

Evaluating Corporate Speech About Science

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How should courts evaluate the truth or falsity of corporate speech about science? This question is critical to antifraud actions like the ongoing state investigations into whether ExxonMobil misrepresented scientific knowledge regarding global climate change. ExxonMobil claims that these investigations chill scientific inquiry and burden speech on a matter of public concern in violation of the First Amendment. Of course, the notion that scientific progress depends on the free exchange of ideas is not controversial. But even if the free-market approach to scientific discourse has firm foundations, this Article suggests that it is a misguided approach to the question of when corporate speech about science is misleading.

Too often, courts and commentators assume the truth of corporate speech about science, an assumption that inevitably results in First Amendment scrutiny. The reluctance to analyze the truth of such speech is understandable given the nature of scientific knowledge itself. Scientific knowledge is not easily described in terms of truth or falsity. But corporate speech that uses the inherent uncertainty of scientific inquiry to mischaracterize scientific knowledge is not participating in scientific discourse. Moreover, when courts treat such speech as part of a larger scientific debate, they threaten to undermine the deterrent function of antifraud laws and shift the costs of misleading speech onto the public.

This Article is the first to offer an analytical approach to the question of whether corporate speech about science is misleading. The central argument is that courts should consider a number of context-specific factors in determining whether such speech is misleading. These factors include the costs and benefits of the speech, as well as the regulatory context, cognitive biases, and cultural values that shape how recipients understand the speech. The Article concludes with a discussion of how the First Amendment would apply to commercial and corporate speech about science once the threshold question of misleadingness is resolved.

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INTRODUCTION

In March 2016, several state attorneys general announced that they would use their investigative powers under state antifraud laws to determine whether

ExxonMobil misrepresented the risks of climate change in its public statements and financial disclosures.¹ The investigations were prompted in part by journalistic investigations claiming to have uncovered evidence that ExxonMobil's own scientific research had substantiated claims of global warming and its likely impacts on surface and ocean temperatures, sea ice melt, and sea level rise.² These sources claimed that ExxonMobil knew that the burning of fossil fuels was responsible for global warming as early as the 1980s but nevertheless engaged in a deliberate campaign to convince the public that this link was uncertain and unsupported by scientific research.³

Polls show that no issue polarizes the American electorate more than climate change.⁴ It is unsurprising then that the ExxonMobil investigations, led by attorneys general in majority Democratic states, such as New York, Massachusetts, and California, generated a polarized and contentious response from commentators.⁵ Libertarian and conservative commentators decried the investigations as an assault on the fundamental freedom of speech and a gross abuse of the states' police power.⁶ Liberal and progressive commentators characterized the investigation as a long overdue effort to hold ExxonMobil accountable for its deliberate attempts to mislead the public and investors about the scientific consensus regarding anthropogenic climate change.⁷ The two sides of the debate agree on little. What ExxonMobil characterizes as political opinion, others characterize as factual statements. When ExxonMobil warns that these investigations could suppress scientific research and debate, critics draw comparisons to tactics used by the tobacco industry to propagate widespread public doubt about the health risks of smoking despite overwhelming scientific evi-

1. See John Schwartz, *Exxon Mobil Climate Change Inquiry in New York Gains Allies*, N.Y. TIMES (Mar. 29, 2016), <https://www.nytimes.com/2016/03/30/science/new-york-climate-change-inquiry-into-exxon-adds-prosecutors.html> [<https://nyti.ms/1qfnSky>].

2. See Neela Banerjee et al., *Exxon's Own Research Confirmed Fossil Fuels' Role in Global Warming Decades Ago*, INSIDECLIMATE NEWS (Sept. 16, 2015), <https://insideclimatenews.org/news/15092015/Exxons-own-research-confirmed-fossil-fuels-role-in-global-warming> [<https://perma.cc/5BSG-9MES>]; Sara Jerving et al., *What Exxon Knew About the Earth's Melting Arctic*, L.A. TIMES (Oct. 9, 2015), <http://graphics.latimes.com/exxon-arctic> [<https://perma.cc/XLS9-BY26>].

3. See Banerjee et al., *supra* note 2; David Hasemyer & John H. Cushman Jr., *Exxon Sowed Doubt About Climate Science for Decades by Stressing Uncertainty*, INSIDECLIMATE NEWS (Oct. 22, 2015), <https://insideclimatenews.org/news/22102015/Exxon-Sowed-Doubt-about-Climate-Science-for-Decades-by-Stressing-Uncertainty> [<https://perma.cc/K7GH-72EH>].

4. See Seth Borenstein, *Divided America: Temperatures Rise, US Splits*, ASSOCIATED PRESS (Aug. 15, 2016), <http://bigstory.ap.org/article/ce7583314867404485a310255546f647/divided-america-global-warming-polarizes-more-abortion> [<https://perma.cc/EK2N-UMNF>].

5. See HANS VON SPAKOVSKY & NICOLAS LORIS, HERITAGE FOUND., *THE CLIMATE CHANGE INQUISITION: AN ABUSE OF POWER THAT OFFENDS THE FIRST AMENDMENT AND THREATENS INFORMED DEBATE* 1, 4–5, 9 (2016), <http://thf-reports.s3.amazonaws.com/2016/LM-193.pdf> [<https://perma.cc/H4NY-HNRN>].

6. See, e.g., *id.*, at 3, 10.

7. See, e.g., Laura Barrón-López, *Bernie Sanders Wants DOJ to Investigate 'Potential Fraud' by Exxon Over Climate Research*, HUFFINGTON POST (Oct. 20, 2015, 6:29 PM), http://www.huffingtonpost.com/entry/bernie-sanders-exxon-investigation_us_5626a0cce4b08589ef496854 [<https://perma.cc/UM8C-QF5E>].

dence of those risks.⁸

Overshadowed by the vitriolic debate regarding climate policy are real and unresolved questions about when corporate speech about scientific knowledge can be the basis of a fraud action. Courts routinely struggle to assess the truth or falsity of corporate speech about science. Because they lack a coherent doctrinal approach to the threshold question of whether speech is false or misleading, courts sometimes assume that speech is true when supported by *any* scientific evidence,⁹ or alternatively, that the speech does not make factual assertions and is therefore outside the reach of antifraud laws and protected by the First Amendment.¹⁰

To bring clarity to these issues, this Article develops an approach to evaluating corporate speech about science under antifraud laws that addresses varied concerns, such as false advertising, securities regulation, unfair competition, and consumer protection. Despite the importance of this initial question, commentators have not given it much attention, focusing instead on the First Amendment implications of presumably true speech.¹¹ Once the threshold question of truth is resolved properly, courts can more accurately resolve questions about when and how the First Amendment applies to misleading corporate speech about science.

The Article unfolds in four Parts. Part I uses climate science and the ExxonMobil investigations to illustrate the challenges in prosecuting misleading corporate speech about scientific knowledge. It begins with background information on the scientific consensus regarding human-caused climate change and then turns to an overview of the state investigations into if and when ExxonMobil misrepresented scientific knowledge about climate change. These investigations are based on state consumer protection and securities laws that give state attorneys general expansive investigative powers and expose corporations to liability for misleading speech that would not constitute common law fraud. The relatively low threshold for liability may raise First Amendment concerns about chilling protected speech and selective prosecution. Moreover, the nature of scientific knowledge complicates the application of these laws. Scientific knowledge is unlike other forms of knowledge: it is inherently contingent and open to revision. If this intrinsic uncertainty undermines our ability to assess the truth or

8. See, e.g., Bill McKibben, *Exxon's Climate Lie: 'No Corporation Has Ever Done Anything This Big or Bad.'* GUARDIAN (Oct. 14, 2015, 7:23 AM), <https://www.theguardian.com/environment/2015/oct/14/exxons-climate-lie-change-global-warming> [<https://perma.cc/ZV38-H92T>].

9. See, e.g., *United States v. Caronia*, 703 F.3d 149, 165–66 (2d Cir. 2012) (treating pharmaceutical representative's speech promoting off-label drug use as truthful and therefore protected by First Amendment).

