismantling the remaining abortion safeguards.⁴¹⁶ Many popular commentators entered the political fray as

⁴¹¹ Brief of the Am. Med. Women’s Ass’n et al. at 21, *Gonzales*, 547 U.S. 1205 (No. 05-1382), 2006 WL 273663.

⁴¹² *Id.* at 18.

⁴¹³ *Id.* at 20.

⁴¹⁴ *Gonzales v. Carhart*, 550 U.S. 124 (2007).

⁴¹⁵ For example, the National Review responded as follows:

Wednesday’s *Gonzales v. Carhart* decision upholding the federal partial-birth-abortion ban has been well received by pro-lifers. Indeed, the Judiciary has been a consistent thorn in the side of the pro-life movement and Supreme Court decisions that uphold pro-life laws should rightfully be applauded. More importantly, this decision demonstrates that the incremental strategy pursued by the pro-life movement continues to pay some real dividends. The ruling is a good indication pro-lifers would do well to continue this strategy of incrementalism in the future.

Michael J. New, *The I’s Have It: Three Cheers for Pro-life Incrementalism*, NAT’L REV. (Apr. 19, 2007, 6:30 AM), <http://www.nationalreview.com/article/220661/have-it-michael-j-new> [<http://perma.cc/WFZ5-4W8C>].

⁴¹⁶ The following public statement was issued on behalf of the Center for Reproductive Rights:

[W]e should assume that this is only the beginning. The Justices have shown their cards. Despite assurances that they would uphold precedents, the Court has now kicked open the door for states to impose broader restrictions on Roe, restrictions that will sacrifice women’s health for the sake of ideological gains.

Roberts Court Shows Its Cards: In a Stunning Reversal, Supreme Court Rules Against Women’s Health, in Favor of Abortion Restriction, CTR. FOR REPROD. RTS. (Apr. 18, 2007), <http://reproductiverights.org/press-room/roberts-court-shows-its-cards-in-a-stunning-reversal-supreme-court-rules-against-womens-h> [<http://perma.cc/K7BV-NM2E>].

self-proclaimed pro-choice or anti-abortion advocates. Others highlighted questions of judicial integrity by focusing on whether the newest members of the Court, Chief Justice Roberts and Justice Alito,⁴¹⁷ had falsely sworn during their recent confirmation hearings to uphold precedent and employ principles of *stare decisis*.⁴¹⁸

a. The Medical Evidence

Justice Kennedy's decision for the *Gonzales v. Carhart* majority began with detailed medical fact-finding:

The woman is placed under general anesthesia or conscious sedation. The doctor, often guided by ultrasound, inserts grasping forceps through the woman's cervix and into the uterus to grab the fetus. The doctor grips a fetal part with the forceps and pulls it back through the cervix and vagina, continuing to pull even after meeting resistance from the cervix. The friction causes the fetus to tear apart. For example, a leg might be ripped off the fetus as it

⁴¹⁷ At the time of his confirmation, then-Judge Alito devoted a significant amount of time to principles of *stare decisis*. In fact,

[h]is testimony opened with a long colloquy between him and Sen. Specter about *Casey*, its discussion of *stare decisis* and how that applies to the right to choose. Justice Alito, as he did throughout his testimony, carefully addressed the importance of precedent, but he consistently refused to discuss how the principles actually applied to a consideration of [the right at issue].

See Confirmation Hearing on the Nomination of Samuel A. Alito, Jr. to Be an Associate Justice of the Supreme Court of the United States: Hearing Before the S. Comm. on the Judiciary, 109th Cong. 943 (Jan. 9–13, 2006).

⁴¹⁸ The fact that Justice Alito had joined the *Gonzales v. Carhart* majority was not a surprise. Prior to his confirmation, the Center for Reproductive Rights had issued the following objection to his nomination:

While the Center does not normally take positions on judicial nominations, our review of Judge Alito's record and testimony has spurred us to submit this written testimony to express our grave concern over the impact Judge Alito would have on reproductive rights jurisprudence as an Associate Justice of the United States Supreme Court. Of particular concern are 1) Judge Alito's repeated refusal to discuss whether he still holds the view, as he expressed in his 1985 job application, that "the Constitution does not protect a right to an abortion"; 2) his refusal to agree that *Roe v. Wade* is "settled law"; and 3) his failure to explain satisfactorily his dissent in the Third Circuit's decision in *Planned Parenthood of Southeastern Pennsylvania v. Casey*. . . . Moreover, his testimony that *Roe v. Wade* is a precedent that is entitled to respect under the doctrine of *stare decisis* coupled with his refusal to state that *Roe* is "settled law," does not allay our concerns.