10. See, e.g., *ONY, Inc. v. Cornerstone Therapeutics, Inc.*, 720 F.3d 490, 496–98 (2d Cir. 2013).

11. See, e.g., Robert Post, Opinion, *Exxon-Mobil is Abusing the First Amendment*, WASH. POST (June 24, 2016), https://www.washingtonpost.com/opinions/exxonmobils-climate-change-smoke-screen/2016/06/24/2df8b29c-38c4-11e6-9ccd-d6005beac8b3_story.html?utm_term=.8fda483b328f [<https://perma.cc/48NC-M63V>]; George F. Will, Opinion, *Scientific Silencers on the Left Are Trying To Shut Down Climate Skepticism*, WASH. POST (Apr. 22, 2016), https://www.washingtonpost.com/opinions/the-settled-science-consensus-du-jour/2016/04/22/46acd802-07de-11e6-a12f-ea5aed7958dc_story.html?utm_term=.db1b88a749e8 [<https://perma.cc/SFH8-8SUX>].

falsity of corporate claims about science, then antifraud laws simply will not apply in this context.

A fundamental premise of this Article, however, is that antifraud laws should have a role to play in policing misleading corporate speech about scientific knowledge. Although scientific knowledge differs from other forms of knowledge, we can still identify consensus views and evaluate the relative strength and reliability of bodies of scientific evidence. To support this view, Part II explores the idea of scientific uncertainty and its many meanings. It begins by examining the relationship between scientific knowledge and truth from the perspective of the philosophy of science. When we say that we *know* something, we usually mean that we believe it to be true. But scientific knowledge does not fit neatly with the notion of truth. The contingent, often empirically unverifiable nature of scientific knowledge distinguishes it from other forms of knowledge. After discussing the nature of scientific knowledge, Part II distinguishes legitimate uncertainties in scientific inquiry from the uncertainties produced by unreliable scientific methods and researchers' biases. Because claims that scientific knowledge is "uncertain" can convey different meanings, corporate statements about scientific certainty or knowledge can easily mislead the public. The final section of Part II argues that corporations should not be able to avoid liability under antifraud laws by characterizing these statements as nonactionable opinions or as protected scientific discourse.

Once courts draw a line between scientific discourse and corporate speech about scientific knowledge, they must determine whether the speech is misleading. Part III explores the critical question of how courts should analyze whether corporate speech regarding scientific knowledge is misleading. Antifraud cases involving this kind of speech demonstrate the need for a coherent doctrinal approach to the misleadingness inquiry. The approach developed in Part III responds to these concerns. The central argument is that courts should consider context-specific factors in determining whether such speech is misleading. These factors include the costs and benefits of the speech, as well as the regulatory context, cognitive biases, and cultural values that shape how the intended recipients understand the speech. These factors can help courts evaluate how much scientific evidence is required in support of a statement by revealing implied assertions and the reasonable inferences that recipients of the speech are likely to draw from them.

A contextual analysis also reduces the likelihood that courts will mistakenly characterize misleading speech about science as truthful or only potentially misleading, a result that opens the door to robust First Amendment protections. As Part IV of the Article explains, the Supreme Court has demonstrated an increasing interest in protecting corporate speech—a trend evident in the Court's recent treatment of commercial speech¹² and in cases that recognize corpora-

12. *See, e.g., Sorrell v. IMS Health Inc.*, 564 U.S. 552 (2011) (supporting heightened judicial scrutiny for promotional speech).

tions as rights holders.¹³ Corporate speech—even false or misleading speech—on political matters enjoys full protection, and, as many have noted, the lesser protection once given commercial speech has given way to more vigorous protection.

Because of these trends, it is likely that more and more corporate speech regarding science will qualify for increased First Amendment protection as “mixed” speech—that is, speech that is both commercial and noncommercial. In an era of increasing First Amendment protections for corporate speech, anti-fraud laws are an essential deterrent to misleading corporate claims about scientific knowledge relevant to public health risks. Recognizing the value of antifraud laws, as well as the likely First Amendment obstacles, Part IV concludes with some predictions regarding the application of the First Amendment to antifraud actions based on mixed corporate speech.

I. CORPORATE SPEECH ABOUT CLIMATE SCIENCE

The investigations into whether ExxonMobil misrepresented scientific knowledge regarding climate change provide an opportunity to think about if and how antifraud laws should police corporate claims about science relevant to environmental and public health risks. As the first section illustrates, the scientific consensus regarding human-caused climate change emerged over the course of many years. Scientists have long understood the theory behind the greenhouse effect of heat-trapping gases such as carbon dioxide, but it took time to confirm this theory with observational data and computer models. At what point is it clearly misleading to claim that scientific knowledge is uncertain? Indeed, scientific inquiry can never rule out all uncertainty.

For this reason, public enforcement of antifraud laws raises particular challenges when based on speech about scientific knowledge. The ExxonMobil investigations illustrate these challenges. As section I.B details, these investigations are based on state consumer protection and securities laws that give state attorneys general expansive investigative powers and expose corporations to liability for misleading speech that would not constitute common law fraud. This section uses the case of ExxonMobil and climate change to demonstrate how antifraud laws can be applied to corporate speech about science and how these applications can raise legitimate concerns. The combination of the uncertainty intrinsic to scientific knowledge with lower liability thresholds for misleading speech gives rise to First Amendment concerns about chilling protected speech and selective prosecution of politically unpopular views. To address these concerns, courts need a framework for evaluating the truth of corporate speech about scientific knowledge.

13. See, e.g., *Citizens United v. Fed. Election Comm'n*, 558 U.S. 310 (2010).

A. THE SCIENTIFIC CONSENSUS REGARDING CLIMATE CHANGE

This section provides an overview of the scientific consensus regarding human-caused climate change. It begins by tracing the development of this consensus beginning in 1990 and ends with a discussion of the bases for the present scientific consensus. The historical discussion is based on the lengthy assessment reports prepared for the Intergovernmental Panel on Climate Change (IPCC), an international organization made up of 195 member states and established in 1988 to provide information to policymakers on the scientific basis for climate change and climate impacts.¹⁴ Thousands of leading scientists from member countries contribute to and review the reports, which summarize the scientific literature on climate change.¹⁵ Five assessment reports have been completed, beginning with the First Assessment Report in 1990 and ending with the Fifth Assessment Report in 2014.¹⁶ As the following discussion outlines, the five reports document the scientific community's increasing confidence since 1990 in the causal link between human activity and a warming planet.

In the First Assessment's Policymakers Summary, the authors report an observed warming effect but admit that it could be due to natural variability—that is, variability caused by factors internal to the climate system rather than external “forcings,” such as greenhouse gases produced when people burn fossil fuels.¹⁷ The report notes that the “unequivocal detection of the enhanced greenhouse effect from observations is not likely for a decade or more.”¹⁸ By the Second Assessment Report in 1995, the “balance of evidence suggests a discernible human influence on global climate.”¹⁹ The Third Assessment Report in 2001 states that “most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations.”²⁰ By the time of the Fourth Assessment Report in 2007, more observational data were

14. See *Organization*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, <http://www.ipcc.ch/organization/organization.shtml> [<https://perma.cc/8EH7-HQYM>] (noting that the IPCC “was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts”).

15. For an overview of the process behind the assessments reports, see INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, UNDERSTANDING CLIMATE CHANGE: 22 YEARS OF IPCC ASSESSMENT 2–3 (2010), https://www.ipcc.ch/pdf/press/ipcc_leaflets_2010/ipcc-brochure_understanding.pdf [<https://perma.cc/3LQQ-GE3B>].

16. For access to the IPCC's multivolume reports, see *Reports*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, https://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml [<https://perma.cc/5Q9C-PP5M>].

17. See WORKING GROUP I, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE: THE IPCC SCIENTIFIC ASSESSMENT xii, xxv, xxix (J.T. Houghton et al. eds., 1990).

18. *Id.* at xii.

19. WORKING GROUP I, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 1995: THE SCIENCE OF CLIMATE CHANGE 4 (J.T. Houghton et al. eds., 1996).

20. WORKING GROUP I, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2001: THE SCIENTIFIC BASIS 10 (J.T. Houghton et al. eds., 2001) [hereinafter THIRD ASSESSMENT REPORT].

available and climate models were better able to represent climate processes.²¹ Based on these advances, the Fourth Assessment concludes that “greenhouse gas forcing has very likely been the dominant cause of the observed global warming over the last 50 years.”²²

In 2013, when the Fifth Assessment’s volume on climate science was written, even more observational data were available, and complex computer models produced separate simulations of the climate’s response to both natural forcing (solar-radiative forcing) and the anthropogenic forcing caused by increases in greenhouse gases.²³ Scientists could then compare these simulations to historical estimates of global mean surface temperature (GMST).²⁴ These advancements now supported the conclusion that “it is *extremely likely* that human activities caused more than half of the observed increase in GMST from 1951 to 2010.”²⁵ When evidence regarding GMST is combined with evidence from across the climate system (such as ocean temperatures and the global water cycle), “it is *virtually certain* that human influence has warmed the global climate system.”²⁶

In sum, since the IPCC’s first assessment in 1990, the theory that human activities have caused the climate to warm has been subject to scientific processes of confirmation; with increasingly consistent observational data and better computer modeling, the causal inference is stronger. The Fifth Assessment’s “virtually certain” language means that the correlation between human activities and global warming is less than 1% likely to be due to chance.

The processes of scientific inquiry and confirmation do not often yield such strong statistical support. It took time, of course, for this degree of confirmation to occur. As the assessment reports acknowledge, the earth sciences, of which climate science is part, pose empirical challenges.²⁷ The openness and complexity of the climate system complicate the testing of causal hypotheses.²⁸ Specifi-

21. See WORKING GROUP I, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 103 (Susan Solomon et al. eds., 2007).

22. *Id.* at 704.

23. See WORKING GROUP I, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS 37, 144–46 (Thomas F. Stocker et al. eds., 2013) [hereinafter FIFTH ASSESSMENT REPORT].

24. See *id.* at 869. The “climate system,” as the assessment reports define it, “is an interactive system consisting of five major components: the atmosphere, the hydrosphere, the cryosphere, the land surface and the biosphere, forced or influenced by various external forcing mechanisms,” including solar irradiance and anthropogenic influences such as the increase in greenhouse gases caused by the burning of fossil fuels. See THIRD ASSESSMENT REPORT, *supra* note 20, at 87.

25. FIFTH ASSESSMENT REPORT, *supra* note 23, at 869. The Fifth Assessment adopts specific language to reflect both “confidence” levels (“very low” to “very high”), which express a qualitative judgment in the validity of a finding, and likelihoods (“exceptionally unlikely” to “virtually certain”), which express quantified probabilistic measures of uncertainty and are based on statistical analyses of observational data or model results. See *id.* at 139. For example, “very likely” indicates a 90% to 100% probability, and “virtually certain” indicates a 99% to 100% probability. *Id.* at 142 tbl.1.2.

26. *Id.* at 871.

27. See *id.* at 126, 138.

28. See *id.* at 138.

cally, studying the climate requires scientists to collect data and build models of a system that occurs on multiple temporal and spatial scales, and there is only one system to observe.²⁹ But by the time of the Fifth Assessment Report, “multiple lines of evidence” had confirmed the existence of climate change based on data from all parts of the climate system—the atmosphere, land, ocean, and cryosphere.³⁰ Observational data from sources such as ice core records had also confirmed that atmospheric concentrations of greenhouse gases have “increased substantially” in the last 200 years.³¹

Today, the overwhelming majority of scientists (about 97%) are certain that human activities, principally the burning of fossil fuels since 1750, have resulted in atmospheric concentrations of carbon dioxide unprecedented in human history.³² They are also certain that increased concentrations of heat-trapping gases such as carbon dioxide have caused and will continue to cause the earth to warm.³³ In 2014, scientists affiliated with the world’s largest multidisciplinary scientific society compared the consensus surrounding climate science to the scientific consensus that smoking causes cancer:

Physicians, cardiovascular scientists, public health experts, and others all agree smoking causes cancer. And this consensus among the health community has convinced most Americans that the health risks from smoking are real. A similar consensus now exists among climate scientists, a consensus that maintains that climate change is happening and that human activity is the cause.³⁴

Furthermore, if the world does not take action, scientists agree that we could see temperatures warm as much as four to five degrees Celsius by the turn of the next century, a rate of warming “ten times that at the end of an ice age, the fastest known natural sustained change on a global scale.”³⁵

29. *See id.*

30. *See id.* at 129.

31. *Id.*

32. *See* AM. ASS’N FOR THE ADVANCEMENT OF SCI., *WHAT WE KNOW: THE REALITY, RISKS, AND RESPONSE TO CLIMATE CHANGE 2* (2014), http://whatwewknow.aaas.org/wp-content/uploads/2014/07/whatwewknow_website.pdf [<https://perma.cc/8TH3-XH4A>] (“Based on well-established evidence, about ninety-seven percent of climate scientists conclude that humans are changing the climate.”); ROYAL SOC’Y & U.S. NAT’L ACAD. OF SCIS., *CLIMATE CHANGE: EVIDENCE & CAUSES 9*, B3 fig.B3 (2014), https://royalsociety.org/media/Royal_Society_Content/policy/projects/climate-evidence-causes/climate-change-evidence-causes.pdf [<https://perma.cc/9UV3-GMB4>] (“Measurements of air in ice cores show that for the past 800,000 years up until the 20th century, the atmospheric CO₂ concentration stayed within the range 170 to 300 parts per million (ppm), making the recent rapid rise to nearly 400 ppm over 200 years particularly remarkable.”)

33. *See* ROYAL SOC’Y & U.S. NAT’L ACAD. OF SCIS., *supra* note 32, at 2.

34. AM. ASS’N FOR THE ADVANCEMENT OF SCI., *supra* note 32, at 2.

35. ROYAL SOC’Y & U.S. NAT’L ACAD. OF SCIS., *supra* note 32, at 9. This dramatic shift will likely result in 1.5 to 3 feet of sea level rise by 2100, with levels continuing to rise for centuries. *See id.* at 16. As oceans have absorbed roughly one-third of carbon emissions they have become more acidic, a trend that threatens various marine species and will continue. *See id.* at 17. Extreme heat and drought

As the Fifth Assessment acknowledges, this certainty is multidisciplinary and supported by both direct observations and theoretical understandings.³⁶ In 2014, the Royal Society and the U.S. National Academy of Sciences reported that the scientific consensus comes “from an understanding of basic physics, comparing observations with models, and fingerprinting the detailed patterns of climate change caused by different human and natural influences.”³⁷ In fact, scientists have long understood the general role that carbon dioxide plays in warming the earth.³⁸ Modern climate science is even more specific. Recently, for example, climate scientists at the National Oceanic and Atmospheric Administration reported that the warming influence of greenhouse gases increased by 40% from 1990 to 2016.³⁹ This conclusion, which is part of the Annual Greenhouse Gas Index (AGGI), is based not on computer models, but on direct measurements of greenhouse gases collected from a network of sites globally.⁴⁰ Furthermore, because the AGGI is “based on the observed amounts of long-lived greenhouse gases in the atmosphere, th[e] index contains relatively little uncertainty.”⁴¹

Of course, even with “multiple lines of evidence,” the latest IPCC assessment recognizes the presence of “uncertainty,” beginning with an acknowledgement of the uncertainty inherent in scientific inquiry.⁴² Indeed, the challenges of multiple temporal and spatial scales and the natural internal variability of the climate complicate climate science. Given these challenges, climate science relies heavily on computer modeling, which must simulate the complex climate system. Incorrect assumptions about aspects of the climate system result in “model uncertainty,” described in the Fifth Assessment as “uncertainty about the extent to which any particular climate model provides an accurate representation of the real climate system.”⁴³ Computer models, for example, predict

conditions, as well as other kinds of extreme weather such as flooding, will increase in frequency and severity. *See id.* at 15.