Id. at 937.

is pulled through the cervix and out of the woman. The process of evacuating the fetus piece by piece continues until it has been completely removed. A doctor may make 10 to 15 passes with the forceps to evacuate the fetus in its entirety⁴¹⁹

The majority's fact-finding echoed the congressional review of the medical evidence. In fact, Justice Kennedy explicitly stated that the Court's principal basis for distinguishing *Stenberg* was that Congress had found that "[a] moral, medical, and ethical consensus exists that the practice of performing a partial-birth abortion . . . is a gruesome and inhumane procedure that is never medically necessary and should be prohibited."⁴²⁰

Justice Ginsburg, writing for Justices Stevens, Souter, and Breyer, issued a powerful dissent. Referring to the decision as "alarming," she faulted the majority for: (1) "refus[ing] to take *Casey* and *Stenberg* seriously";⁴²¹ (2) "blur[ring] the line, firmly drawn in *Casey*, between previability and postviability abortions";⁴²² and (3) "for the first time since *Roe*, . . . bless[ing] a prohibition with no exception safeguarding a woman's health."⁴²³ The dissenters also attacked the Court's blind obeisance to "[t]he congressional findings on which the Partial-Birth Abortion Ban Act rests."⁴²⁴ The Court's fact-finding ignored the "thoroughgoing review of the trial evidence and the congressional record, [conducted by] each of the District Courts to consider the issue,"⁴²⁵ and the fact that every lower court had "rejected Congress's findings as unreasonable and not supported by the evidence."⁴²⁶

Justice Ginsburg also faulted the majority for fact-finding based on unreliable scientific theories from non-experts: "[N]one of the six physicians who testified before Congress had ever performed an intact D&E. Several did not provide abortion services at all; and one was not even an obgyn."⁴²⁷ On complex questions of medical fact, the Court was mistakenly relying on congressional testimony from doctors who admitted to having "no (or very little) recent and relevant experience with surgical abortions, and disregarded the views of doctors who had significant and relevant experience with those procedures"⁴²⁸ and rejecting the trial testimony of "'numerous' 'extraordinarily accomplished' and 'very experienced' medical experts [who] explained that, in certain circumstances and for certain women, intact D&E is safer than alternative procedures and necessary to protect women's health."⁴²⁹

⁴¹⁹ *Gonzales*, 550 U.S. at 135–36.

⁴²⁰ *Id.* at 141 (alterations in original).

⁴²¹ *Id.* at 170 (Ginsburg, J., dissenting).

⁴²² *Id.* at 171.

⁴²³ *Id.*

⁴²⁴ *Id.* at 174–75.

⁴²⁵ *Id.* at 178–79.

⁴²⁶ *Id.*

⁴²⁷ *Id.* at 175 (alteration in original) (quoting *Planned Parenthood Fed'n of Am. v. Ashcroft*, 320 F. Supp. 2d 957, 1019 (N.D. Cal. 2004)).

⁴²⁸ *Id.* (quoting *Carhart v. Ashcroft*, 331 F. Supp. 2d 805, 1011 (D. Neb. 2004)).

⁴²⁹ *Id.* at 177 (citing *Carhart*, 331 F. Supp. 2d at 1024–27).

b. The Psychological Evidence

Justice Kennedy also engaged in fact-finding on the psychological evidence. Without citing any empirical evidence, the majority found that it is “self-evident” that a mother’s mental health will be threatened when she “comes to regret her choice to abort [and] must struggle with grief . . . anguish[] and sorrow.”⁴³⁰ The psychological harm will be “more profound when she learns, only after the event, what she once did not know: that she allowed a doctor to pierce the skull and vacuum the fast-developing brain of her unborn child, a child assuming the human form.”⁴³¹ Under these circumstances, Justice Kennedy assumed, without support, that “[s]evere depression and loss of esteem can follow.”⁴³²

The dissenters’ response to the majority’s unsubstantiated psychological fact-finding was vitriolic. In Justice Ginsburg’s view, “the Court invoke[d] an antiabortion shibboleth for which it concededly has no reliable evidence: Women who have abortions come to regret their choices, and consequently suffer from ‘[s]evere depression and loss of esteem.’”⁴³³ In a purported effort to protect “women’s fragile emotional state,” the majority “deprive[d] women of the right to make an autonomous choice, even at the expense of their safety.”⁴³⁴ The dissenters specifically objected to the lack of an evidence base and to the majority’s outdated and gendered approach.⁴³⁵ Just seven years ago, *Casey* had confirmed that “[t]he destiny of the woman must be shaped . . . on her own conception of her spiritual imperatives and her place in society.”⁴³⁶ Now, under the guise of a seemingly “scientific theory” regarding mental health, the majority was advancing a “way of thinking [which] reflects ancient notions about women’s place in the family and under the Constitution—ideas that have long since been discredited.”⁴³⁷

C. Judicial Policy-Making Undermines Science and Science Policy

Linda Greenhouse is undoubtedly correct that “[h]ow the Supreme Court responds to facts offers a window on the current Court and its Justices.”⁴³⁸ In 2000, when the

⁴³⁰ *Id.* at 159 (majority opinion).

⁴³¹ *Id.* at 160. Perhaps Linda Greenhouse of the *New York Times* best described the decision when she wrote that it reflected the Court’s new view that “the procedure itself, not the pregnancy, threatened a woman’s health—mental health.” Linda Greenhouse, *Adjudging a Moral Harm to Women from Abortions*, N.Y. TIMES (Apr. 20, 2007), http://www.nytimes.com/2007/04/20/us/20assess.html?_r=0.

⁴³² *Gonzales*, 550 U.S. at 159.

⁴³³ *Id.* at 183 (Ginsburg, J., dissenting) (second alteration in original).

⁴³⁴ *Id.* at 183–84.

⁴³⁵ *See id.* at 170–71.

⁴³⁶ *Id.* at 185 (alterations in original) (quoting *Planned Parenthood of Se. Pa. v. Casey*, 505 U.S. 833, 852 (1992)).

⁴³⁷ *Id.* at 185.