36. *See* FIFTH ASSESSMENT REPORT, *supra* note 23, at 4, 129.

37. ROYAL SOC'Y & U.S. NAT'L ACAD. OF SCIS., *supra* note 32, at 5.

38. *See id.* (“Since the mid-1800s, scientists have known that CO₂ is one of the main greenhouse gases of importance to Earth’s energy balance.”).

39. NOAA’s Greenhouse Gas Index Up 40 Percent Since 1990, NAT’L OCEANIC & ATMOSPHERIC ADMIN. (July 11, 2017), <http://www.noaa.gov/news/noaa-s-greenhouse-gas-index-up-40-percent-since-1990> [<https://perma.cc/F3AN-XW5U>].

40. *See id.*

41. James H. Butler & Stephen A. Montzka, *The NOAA Annual Greenhouse Gas Index (AGGI)*, EARTH SYS. RES. LABORATORY, <https://www.esrl.noaa.gov/gmd/aggi/aggi.html> [<https://perma.cc/8CUW-YBT7>] (last updated Spring 2017). In 2015, scientists confirmed with experimental data “the influence of atmospheric CO₂ on the balance between incoming energy from the Sun and outgoing heat from the Earth (also called the planet’s energy balance).” Dan Krotz, *First Direct Observation of Carbon Dioxide’s Increasing Greenhouse Effect at the Earth’s Surface*, LAWRENCE BERKELEY NAT’L LAB. (Feb. 25, 2015), <http://newscenter.lbl.gov/2015/02/25/co2-greenhouse-effect-increase> [<https://perma.cc/8P29-BZK6>]. These new data confirm long-accepted theoretical understandings of CO₂’s greenhouse effect. *See id.*

42. *See* FIFTH ASSESSMENT REPORT, *supra* note 23, at 129, 138 (“Science always involves uncertainties. These arise at each step of the scientific method: in the development of models or hypotheses, in measurements and in analyses and interpretation of scientific assumptions.”).

43. *Id.* at 138.

decreasing Antarctic sea ice, but scientists have observed increasing Antarctic sea ice in recent years, contrary to observations of rapid melting in the Arctic.⁴⁴ This suggests that the computer models do not capture all the processes and variables that affect Antarctic sea ice.⁴⁵

To conclude, however, that model uncertainty undermines the theory that anthropogenic emissions are warming the planet would be wrong. The high confidence level and likelihood that the assessment's authors assign to this claim reflect qualitative and quantitative judgments about the evidence underlying the claim. The Fifth Assessment concludes that despite inconsistencies among model responses, "the detection of the global temperature response to GHG increases using average responses from multiple models is robust to observational uncertainty and methodological choices."⁴⁶ In other words, the *average* responses of various models show a similar pattern of warming over long periods of time that corresponds with observed increases of greenhouse gases in the atmosphere.

Moreover, this conclusion is strengthened "by basic physical arguments," namely the physics behind the greenhouse effect.⁴⁷ And perhaps most important, the science of climate change draws from much more than computer models: "The observed patterns of surface warming, temperature changes through the atmosphere, increases in ocean heat content, increases in atmospheric moisture, sea level rise, and increased melting of land and sea ice also match the patterns scientists expect to see due to rising levels of CO₂ and other human-induced changes."⁴⁸ In short, a wealth of evidence supports the scientific consensus regarding human-caused climate change.⁴⁹

44. See Bob Berwyn, *Why Is Antarctica's Sea Ice Growing While the Arctic Melts? Scientists Have an Answer*, INSIDECLIMATE NEWS (May 31, 2016), <https://insideclimatenews.org/news/31052016/why-antarctica-sea-ice-level-growing-while-arctic-glaciers-melts-climate-change-global-warming> [<https://perma.cc/NG96-BWDF>].

45. Indeed, recent observational research has identified possible influences, including icy winds blowing off the continent and a strong ocean current that keeps warmer water away from Antarctic sea ice. *See id.*

46. FIFTH ASSESSMENT REPORT, *supra* note 23, at 884. These inconsistencies are discrepancies in observed and modelled magnitude of response to greenhouse gas forcing. To account for this variation, the assessment authors use a conservative approach, which compares the average response from multiple models and accounts for model uncertainty. *See id.* at 874. Moreover, because models are imperfect representations that cannot exactly simulate natural variability and other influences, climate scientists assume that "models simulate the *shape* of the response to external forcings (meaning the large-scale pattern in space and/or time) correctly, but do not assume that models simulate the *magnitude* of the response correctly." *Id.* at 873.

47. *See id.* at 884.

48. ROYAL SOC'Y & U.S. NAT'L ACAD. OF SCIS., *supra* note 32, at 5.

49. Although scientists are certain about the link between human activity and climate change, there is notable uncertainty surrounding specific questions, including the role of clouds, the implications of ocean acidification, the amount of rainfall, and the rate of glacial melt. *See* Scott Waldman, *It's Real! But Climate Researchers Have Lots of Questions*, E&E NEWS: CLIMATEWIRE (June 14, 2017), <https://www.eenews.net/climatewire/stories/1060055985/search?keyword=extreme+weather> [<https://perma.cc/FEX8-R6MR>]. Uncertainty regarding these issues results from and contributes to uncertainty about the severity of future warming.

B. INVESTIGATING CORPORATE SPEECH ABOUT CLIMATE SCIENCE

In November 2015, New York Attorney General Eric Schneiderman opened an investigation into whether ExxonMobil misled investors and the public about the risks of climate change.⁵⁰ The attorneys general of the Virgin Islands and Massachusetts indicated that they would also investigate, although the Virgin Islands dropped its investigation after ExxonMobil sued the territory in federal court.⁵¹ The Massachusetts attorney general followed New York's lead, issuing a civil investigative demand under state consumer protection laws in April 2016.⁵²

In addition to political will, Schneiderman's investigation benefits from his broad authority to investigate and prosecute securities fraud under New York's Martin Act.⁵³ Although many states have similar blue sky laws targeting securities fraud, New York's law gives the attorney general considerable discretion in deciding whether to begin an investigation, as well as broad investigatory powers to subpoena documents and witness statements.⁵⁴ It also contains language that sweeps more broadly than common law fraud.⁵⁵ State courts have interpreted fraudulent practices under the Martin Act to "include[] all deceitful practices contrary to the plain rules of common honesty and all acts tending to deceive or mislead the public."⁵⁶ In essence, the New York attorney general need only prove a material misrepresentation or omission.⁵⁷ Public enforcement does not require other elements of a traditional common law fraud claim such as scienter (intent), reliance (including causation), and damages.⁵⁸

The combination of broad investigative powers and lower thresholds for liability encourages those under investigation to settle rather than litigate. In fact, the same month that Schneiderman launched the ExxonMobil investiga-

50. See Justin Gillis & Clifford Krauss, *Exxon Mobil Investigated for Possible Climate Change Lies by New York Attorney General*, N.Y. TIMES (Nov. 5, 2015), <https://www.nytimes.com/2015/11/06/science/exxon-mobil-under-investigation-in-new-york-over-climate-statements.html> [https://nyti.ms/1WzsnSi] (noting that the "investigation focuses on whether statements the company made to investors about climate risks as recently as this year [2015] were consistent with the company's own long-running scientific research").