⁴³⁸ Linda Greenhouse, *The Counter-Factual Court: Brandeis Lecture, Louis D. Brandeis School of Law, University of Louisville, March 5, 2008*, 47 U. LOUISVILLE L. REV. 1, 4 (2008).

Supreme Court decided *Stenberg*, the Court's implicit science law message was that most of the Justices, regardless of their personal views on the ethics of abortion, would consider the empirical data.⁴³⁹ The *Gonzales v. Carhart* message is entirely different. Science in the abortion context may now be supplanted with pseudoscientific assumptions from non-expert witnesses and unsubstantiated speculations from the Justices themselves.⁴⁴⁰ This blatant epistemic relativism cannot mask the Justices's partisan objectives.

Gonzales v. Carhart is also a clear victory for all post-*Edwards* "scientized" approaches to public policy debates involving questions of empirical fact. The decision reveals the power of a "scientized" anti-abortion approach that,

[i]nstead of simply lecturing about the moral evils of abortion, . . . increasingly depict[s] the procedure as damaging to women's health. And on a range of other issues . . . ha[s] similarly adopted the veneration of scientific and technical expertise instead of merely asserting their heartfelt beliefs. Their claims [include]—that abortion causes mental problems in women, that condoms aren't very effective in preventing HIV and other sexually transmitted diseases, [and] that adult stem cells have more research promise than embryonic ones⁴⁴¹

Over the past seven years, many commentators have criticized Justice Kennedy's paternalistic abortion jurisprudence.⁴⁴² But the Court's unscientific approach to questions of medicine and mental health transcend questions of reproductive rights.⁴⁴³

1. Anticipating Consequences

The Court's cavalier rejection of empirical information in *Gonzales v. Carhart* also supports Linda Greenhouse's concern that we now have a "counter-factual Court."⁴⁴⁴ Shortly after the case was decided, the *New England Journal of Medicine* published a detailed critique of the majority's willingness to "disregard the health of

⁴³⁹ See *Stenberg v. Carhart*, 530 U.S. 914, 920–21, 932 (2000).

⁴⁴⁰ See *supra* Part IV.B.2.b.

⁴⁴¹ Chris Mooney, *Research and Destroy: How the Religious Right Promotes Its Own "Experts" to Combat Mainstream Science*, WASH. MONTHLY (Oct. 2004), <http://www.washingtonmonthly.com/features/2004/0410.mooney.html> [<http://perma.cc/4DEF-7AGQ>].

⁴⁴² See, e.g., Elizabeth Kukura, *Choice in Birth: Preserving Access to VBAC*, 114 PENN ST. L. REV. 955, 981 (2010) ("Carhart is a devastating decision for advocates of reproductive freedom because it not only whittles away at the guarantee of health exceptions for the woman, but it also contains highly paternalistic language about the health and interests of a pregnant woman seeking an abortion.").

⁴⁴³ See *supra* Part IV.B.2.b.

⁴⁴⁴ Greenhouse, *supra* note 438, at 20.

pregnant women and the medical judgment of their physicians.”⁴⁴⁵ The authors also complained of barely shielded partisan contempt evidenced by the majority’s repeated reference to physicians as “unprincipled ‘abortion doctors.’”⁴⁴⁶ They also critiqued the majority for “infantilizing pregnant women as incapable of making serious decisions about their lives and health.”⁴⁴⁷

Inaccurate fact-finding in science-dependent cases alters the scope and operation of legal standards. In effect, *Gonzales v. Carhart* redefined the preexisting “significant body of medical opinion” standard by deeming it satisfied by the proffered evidence. Because Justice Kennedy freely admitted that the Court could “find no reliable data to measure the phenomenon” of post-abortion mental trauma,⁴⁴⁸ his mental health fact-finding is especially problematic. The majority’s conclusion that a mother will “come[] to regret her choice to abort [and] must struggle with grief . . . anguish[] and sorrow”⁴⁴⁹ and that “[s]evere depression and loss of esteem can follow”⁴⁵⁰ were “self-evident.”⁴⁵¹ A self-evident scientific conclusion is—like gravity—widely accepted and easily tested. It is not—like post-abortion depression—empirically unsupported. Even at the time,

[m]ultiple scientific studies ha[d] rejected the claim that a “post-abortion syndrome” threatens the mental health of women who have abortions. A study by the American Psychiatric Association reported that seventy-six percent of women report feeling relief at having terminated an unwanted pregnancy, and concluded that abortion “does not pose a psychological hazard for most women.” . . . In fact, . . . “there is evidence that positive psychological changes occur as a result of abortions,” including “feelings of increased self-directedness, autonomy, and efficiency.”⁴⁵²

Yet the Court “seemed not to care that medical authority had debunked the theory of a ‘post-abortion syndrome.’”⁴⁵³

Gonzales v. Carhart provides a worrisome template for future “scientized” abortion debates inside and outside the courts. As the Alan Guttmacher Institute reported on February 1, 2015, most current and pending abortion restrictions similarly purport to address medical concerns and advance maternal health and safety interests by requiring

⁴⁴⁵ George J. Annas, *The Supreme Court and Abortion Rights*, 356 NEW ENG. J. MED. 2201, 2205 (2007).

⁴⁴⁶ *Id.*

⁴⁴⁷ *Id.*

⁴⁴⁸ *Gonzales v. Carhart*, 550 U.S. 124, 159 (2007).

⁴⁴⁹ *Id.*

⁴⁵⁰ *Id.*

⁴⁵¹ *See id.* at 185 (Ginsburg, J., dissenting).

⁴⁵² Greenhouse, *supra* note 438, at 13 (footnotes omitted).

⁴⁵³ Borgmann, *supra* note 298, at 28.

abortions to be performed: (1) by a licensed physician; (2) in a hospital; (3) with the involvement of a second physician; or (4) only to protect the woman's life or health.⁴⁵⁴ Some states also purport to advance maternal mental health interests by mandating pre-abortion counseling on the purported link between abortion and breast cancer and post-abortion trauma.⁴⁵⁵ To win in the courts, with the media, and with the public after *Gonzales v. Carhart*, abortion opponents will continue to focus on the science, to "talk more narrowly about the unpleasant details of abortion,"⁴⁵⁶ and to ignore the overwhelmingly empirical evidence.

CONCLUSION: A BETTER PATH FORWARD

The legacy of the anti-evolution movement is that many current and future science-based legal controversies will appear to be a battle of competing scientists.⁴⁵⁷

A. Four Recent Decision-Making Insights

If you've made your way here to the end, it should come as no surprise that there is no quick fix or simple solution to the problem of inaccurate judicial fact-finding about the natural world and human behavior. Justices of the Supreme Court have lifetime tenure, expansive authority, unconstrained access to increasingly extensive amicus filings and the internet, and a firm commitment to opaque and even secret decision-making. Under these circumstances, only a naïve observer would anticipate the advent of formal judicial decision-making constraints. Instead, this analysis concludes by practicing what it preaches, using new empirical information from a range of relevant research fields. In a more perfect world, these innovations could enhance judicial fact-finding by enlightening the Court regarding decision-making impediments. In the real world, these fields are more likely to provide ongoing insights for scholars and commentators.

1. The Role of the Media

When judges engage in extralegal fact-finding, especially when they seek independent evidence online or from other media sources, they should better anticipate misrepresentations of "scientific" information, critique, and debate.

⁴⁵⁴ *State Policies in Brief: An Overview of Abortion Laws*, *supra* note 69.

⁴⁵⁵ *Id.*

⁴⁵⁶ Sanneh, *supra* note 394.

⁴⁵⁷ See, e.g., Michael J. Behe, Opinion, *Design for Living*, N.Y. TIMES (Feb. 7, 2005), <http://www.nytimes.com/2005/02/07/opinion/07behe.html> (explaining why Intelligent Design is merely a scientific critique of evolution).

The most pervasive media problem is the ubiquitous presentation of “balanced” views on virtually every question of natural or social science.⁴⁵⁸ This creates a false impression of empirical equivalence even when the evidence for one explanation or theory is overwhelming.

To cite an example from outside the scientific fields discussed herein, child abuse kills over 1,600 children every year.⁴⁵⁹ Most child abuse victims are infants less than one year old, and abusive head trauma inflicted on infants by shaking, or shaking plus impact injury, is the most common form of fatal child infant abuse.⁴⁶⁰ There is overwhelming scientific support for the fact that shaking an infant can be fatal.⁴⁶¹ According to the Centers for Disease Control and Prevention, “[a]busive head trauma is the leading cause of physical child abuse deaths in the United States,”⁴⁶² because “vigorously shaking a baby can be fatal.”⁴⁶³ The Mayo Clinic defines “Shaken Baby Syndrome” as “a form of child abuse that can result in permanent brain damage or death,”⁴⁶⁴ and every international and domestic medical organization that has issued a formal statement on the topic has emphasized the serious risk of infant brain trauma or death from shaking.⁴⁶⁵ However, despite overwhelming scientific support

⁴⁵⁸ Katrina vanden Heuvel, Opinion, *The Distorting Reality of ‘False Balance’ in the Media*, WASH. POST (July 15, 2014), http://www.washingtonpost.com/opinions/katrina-vanden-heuvel-the-distorting-reality-of-false-balance-in-the-media/2014/07/14/6def5706-0b81-11e4-b8e5-d0de80767fc2_story.html [<http://perma.cc/Y7UA-NZDK>] (describing the problem of “[f]alse equivalence in the media—giving equal weight to unsupported or even discredited claims for the sake of appearing impartial”).

⁴⁵⁹ U.S. DEP’T OF HEALTH & HUM. SERVS., CHILD MALTREATMENT 2013, 54–55 (2013), <http://www.acf.hhs.gov/sites/default/files/cb/cm2013.pdf> [<http://perma.cc/858Z-S54P>].

⁴⁶⁰ Sabine A. Maguire et al., *Estimating the Probability of Abusive Head Trauma: A Pooled Analysis*, 128 PEDIATRICS e550, e551 (2011).

⁴⁶¹ Over the past four decades, Abusive Head Trauma/Shaken Baby Syndrome has been well documented in the peer-reviewed medical literature. The research supporting this diagnosis includes: (1) two medical treatises; (2) at least fourteen chapters in medical treatises; (3) over seven hundred peer-reviewed clinical medical articles published by over one thousand medical authors from at least twenty-eight countries; (4) at least eight systematic reviews of the medical literature; (5) at least fifteen controlled trials; (6) at least fifty comparative cohort studies or prospective case series; and (7) numerous well-designed retrospective case series/reports comprising thousands of cases. See Sandeep Narang, *A Daubert Analysis of Abusive Head Trauma/Shaken Baby Syndrome*, 11 HOUS. J. HEALTH L. & POL’Y 505, 539–40 (2011).