51. For overviews and timelines of the state investigations and ongoing litigation, see Paul Barrett & Matthew Phillips, *Can ExxonMobil Be Found Liable for Misleading the Public on Climate Change*, BLOOMBERG: BUSINESSWEEK (Sept. 7, 2016, 5:00 AM), <https://www.bloomberg.com/news/articles/2016-09-07/will-exxonmobil-have-to-pay-for-misleading-the-public-on-climate-change> [https://perma.cc/9UV8-WU6C]; James Osborne, *Climate Probe into Exxon Mobil Deepens*, HOUS. CHRON. (June 16, 2017), <http://www.houstonchronicle.com/business/article/Climate-probe-into-Exxon-Mobil-deepens-11226504.php> [https://perma.cc/3LCW-VS97].

52. Civil Investigative Demand from Maura Healey, Attorney Gen., Mass., to Exxon Mobil Corp. (Apr. 19, 2016), <http://www.mass.gov/ago/docs/energy-utilities/exxon/ma-exxon-cid-.pdf> [https://perma.cc/7WAX-TUJG].

53. See N.Y. GEN. BUS. LAW §§ 352–353 (McKinney 2017).

54. See *id.* § 352.

55. See *id.* § 352-c(1).

56. See *People ex rel. Cuomo v. Greenberg*, 946 N.Y.S.2d 1, 8 (N.Y. App. Div. 2012).

57. See *State v. Rachmani Corp.*, 525 N.E.2d 704, 707 n.6, 708 (N.Y. 1988).

58. See *id.* at 707 n.6; *People v. Royal Sec. Corp.*, 165 N.Y.S.2d 945, 949 (N.Y. Sup. Ct. 1955).

tion, he entered into a settlement with coal company Peabody Energy.⁵⁹ The settlement followed Schneiderman's finding that Peabody had not sufficiently informed investors "by saying in public reports that it couldn't 'reasonably predict' the risks it faced from climate-related regulations."⁶⁰ Under the terms of the settlement, Peabody agreed to disclose to investors the financial risks to its business likely to result from climate change and attendant regulation.⁶¹

Like New York's Martin Act, state consumer protection laws—such as the one under which the Massachusetts attorney general is proceeding—give state attorneys general wide latitude to police corporate speech.⁶² In January 2017, a Massachusetts court ordered ExxonMobil to comply with the attorney general's civil investigative demand, noting that "[i]f Exxon presented to consumers 'potentially misleading information about the risks of climate change, the viability of alternative energy sources, and the environmental attributes of its products and services,' . . . the Attorney General may conclude" that it violated the state statute.⁶³ As the court acknowledged, state statutes prohibiting "unfair and deceptive acts or practices" seek to promote disclosure of accurate information to consumers by targeting not only literal falsehoods but also misleading "half truth[s]" and material omissions.⁶⁴ Statements or omissions that a reasonable consumer would find misleading, and consequently material, therefore open the door to civil liability.⁶⁵

Not surprisingly, ExxonMobil has challenged these investigations. Although the corporation has produced numerous documents in response to New York subpoenas, it has pursued legal challenges to the investigations in both federal and state courts.⁶⁶ Rather than challenge the first subpoenas in the jurisdictions

59. See Barrett & Philips, *supra* note 51.

60. *Id.*

61. *See id.*

62. All states have consumer protection statutes that prohibit "unfair" or "deceptive" practices. See Victor E. Schwartz & Cary Silverman, *Common-Sense Construction of Consumer Protection Acts*, 54 U. KAN. L. REV. 1, 16 (2005). Although they broadly give state attorneys general the right to enforce their provisions without proof of common law elements such as reliance or damages, they often require—either in their text or by judicial interpretation—proof of reliance, intent, and damages in private lawsuits. *See id.* at 18–21. This distinction between public and private enforcement permits the attorneys general to use these statutes to remedy diffuse public harms (where reliance and injury in fact would be difficult to show), while limiting private rights of action to situations where consumers can show actual reliance and injury. *See id.* at 21.

63. *In re* Civil Investigative Demand No. 2016-EPD-36, SUCV20161888F, 2017 WL 627305, at *4 (Mass. Super. Ct. Jan. 11, 2017) (compelling compliance with the civil investigative demand).

64. *See id.* The court also rejected ExxonMobil's argument that Massachusetts courts do not have personal jurisdiction over ExxonMobil for the violations of state law currently under investigation. *See id.* at *2–4.

65. *See infra* Section II.C for a discussion of the elements of common law fraud, including materiality.

66. As of December 9, 2016, ExxonMobil had apparently already turned over roughly 1.4 million pages of documents to the New York attorney general's office. *See* Letter from I. Andrew Goldberg, Assistant Attorney Gen., Mass., to Hon. Heidi E. Brieger, Assoc. Justice, Mass. Superior Court 1 (Dec. 9, 2016), <http://www.mass.gov/ago/docs/energy-utilities/exxon/post-hearing-letter-to-brieger-j.pdf> [<https://perma.cc/84KF-7X27>]. In June 2017, the *New York Times* reported that ExxonMobil had turned over

where they were issued, the corporation filed suit in a federal court in Texas (where the company is headquartered), raising constitutional objections to the investigations.⁶⁷ In addition to raising First Amendment claims about the chilling of political speech, ExxonMobil accused the state attorneys general of abusing their power, characterizing their actions as part of a politically motivated conspiracy to damage the company's reputation and further an ideological campaign against fossil fuel companies.⁶⁸

The corporation's position has won notable support. The federal judge in Texas questioned the legitimacy of the motives of the attorneys general.⁶⁹ In addition, Congressman Lamar Smith, the chair of the House Committee on Science, Space, and Technology, raised concerns that the state investigations violate the First Amendment by chilling scientific inquiry and political debate.⁷⁰ To investigate what he characterizes as abuse of governmental power, Smith issued subpoenas for documents that contain communications between Democratic state attorneys general and environmental groups regarding climate change and environmental science.⁷¹ Recently, twelve Republican state attorneys general filed an amicus brief in support of ExxonMobil's suit against the New York and Massachusetts attorneys general in federal court; they echoed ExxonMobil's arguments that the state investigations constitute an abuse of power and a violation of ExxonMobil's free speech rights.⁷² Thus far, however, this support has not persuaded courts to curtail the state investigations.⁷³

Setting aside the underlying political dimensions of this conflict, there is a legitimate concern that broadly worded antifraud laws encroach on the breathing room essential to the preservation of free speech. Although the Supreme Court has upheld state fraud actions against protected speech, it has also

"[n]early three million pages of evidence." John Schwartz, *Exxon Mobil Calls Emissions Inquiry a 'Political Witch Hunt'*, N.Y. TIMES (June 9, 2017), <https://www.nytimes.com/2017/06/09/business/energy-environment/exxon-mobil-schneiderman.html> [https://nyti.ms/2t4ErRR].

67. See Benjamin Hulac, *Blockbuster Climate Case Heads to N.Y.*, E&E NEWS: CLIMATEWIRE (Mar. 20, 2017), <https://www.eenews.net/climatewire/2017/03/30/stories/1060052339> [https://perma.cc/SP92-SR35] (reporting that the Texas judge later transferred the case to a federal court in New York).

68. See Plaintiff's Original Petition for Declaratory Relief at 2, *Exxon Mobil Corp. v. Walker*, No. 017-284890-16 (Tex. Dist. Ct. Tarrant Cty. Apr. 13, 2016).

69. See Order at 5–6, *Exxon Mobil Corp. v. Schneiderman*, No. 4:16-cv-00469-K (N.D. Tex. Mar. 29, 2017) (transferring case to the U.S. District Court for the Southern District of New York).

70. See John Schwartz, *State Officials Investigated Over Their Inquiry into Exxon Mobil's Climate Change Research*, N.Y. TIMES (May 19, 2016), <https://www.nytimes.com/2016/05/20/science/exxon-mobil-climate-change-global-warming.html> [https://nyti.ms/1rXDVV3].

71. See John Schwartz, *Are Subpoenas on Exxon Mobil Inquiries Valid? Experts Say Yes, and No*, N.Y. TIMES (Sept. 14, 2016), <https://www.nytimes.com/2016/09/15/science/are-subpoenas-on-exxon-mobil-inquiries-valid-experts-say-yes-and-no.html> [https://nyti.ms/2cO8wOi].