⁴⁶² *Preventing Abusive Head Trauma in Children*, CENTERS FOR DISEASE CONTROL & PREVENTION, <http://www.cdc.gov/violenceprevention/childmaltreatment/abusive-head-trauma.html> [<http://perma.cc/E3PB-H7GP>] (last updated Aug. 10, 2015).

⁴⁶³ *A Journalist’s Guide to Shaken Baby Syndrome: A Preventable Tragedy*, CENTERS FOR DISEASE CONTROL & PREVENTION, http://www.cdc.gov/concussion/pdf/sbs_media_guide_508_optimized-a.pdf [<http://perma.cc/9V79-XBLP>].

⁴⁶⁴ *Shaken Baby Syndrome, Definition*, MAYO CLINIC (Oct. 18, 2014), <http://www.mayoclinic.org/diseases-conditions/shaken-baby-syndrome/basics/definition/con-20034461> [<http://perma.cc/M4FJ-Q3FP>].

⁴⁶⁵ See ROYAL COLL. PAEDIATRICS & CHILD HEALTH, ABUSIVE HEAD TRAUMA AND THE EYE IN INFANCY (2013), <https://www.rcophth.ac.uk/wp-content/uploads/2014/12/2013-SCI>

and near-consensus in the relevant medical community of pediatric healthcare, the media frequently mischaracterizes “Shaken Baby Syndrome” as a flawed diagnosis and a scientific controversy dividing the medical field.⁴⁶⁶ A similar recent report in the *Columbia Journalism Review* addressed the problem of a false scientific media balance in coverage of climate science.⁴⁶⁷

-292-ABUSIVE-HEAD-TRAUMA-AND-THE-EYE-FINAL-at-June-2013.pdf [http://perma.cc/8V6Y-378A]; *Abusive Head Trauma (Shaken Baby Syndrome)*, AM. ACAD. PEDIATRICS, <https://www.aap.org/en-us/about-the-aap/aap-press-room/aap-press-room-media-center/Pages/Abusive-Head-Trauma-Fact-Sheet.aspx> [http://perma.cc/N9A2-UBZW]; *Abusive Head Trauma/Shaken Baby Syndrome—2015*, AM. ACAD. OPHTHALMOLOGY (Mar. 2015), <http://www.aao.org/clinical-statement/abusive-head-traumashaken-baby-syndrome--june-2010> [http://perma.cc/69G9-2ZK8]; Sherry Boschert, *Recognize the Red Flags of Child Abuse*, AM. C. EMERGENCY PHYSICIANS (Dec. 2011), [http://www.acep.org/MobileArticle.aspx?id=82881&\[http://perma.cc/DGU4-WJQB\]](http://www.acep.org/MobileArticle.aspx?id=82881&[http://perma.cc/DGU4-WJQB]); *Fragile Brain, Handle with Care*, WORLD HEALTH ORG. (May 2009), <http://www.who.int/bulletin/volumes/87/5/09-030509/en/> [http://perma.cc/7LCR-32UJ]; *Joint Statement on Shaken Baby Syndrome*, CANADIAN PEDIATRIC SOC. (Sept. 1, 2005), <http://www.cps.ca/documents/position/shaken-baby-syndrome> [http://perma.cc/GX4A-ZWY8]; Charles Kodner & Angela Wetherton, *Diagnosis and Management of Physical Abuse in Children*, 88 AM. FAM. PHYSICIAN 669, 670 (Nov. 2013), <http://www.aafp.org/afp/2013/1115/p669.html> [http://perma.cc/E7WX-4P9F]; *Shaken Baby Syndrome*, AM. ASS’N NEUROLOGICAL SURGEONS (Nov. 2005), <http://www.aans.org/patient%20information/conditions%20and%20treatments/shaken%20baby%20syndrome.aspx>; *Shaken Baby Syndrome*, AM. ASS’N PEDIATRIC OPHTHALMOLOGY & STRABISMUS, <http://www.aapos.org/terms/conditions/97> [http://perma.cc/3DW3-KB25] (last updated Nov. 2014).

⁴⁶⁶ See Deborah Tuerkheimer, Opinion, *Anatomy of a Misdiagnosis*, N.Y. TIMES (Sept. 20, 2010), http://www.nytimes.com/2010/09/21/opinion/21tuerkheimer.html?_r=1&pagewanted=print. Professor Findley recently appeared with Ms. Edmunds on a television program hosted by news journalist Katie Couric to proclaim Ms. Edmunds’s “innocence” and promote the false AHT/SBS “controversy.” See *Katie Couric: Falsely Accused: Innocent Behind Bars* (television broadcast Dec. 10, 2012), <http://sexoffenderissues.blogspot.com/2012/12/katie-couric-falsely-accused-innocent.html> [http://perma.cc/QN3Y-UU54]; see also Emily Bazelon, *Shaken*, N.Y. TIMES (Feb. 6, 2011), <http://query.nytimes.com/gst/fullpage.html?res=9904E2DD1339F935A35751C0A9679D8B63&pagewanted=all&smid=pl-share>; Richard Ruelas, *New Doubts in “Shaken Baby” Fatalities*, REPUBLIC (Sept. 15, 2012, 10:53 PM), <http://www.azcentral.com/news/articles/20120904shaken-baby-fatalities-doubts.html> [http://perma.cc/P4KW-XJGJ]; Maia Szalavitz, *The Shaky Science of Shaken Baby Syndrome*, TIME (Jan. 17, 2012), <http://healthland.time.com/2012/01/17/the-shaky-science-of-shaken-baby-syndrome/> [http://perma.cc/E9TP-QLR4]. Indeed, several articles have appeared more recently in response to the *Smith* dissent. See, e.g., Emily Bazelon, *A Vindictive Decision: The Supreme Court Sends a Grandmother Back to Prison to Teach the 9th Circuit a Lesson*, SLATE (Nov. 28, 2011, 4:58 PM), http://www.slate.com/articles/news_and_politics/jurisprudence/2011/11/shaken_baby_syndrome_and_the_supreme_court_single.html [http://perma.cc/XN4F-NB4H]; A.C. Thompson & Joseph Shapiro, *New Evidence in High Profile Shaken Baby Case*, NPR, <http://www.npr.org/2012/03/29/149576627/new-evidence-in-high-profile-shaken-baby-case> (last updated Apr. 17, 2012, 4:31 PM); Carol J. Williams, *A Pawn in a Legal Chess Match*, L.A. TIMES (Dec. 16, 2010), <http://articles.latimes.com/2010/dec/16/local/la-me-1216-shaken-baby-verdict-20101216> [http://perma.cc/49HK-9QE2].

⁴⁶⁷ Robert S. Eshelman, *The Danger of Fair and Balanced*, 52 COLUM. JOURNALISM REV.

Journalists who report on science “should treat fringe scientific claims with considerable skepticism, and find out what major peer-reviewed papers or assessments have to say about them.”⁴⁶⁸ But because this generally does not occur, judges should be wary. According to Professor Larsen, when judges supplement the record with their own independent research, “[i]t is not easy [for them] to evaluate the significance of scientific claims, not to mention the validity of methods employed,”⁴⁶⁹ especially because “[v]ery few members of the judiciary have prior experience in scientific fields.”⁴⁷⁰ Well-intentioned journalists suffer from the same deficits. When reporters fail to investigate the validity and evidence base of competing scientific claims, it is frequently attributable to the fact that “determining how much weight to give different sides in a scientific debate requires considerable expertise on the issue at hand . . . [and] [f]ew journalists have real scientific knowledge.”⁴⁷¹ Media misinformation is not limited to the internet or even to mainstream media. A 2011 study of 1,500 medical articles found that journalists generally fail to include information regarding sources and potential conflicts of interest.⁴⁷²

2. Incomplete Information

Judges should better understand the overt and covert effects of decision-making based on incomplete information. Most questions of natural and social science require courts to either accept or reject arguments about causation. In research conducted by Dr. Frank C. Keil, Director of the Yale Cognition and Development Lab, found that “[p]eople of all ages tend to be miscalibrated with respect to their explanatory understandings; that is, they think they understand in far more detail than they really do how some aspect of the world works or why some pattern in the world exists,”⁴⁷³ and that in order “[t]o assess how well people deal with causal complexity . . . one must first know when one is in over one’s head.”⁴⁷⁴

52 (2014), http://www.cjr.org/essay/the_danger_of_fair_and_balance.php?page=all [<http://perma.cc/EG3N-8YK5>].

⁴⁶⁸ Chris Mooney, *Blinded by Science: How “Balanced” Coverage Lets the Scientific Fringe Hijack Reality*, DISCOVER MAG.: THE INTERSECTION (Jan. 15, 2010, 9:13 AM), <http://blogs.discovermagazine.com/intersection/2010/01/15/blinded-by-science-how-balanced-coverage-lets-the-scientific-fringe-hijack-reality/#.VOOFBVPF9XY> [<http://perma.cc/L8YN-LJMD>].

⁴⁶⁹ Larsen, *supra* note 17, at 1298.

⁴⁷⁰ *Id.*

⁴⁷¹ Mooney, *supra* note 468.

⁴⁷² Curtis Brainard, *Mixed Grades for Medical Coverage*, COLUM. JOURNALISM REV. (Apr. 22, 2011), http://www.cjr.org/the_observatory/mixed_grades_for_med_coverage.php?page=all [<http://perma.cc/U8BC-BCJ6>].

⁴⁷³ Frank C. Keil, *Explanation and Understanding*, 57 ANN. REV. PSYCHOL. 227 (2006), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3034737/>.

⁴⁷⁴ Frank C. Keil, *Getting to the Truth: Grounding Incomplete Knowledge*, 73 BROOK. L. REV. 1035, 1037 (2008).