72. See Keith Goldberg, *Republican AGs Back Exxon in Climate Probe Fight*, LAW360 (June 27, 2017, 4:33 PM), <https://www.law360.com/articles/938835/republican-ags-back-exxon-in-climate-probe-fight> [https://perma.cc/LB9J-3TXS].

73. See Emily Flitter, *State Appeals Court Rules Exxon Must Give Records to NY Prosecutor*, REUTERS (May 23, 2017, 5:06 PM), <http://www.reuters.com/article/usa-climatechange-exxon-idUSL1N1IP286> [https://perma.cc/D2T2-NK2J].

suggested that the First Amendment may require safeguards such as proof of intent.⁷⁴ Moreover, as Part II explains, the complex nature of scientific knowledge complicates the assessment of the truth or falsity of speech about science. On the other hand, if corporations can use the complexity and uncertainty inherent in science to obscure scientific consensus, they may undermine informed decision making by consumers, investors, and regulators. Liability seems particularly appropriate when corporate agents know that their statements about scientific knowledge are false or misleading.

Interestingly, the journalistic investigations that led to Schneiderman's inquiry uncovered documents that show ExxonMobil engaged in climate research as early as the 1970s.⁷⁵ Some of these documents recognize the strong evidence linking fossil fuel combustion to global warming. For example, in one internal memorandum in 1982, an Exxon scientist acknowledged the variability of model predictions but stressed that "a clear scientific consensus has emerged regarding the expected climatic effects of increased atmospheric CO₂."⁷⁶ He explained that the "consensus is that a doubling of atmospheric CO₂ from its pre-industrial revolution value would result in an average global temperature rise of (3.0 ± 1.5) °C."⁷⁷ After noting the uncertainty inherent in climate models, he again emphasized the consensus surrounding climate change: "There is unanimous agreement in the scientific community that a temperature increase of this magnitude would bring about significant changes in the earth's climate"⁷⁸ He also noted that the timeframe for the "doubling of atmospheric CO₂ depends on future world consumption of fossil fuels" and made clear that Exxon's own research was consistent with the consensus view.⁷⁹ Other documents from this time period also suggest that ExxonMobil's scientists were actively communicating the risks of climate change from continued fossil fuel consumption to corporate executives.⁸⁰

Despite ExxonMobil's apparent knowledge of an emerging consensus regarding climate change, later documents drafted for public dissemination explicitly question the science behind climate change, including the link between burning fossil fuels and global warming. For example, an op-ed republished by ExxonMobil in 2000 entitled "Unsettled Science" states that scientists "remain unable to con-

74. See *Illinois ex rel. Madigan v. Telemarketing Assocs., Inc.*, 538 U.S. 600, 620–21 (2003). For a discussion of this case, see *infra* Section IV.B.2.

75. See David Kaiser & Lee Wasserman, *The Rockefeller Family Fund vs. Exxon*, N.Y. REV. BOOKS (Dec. 8, 2016), <http://www.nybooks.com/articles/2016/12/08/the-rockefeller-family-fund-vs-exxon> [<https://perma.cc/CG4J-X9YL>].

76. Letter from Roger W. Cohen, Dir., Theoretical & Mathematical Scis. Lab., Exxon Corp., to A. M. Natkin, Office of Sci. & Tech., Exxon Corp. (Sept. 2, 1982), <http://www.climatefiles.com/exxonmobil/1982-exxon-memo-summarizing-climate-modeling-and-co2-greenhouse-effect-research> [<https://perma.cc/P7NW-L826>].

77. *Id.*

78. *Id.*

79. *Id.*

80. For a collection of documents uncovered by the journalistic investigations, see CLIMATE FILES, <http://www.climatefiles.com> [<https://perma.cc/AZ3Z-ZY7N>] (last updated 2017).

firm” the link between human activity and global warming.⁸¹ Other documents from around this same time period also cast doubt on the link between fossil fuel use and global warming by highlighting uncertainties from individual studies and models without acknowledging the larger consensus that increased concentrations of greenhouse gases in the atmosphere are “likely” responsible for most of the recent warming of the planet.⁸² Indeed, a recent empirical study found a significant discrepancy between ExxonMobil’s internal understanding of climate change and its public position on climate change in paid op-eds or “advertorials.”⁸³ Two history of science experts analyzed 187 ExxonMobil documents, including internal documents, peer-reviewed and other publications, and advertorials published in the *New York Times*.⁸⁴ The documents show that the company accepted the scientific consensus on climate change but nevertheless expressed doubt in its public advertorials: “The majority of ExxonMobil’s peer-reviewed publications acknowledge that climate change is real and human-caused, and internal documents reflect this scientific framework In contrast, ExxonMobil’s advertorials overwhelmingly focus on the uncertainties, casting doubt on the growing scientific consensus”⁸⁵

These documents show that corporate actors were interested in spinning the science in their public communications to serve the company’s bottom line. Whether those communications amount to misleading or fraudulent speech under state law is another question. Even if ExxonMobil’s public statements are technically misleading, it may be difficult to show if and how the statements affected consumers. This is likely the reason that the New York attorney general is focusing on securities fraud.⁸⁶ Until recently, ExxonMobil downplayed in its public statements the risks to its assets and long-term profitability resulting from regulatory efforts to address climate change.⁸⁷

81. ExxonMobil, *Unsettled Science*, in GLOBAL CLIMATE CHANGE: THE OP-ED SERIES 4 (2000), <http://www.climatefiles.com/exxonmobil/2000-exxon-global-climate-change-op-ed-series> [https://perma.cc/84FN-2FAZ].

82. See Geoffrey Supran & Naomi Oreskes, *Assessing ExxonMobil’s Climate Change Communications (1977–2014)*, 12 ENVTL. RES. LETTERS, Aug. 23, 2017, at 1, 9. “Likely” is the language used in the IPCC’s Third Assessment Report. See THIRD ASSESSMENT REPORT, *supra* note 20, at 2 n.7, 699. Because these reports are conservative in their conclusions, it seems safe to assume that many scientists had even stronger confidence in this link at the time.

83. Supran & Oreskes, *supra* note 82, at 9.

84. See *id.* at 2.

85. *Id.* at 9.

86. See John Schwartz, *Exxon Mobil Fraud Inquiry Said To Focus More on Future than Past*, N.Y. TIMES (Aug. 19, 2016), <https://www.nytimes.com/2016/08/20/science/exxon-mobil-fraud-inquiry-said-to-focus-more-on-future-than-past.html?action=click&contentCollection=Energy%20%26%20Environment%20&module=RelatedCoverage®ion=Marginalia&pgtype=article> [https://nyti.ms/2bs9dyJ].

87. See Diane Cardwell & John Schwartz, *Exxon Emissions Costs Accounting ‘May be a Sham,’ New York State Says*, N.Y. TIMES (June 2, 2017), <https://www.nytimes.com/2017/06/02/business/energy-environment/exxon-mobil-climate-change-lawsuit.html> [https://nyti.ms/2sxORcn]. In addition, the New York investigation appears to be pursuing evidence that ExxonMobil misrepresented to investors how it incorporates a proxy cost for carbon into its project planning and investment decisions. See *id.*

It may indeed be easier to prove the misleading and material nature of recent financial statements directed toward investors than statements about climate science directed toward the general public.⁸⁸ For example, in a company report from 2014, ExxonMobil claimed that global efforts to mitigate climate change would not result in “stranded” assets, meaning that the company would not have to leave valuable hydrocarbon reserves in the ground.⁸⁹ By 2014, however, it was well known that to avert catastrophic climate change, a large portion of the remaining hydrocarbon reserves must remain in the ground.⁹⁰ To respond to this risk, fossil fuel companies must “write down” the value of some reserves, as many companies have in fact done.⁹¹ ExxonMobil’s failure to do so is at the heart of a recent shareholder class action for securities fraud under federal law.⁹²

Even if investigations of ExxonMobil ultimately focus more narrowly on statements about the financial risks of climate regulation, they have already inspired a broader debate about when corporate speech about scientific knowledge is misleading and potentially actionable. To answer these questions, the next Part examines the relationship between scientific knowledge and truth. Understanding this relationship is essential to answering the legal question of when speech about science contains factual assertions as opposed to nonactionable opinions.