New cognitive science research suggests that judges, like everyone else, are ignorant of their own ignorance. When judges engage in decisions about the natural world or human behavior, they “must have a way of sensing when there are gaps in one’s knowledge that make one’s understanding so flawed that it is inadequate for use in a task.”⁴⁷⁵ Or in the now famous words of Donald Rumsfeld: “As we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say, we know there are some things we do not know. But there are also unknown unknowns—the ones we don’t know we don’t know.”⁴⁷⁶ If courts better learn to anticipate unknown unknowns, they should become more skeptical about the validity of their assumptions. Judges can also respond to fact-finding demands proactively by seeking guidance on knowledge gaps. For example, the Justices and all other federal judges can seek neutral expert assistance under Federal Rule of Evidence 706.⁴⁷⁷

3. Logical Fallacies

Judges should prepare to encounter new scientific theories and scientific critiques that rely on logical fallacies, including exaggerated uncertainty and false dichotomies. According to Professor Ceccarelli, the fallacy of exaggerated uncertainty taints public debate by suggesting that manufactured controversies have legitimate scientific bona fides.⁴⁷⁸

Scholars outside the field of rhetorical inquiry who have studied this tactic have told us a great deal about the use and misuse of scientific uncertainty in the public sphere. For example, epidemiologist David Michaels details a number of cases where industries have deployed a strategy he calls “manufacturing uncertainty” in which “mercenary scientists” are hired to skillfully turn “what should be a debate over policy into a debate over science.”⁴⁷⁹

This logical fallacy is routinely deployed to support anti-evolution arguments that the scientific theory fails to account for species diversification and complexity.⁴⁸⁰ Similarly, exaggerated uncertainty about maternal medical risks are frequently

⁴⁷⁵ *Id.*

⁴⁷⁶ Richard Cohen, Opinion, *Donald Rumsfeld’s Battle with Truth*, WASH. POST (Apr. 7, 2014), http://www.washingtonpost.com/opinions/richard-cohen-donald-rumsfelds-battle-with-truth/2014/04/07/e2ee3928-be7e-11e3-b195-dd0c1174052c_story.html [<http://perma.cc/7M4T-PV5A>].

⁴⁷⁷ FED. R. EVID. 706.

⁴⁷⁸ Ceccarelli, *supra* note 107, at 197.

⁴⁷⁹ *Id.*

⁴⁸⁰ *See supra* Part II.C–D.

advanced to restrict abortion access. For example, on January 7, 2015, the Fifth Circuit heard argument on a new Texas statute⁴⁸¹ limiting abortions to clinics that conform to hospital standards.⁴⁸² According to a joint amicus brief filed by the American Medical Association and the American College of Obstetricians and Gynecologists, “abortion is a very safe procedure only rarely resulting in hospitalization.”⁴⁸³ Accordingly, this new law depends on the logical fallacy of an exaggerated uncertainty regarding the dangers of clinic-based procedures and procedures performed by medical professionals who lack specific hospital admitting privileges.⁴⁸⁴

Judges should also seek to avoid the logical trap of the false dichotomy. In anti-evolution arguments, this fallacy is sometimes described as the “two-model approach.” The two-model approach posits that critique of one theory serves as proof of a competing theory.⁴⁸⁵ The false dichotomy presumes the existence of only two possible explanatory theories.⁴⁸⁶ It also presumes that scientific theories offer complete and mutually exclusive explanations of natural phenomena or human behavior.⁴⁸⁷ It is a logical fallacy that “bears no relation to scientific reasoning, and stifles scientific inquiry.”⁴⁸⁸ Scientific inquiry is not a zero-sum game. The misleading suggestion that all critique invariably does double duty as proof ignores the possibility of a partial but accurate explanation and “denies the possibility that empirical observation may suggest new theories of even greater explanatory force.”⁴⁸⁹ Data inconsistent with the current formulation of a scientific theory is just that; in itself, it offers no legitimate support for any competing explanation.

A false dichotomy is also frequently deployed to advance the argument that proponents of evolution or reproductive rights are atheists or anti-theists. This question has been addressed at great length by Richard Dawkins, among others.⁴⁹⁰

⁴⁸¹ H.B. 2, 83rd Leg., 2d Spec. Sess. (Tex. 2013), <https://legiscan.com/TX/text/HB2/id/872841/Texas-2013-HB2-Enrolled.html> [<http://perma.cc/Q3VW-WKUD>].

⁴⁸² Jennifer Ludden, *U.S. Court Weighs Texas Law’s Burden on Women Seeking Abortions*, NPR, <http://www.npr.org/2015/01/07/375396952/u-s-court-weighs-texas-laws-burden-on-women-seeking-abortions> (last updated Jan. 7, 2015, 12:35 PM).

⁴⁸³ Brief of the Am. Coll. of Obstetricians & Gynecologists & Am. Med. Ass’n as Amici Curiae Supporting Plaintiffs-Appellees-Cross-Appellants, *Whole Woman’s Health v. Cole*, 790 F.3d 563 (5th Cir. 2015) (No. 14-50928), 2014 WL 6865861, at *12.

⁴⁸⁴ Michelle Goldberg, *The Uncertain Science of Fetal Pain*, DAILY BEAST (June 19, 2013, 4:45 AM), <http://www.thedailybeast.com/witw/articles/2013/06/19/the-uncertain-science-of-fetal-pain.html> [<http://perma.cc/RC7R-MABQ>]. On June 5, 2015, the Fifth Circuit upheld the law. *Whole Woman’s Health*, 790 F.3d 563.

⁴⁸⁵ See Brief for the Nat’l Acad. of Scis., *supra* note 186, at *5.

⁴⁸⁶ *Id.*

⁴⁸⁷ *Id.* at *16.

⁴⁸⁸ *Id.*

⁴⁸⁹ *Id.*

⁴⁹⁰ See generally RICHARD DAWKINS, *THE GOD DELUSION* (2006); MICHAEL RUSE, *EVOLUTION AND RELIGION: A DIALOGUE* (2008).

The National Academy of Sciences has specifically responded to this false dichotomy with a public statement that “science and religion are separate and address aspects of human understanding in different ways [so] [a]ttempts to pit science and religion against each other create controversy where none needs to exist.”⁴⁹¹ More recently, the “Clergy Letter Project” has been endorsed by over thirteen thousand Christian, Jewish, Unitarian, and Buddhist leaders.⁴⁹² The Clergy Project urges that the teaching of evolution is consistent with all faiths and urges the rejection of Intelligent Design, which “embrace[s] scientific ignorance and transmit[s] such ignorance to our children.”⁴⁹³

4. The Science of Science Communication

Research from behavioral economics and communication science also provides useful new insight into judicial fact-finding on questions of natural phenomena. For example, in April 2014, Professor Brendan Nyhan published the results of a three-year study on the effect of providing accurate scientific information to parents who were deciding whether to vaccinate their children.⁴⁹⁴ He found that parents who began the study with mixed or negative feelings toward vaccines and were provided with accurate information about benefits and risk “actually became *less* likely to say they would vaccinate a future child after receiving information debunking the myth that vaccines cause autism.”⁴⁹⁵ Professor Nyhan’s research suggests that simply providing decision makers with accurate scientific information may be insufficient to overcome conscious and unconscious emotional reactions. Judges savvy about this new research might focus greater attention on the distorting effects of emotional and normative appeals.

Other recent behavioral economics research challenges traditional assumptions about the influence of accurate scientific information. In a study published in 2014, Professor Dan Kahan was surprised to find that an accurate understanding of scientific principles was a poor predictor of a person’s beliefs about evolution and natural selection.⁴⁹⁶ In this study, “profession of ‘belief in’ evolution ha[d] no correlation with

⁴⁹¹ NAT’L ACAD. SCIS. & INST. MED., SCIENCE, EVOLUTION, AND CREATIONISM 12 (2008).

⁴⁹² *Welcome to the Clergy Letter Project*, CLERGY LETTER PROJECT, <http://www.theclergyletterproject.org/> [<http://perma.cc/P4KA-TY2D>].

⁴⁹³ *The Clergy Letter—from American Christian Clergy—An Open Letter Concerning Religion and Science*, CLERGY LETTER PROJECT, http://www.theclergyletterproject.org/Christian_Clergy/ChrClergyLtr.htm [<http://perma.cc/M6X3-FZZ5>].

⁴⁹⁴ Brendan Nyhan, *Effective Messages in Vaccine Promotion: A Randomized Trial*, 133 PEDIATRICS e835 (2014), <http://www.dartmouth.edu/~nyhan/vaccine-misinformation.pdf> [<http://perma.cc/56T6-62UX>].

⁴⁹⁵ Brendan Nyhan, *Vaccine Opponents Can Be Immune to Education*, N.Y. TIMES (May 8, 2014), <http://www.nytimes.com/2014/05/09/upshot/vaccine-opponents-can-be-immune-to-education.html?abt=0002&abg=0> (emphasis added).

⁴⁹⁶ Dan M. Kahan, *Climate-Science Communication and the Measurement Problem*, 36 ADVANCES POL. PSYCHOL. Suppl. 1, 3 (2015).

an *understanding* of basic evolutionary science.”⁴⁹⁷ According to Professor Kahan, “[i]ndividuals who say they ‘believe’ are no more likely than those who say they ‘don’t’ to give the correct responses to questions pertaining to natural selection, random mutation, and genetic variance—the core elements of the modern synthesis.”⁴⁹⁸ In contrast, religious beliefs were a good predictor. In fact, Professor Kahan found that “belief in evolution between more and less religious people is *wider* among people who otherwise show familiarity with math and science.”⁴⁹⁹ This led him to conclude that “the problem isn’t a lack of information. . . . In other words, religious people knew the science; they just weren’t willing to say that they believed in it.”⁵⁰⁰

Given these new insights into previously unrecognized decision-making impediments and the information overload of a digital world, judges could become more sophisticated consumers of information about the natural world and human behavior. In the prescient words of Stephen Colbert:

Truthiness is tearing apart our country, and I don’t mean the argument over who came up with the word. I don’t know whether it’s a new thing, but it’s certainly a current thing, in that it doesn’t seem to matter what facts are. It used to be, everyone was entitled to their own opinion, but not their own facts. But that’s not the case anymore. Facts matter not at all. Perception is everything.⁵⁰¹

As scientific-sounding arguments continue to be deployed inside and outside the courthouse to advance a range of partisan or normative objects, a jurisprudence of truthiness equating empirical information with belief or speculation damns us to scientific ignorance and engenders legal and public policies based on faith, not facts.

⁴⁹⁷ *Id.*

⁴⁹⁸ *Id.*

⁴⁹⁹ Brendan Nyhan, *When Beliefs and Facts Collide*, N.Y. TIMES (July 5, 2014), <http://www.nytimes.com/2014/07/06/upshot/when-beliefs-and-facts-collide.html?abt=0002&abg=0> (“Mr. Kahan’s study suggests that more people know what scientists think about high-profile scientific controversies than polls suggest; they just aren’t willing to endorse the consensus when it contradicts their political or religious views.”).

⁵⁰⁰ *Id.*

⁵⁰¹ Nathan Rabin, *Stephen Colbert*, A.V. CLUB (Jan. 25, 2006, 1:26 PM), <http://www.avclub.com/article/stephen-colbert-13970> [<http://perma.cc/8XZ7-R9Z9>].