II. THE RELATIONSHIP BETWEEN SCIENTIFIC KNOWLEDGE AND TRUTH

How should we understand the relationship between scientific knowledge and truth? The discipline of epistemology, which examines how knowledge is

88. Last May, a majority of shareholders voted for more detailed disclosure of the risks to ExxonMobil’s business from climate regulation, including analyses of the potential impact of regulation designed to keep global warming under two degrees Celsius from preindustrial levels. See Diane Cardwell, *Exxon Mobil Shareholders Demand Accounting of Climate Change Policy Risks*, N.Y. TIMES (May 31, 2017), <https://www.nytimes.com/2017/05/31/business/energy-environment/exxon-shareholders-climate-change.html> [<https://nyti.ms/2snhlFM>].

89. See EXXONMOBIL, ENERGY AND CARBON—MANAGING THE RISKS 1 (2014), <http://cdn.exxonmobil.com/media/global/files/energy-and-environment/report-energy-and-carbon-managing-the-risks.pdf> [<https://perma.cc/4H7S-GSZN>] (“[W]e are confident that none of our hydrocarbon reserves are now or will become ‘stranded.’”).

90. See Katherine Bagley, *The Most Influential Climate Science Paper Today Remains Unknown to Most People*, INSIDECLIMATE NEWS (Feb. 14, 2013), <https://insideclimatenews.org/news/20140213/climate-change-science-carbon-budget-nature-global-warming-2-degrees-bill-mckibben-fossil-fuels-keystone-xl-oil> [<https://perma.cc/WML5-PSFK>] (explaining that studies show many of the world’s fossil fuel reserves must remain in the ground if we are to stay within the “carbon budget” set by an influential 2009 study).

91. See Bradley Olson & Lynn Cook, *Exxon Warns On Reserves as It Posts Lower Profit*, WALL ST. J. (Oct. 28, 2016, 4:43 PM), <https://www.wsj.com/articles/exxon-mobil-profit-revenue-slide-again-1477657202> [<https://perma.cc/A9YG-738M>] (noting that “Exxon is alone among major oil companies in not having written down the value of its future wells as prices fell”).

92. See Complaint at 8–9, *Ramirez v. Exxon Mobil Corp.*, No. 3:16-cv-03111-L (N.D. Tex. Nov. 7, 2016).

legitimately acquired, studies truth as a component of knowledge.⁹³ Scientists certainly act as if their work is part of an effort to advance human knowledge. But to answer the question of how society should understand the truth or falsity of scientific claims requires a more thorough analysis of the nature of scientific knowledge. To that end, this Part begins by exploring debates within the philosophy of science regarding truth and scientific knowledge. It then turns to a discussion of the critical difference between the uncertainty inherent in scientific inquiry and the uncertainty that results from unreliable or biased scientific methods.

Understanding the different meanings of uncertainty in scientific inquiry is critical to understanding the content of claims about scientific knowledge. To say that a causal link (such as the link between fossil fuel use and climate change) is uncertain can be understood as a statement about the strength of existing scientific evidence or as a statement about the reliability of that evidence. Claims about scientific uncertainty can also exploit the uncertainty inherent in scientific knowledge to cast doubt on scientific conclusions that are both well established and reliable. Today, a claim that the link between fossil fuel consumption and climate change is uncertain would fall in this last category.

Because scientific knowledge is contingent rather than fixed, it is unlike other forms of knowledge. Scientific inquiry and progress depend, therefore, on the free and open exchange of theoretical ideas and empirical findings among scientists. Subjecting a scientist to liability for a conclusion contrary to scientific consensus would not only infringe on First Amendment liberties but also threaten the disciplinary processes central to scientific debate and study.

But the representation of scientific knowledge by corporations seeking to sell products and services is an entirely different matter. As the final section of this Part explains, these representations are not part of a larger scientific or academic debate, but are instead factual assertions about the strength and reliability of scientific knowledge. Because claims that scientific knowledge is uncertain can carry various meanings, corporate statements about scientific certainty or knowledge can easily mislead the public. But before courts can assess whether such speech is misleading, they must reject characterizations of these statements as nonactionable opinions or protected scientific discourse.

A. PHILOSOPHICAL ACCOUNTS OF SCIENTIFIC KNOWLEDGE

Because scientific knowledge is a subset of propositional knowledge, or knowledge that “purports to describe a fact or a state of affairs,” theoretical

93. See David A. Truncellito, *Epistemology*, INTERNET ENCYCLOPEDIA OF PHILOSOPHY, <http://www.iep.utm.edu/epistemo> [https://perma.cc/LPC2-2DEL]. Epistemologists must also grapple with the famous “Gettier” problem. As Edmund Gettier demonstrated, even true, justified beliefs can result from luck when someone “justifiably draws a conclusion that happens to be true from a premise that is justifiably believed yet false.” Alan Millar et al., *Introduction to EPISTEMIC VALUE 2* (Adrian Haddock et al. eds., 2009). These beliefs do not qualify as knowledge without an additional “anti-Gettier condition,” a topic of much debate in the field. *See id.*

accounts of the nature of propositional knowledge provide a starting point for an analysis of truth in the context of scientific knowledge.⁹⁴ Broadly speaking, epistemological theories identify three necessary conditions for knowledge: belief, truth, and justification.⁹⁵ Although humans are fallible, the assumption is that in seeking to acquire knowledge, we are seeking *true* beliefs about the world as it actually is (knowledge is therefore described by most epistemologists as “factive”).⁹⁶ Theoretical accounts of the value of knowledge often grapple with why true *justified* belief is better than simply true belief.⁹⁷ Although whether and how a belief is justified is the subject of much debate, the notion that truth has intrinsic epistemic value is widely accepted.⁹⁸ From this, we can conclude that—at least from a normative perspective—the acquisition of true belief is the objective of scientific inquiry.

Once we delve deeper, however, into the theories of scientific knowledge within the philosophy of science, we encounter some vexing problems for the acquisition of truth. The problems arise because experimental science relies on inductive reasoning, which often arrives at generalizations about how the world works based on observations of a relatively small sample.⁹⁹ For example, to study the toxicity of a given chemical, a scientist might expose a number of mice to the same dose of chemical X. If a sufficiently large number of the mice contract disease Y after exposure, the scientist might conclude (subject to many methodological caveats) that exposure to X at this dose poses a particular risk to mice *generally*.

But from the standpoint of formal logic, this conclusion (X increases the risk of Y in *all* mice) does not necessarily follow from the premise (X increases the risk of Y in the sample). Even if the premise is true, the scientist would need another generalization (all mice are similar in relevant ways to the mice in the sample), which itself relies on an inductive argument, to justify the conclusion.¹⁰⁰ Inductive reasoning is therefore unlike a valid deductive argument in which a true premise will always lead logically to a true conclusion.¹⁰¹ For

94. See Truncellito, *supra* note 93.

95. See Emma C. Gordon, *Understanding in Epistemology*, INTERNET ENCYCLOPEDIA OF PHILOSOPHY, <http://www.iep.utm.edu/understa> [<https://perma.cc/HY5Q-H97N>] (“Knowledge is almost universally taken to be factive. In other words, *S* knows that *p* only if *p* is true.” (internal citation omitted)).

96. See Truncellito, *supra* note 93.

97. See, e.g., Millar et al., *supra* note 93, at 1. These accounts focus on why knowledge must be acquired by some legitimate process as opposed to, for example, luck. See *id.*

98. See Stephen R. Grimm, *Epistemic Normativity*, in EPISTEMIC VALUE, *supra* note 93, at 243, 245 (discussing the view that “believing the truth is the thing that possesses intrinsic epistemic value”); Millar et al., *supra* note 93, at 4 (“A common idea is that it is for the sake of truth that it matters that we should acquire knowledge or matters that our beliefs should be justified.”); Jonathan Jenkins Ichikawa & Matthias Steup, *The Analysis of Knowledge*, § 1.1, STANFORD ENCYCLOPEDIA OF PHILOSOPHY, <http://plato.stanford.edu/entries/knowledge-analysis/#TruCon> [<https://perma.cc/6U2V-468M>] (last updated Mar. 7, 2017).

99. See KENT W. STALEY, AN INTRODUCTION TO THE PHILOSOPHY OF SCIENCE 6–7 (2014).

100. See *id.* (discussing that a general principle of uniformity requires an inductive inference).

101. See *id.* at 4 (“Deductive arguments are sometimes said to be ‘truth-preserving’ because a deductively valid argument is guaranteed not to lead you from true premises to a false conclusion.”).

example, if the premises that all German Shepherds are dogs and Rover is a German Shepherd are true, then the conclusion that Rover is a dog is true. We would have to disprove the premises to render the conclusion false.

The problem of induction in scientific reasoning has inspired a wealth of scholarship within the philosophy of science. Space constraints prevent a complete treatment of this literature. To get a basic sense, however, of how philosophers of science have responded to this problem requires a brief discussion of some historical responses followed by consideration of the contemporary debate about scientific realism.

In an effort to escape the induction problem, Karl Popper argued that the strength of a given hypothesis depends on how well corroborated it is, which in turn depends on how well the hypothesis has survived tests designed to disprove or falsify it and its boldness.¹⁰² The degree of boldness depends on how falsifiable a hypothesis may be, which is a function of how many potential experimental outcomes, or observations, are inconsistent with the hypothesis.¹⁰³ In other words, a theory is more falsifiable when it predicts a lot of things that will not happen; this is so because scientists will have more opportunities to subject the theory to falsifying tests.¹⁰⁴ If a highly falsifiable theory fails a given test, because an outcome predicted to not happen does in fact happen, it arguably leads to a conclusion apparently supported by deductive logic. That is, if Theory X predicts Y will not happen but Y does in fact happen, then Theory X is not true.

Falsification may appear to solve the induction problem, but it does not settle the question of whether a theory is true. In addition, it suffers from a serious “underdetermination” problem.¹⁰⁵ In practice, scientists do not test hypotheses in isolation. To connect a hypothesis with experimental observations or data, scientists must also rely on any number of additional assumptions, ranging from assumptions grounded in mathematics to assumptions regarding the equipment used in the experiment.¹⁰⁶ If an experimental outcome appears to falsify a theory, it may in reality only be falsifying one of these “auxiliary” assumptions. In this way, observations or data “underdetermine” the theories they seek to test.¹⁰⁷

To further complicate matters, the work of Thomas Kuhn in the middle of the twentieth century significantly supplanted the notion that scientific data or observation can be described or conceptualized separately from scientific theory.

102. See KARL R. POPPER, *THE LOGIC OF SCIENTIFIC DISCOVERY* 113 (Routledge 1992) (1959).

103. See *id.* at 112–13.

104. See *id.*

105. See STALEY, *supra* note 99, at 26.

106. See *id.* at 30–31.

107. See *id.* at 26. Imre Lakatos attempted to deal with this problem by strengthening the requirements of falsification. In his view, a theory must also facilitate the “discovery of novel facts” and is falsified only when another theory exists that meets certain criteria relative to the existing theory. See *id.* at 74 (quoting Imre Lakatos, *Falsification and the Methodology of Scientific Research Programmes*, in *CRITICISM AND THE GROWTH OF KNOWLEDGE* 91, 116 (Imre Lakatos & Alan Musgrave eds., 1970)).

Kuhn argued that observation is determined by theory: a scientist within a given discipline sees the world through a lens of shared scientific beliefs, values, and techniques.¹⁰⁸ These shared beliefs and norms constitute a paradigm in which “normal” science functions until it reaches a moment of crisis created by one or more “anomal[ies]” that scientists gradually realize the current theory or paradigm cannot solve.¹⁰⁹ This growing disconnect eventually leads to a scientific “revolution,” in which the current paradigm is ousted by a new paradigm.¹¹⁰ A familiar example of such a paradigm shift is the shift from Ptolemaic to Copernican theories of the solar system.¹¹¹ Kuhn notes that the Ptolemaic earth-centered view “was admirably successful in predicting the changing positions of both stars and planets.”¹¹² But over time the theory failed to align with more and more observations, which required more and more theoretical adjustments.¹¹³ By the time Copernicus advanced a different theory, astronomy was in a “crisis” state and ready for a revolution.¹¹⁴

For Kuhn, then, science does seek to progress, but not toward some immutable scientific truth. Instead, he would characterize the progression as one of specialization.¹¹⁵ The historical fact that theories or paradigms have shifted challenges the view that empirically successful theories are accurate reflections of the world as it is.¹¹⁶ Theories of light illustrate this view nicely. Isaac Newton’s particle theory of light gave way to different wave theories of light, including James Clerk Maxwell’s electromagnetic theory of light, and today, physicists informed by twentieth-century quantum theory acknowledge that light exhibits *both* wave-like and particle-like behaviors.¹¹⁷

The historical record therefore “gives us reason to suppose that [current scientific theories] will eventually turn out to be false.”¹¹⁸ The response to this argument from history comes from a school of thought called scientific realism, which argues that the view that our theories are destined to fail is too pessimistic.¹¹⁹ After all, much of what we do each day depends on the predictive success of scientific theories; we can count on airplanes not to fall out of the sky and electricity to power our homes because the scientific theories underlying these

108. See THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* 125–26 (4th ed. 2012).

109. See *id.* at 64–65.

110. See *id.* at 89–90.

111. See *id.* at 68–70.

112. *Id.* at 68.

113. See *id.* at 68–69.

114. See *id.* at 69.

115. See *id.* at 169–70. Kuhn understood scientific inquiry as a puzzle-solving process that ensures progress in the sense of more problems solved and more precise solutions, but he rejected a teleological view of science as progressing toward an end goal such as truth. See *id.* Consequently, he concluded that “[w]e may . . . have to relinquish the notion, explicit or implicit, that changes of paradigm carry scientists and those who learn from them closer and closer to the truth.” *Id.* at 169.

116. See *id.* at 205; STALEY, *supra* note 99, at 167.

117. See STALEY, *supra* note 99, at 174.

118. PAUL DICKEN, *A CRITICAL INTRODUCTION TO SCIENTIFIC REALISM* 2 (2016).

119. See *id.* at 1.

technologies are mostly true.¹²⁰ Within the philosophy of science, this optimistic view is called the “No-Miracles Argument.”¹²¹ In the words of Hilary Putnam, “[t]he positive argument for realism is that it is the only philosophy that does not make the success of science a miracle.”¹²²

But even proponents of scientific realism do not regard empirically successful theories as true, but rather as “approximately true.”¹²³ Scientific realists argue that when a theory enjoys empirical success, for example, by predicting novel experimental outcomes or by facilitating technological progress, the best explanation for that success is that the theory is at least approximately true.¹²⁴ For example, in the language of scientific realism, the theory that anthropogenic greenhouse gases have contributed to the warming of the planet is approximately true because it is the best explanation of the observed phenomena.¹²⁵ This idea of approximate truth not only acknowledges the logical gaps in inductive reasoning discussed above but also better describes the ultimate goals of scientific inquiry. Scientific theories are working approximations of the actual world subject to a process of confirmation over time.¹²⁶

In fact, science uses models and idealizations that do not reflect the actual world at all.¹²⁷ For example, the scientific theory called Charles’ Law predicts that “at constant pressure, the volume of a given mass of an ideal gas is directly proportional to its absolute temperature.”¹²⁸ The “ideal gas” is a fiction; it is “composed of dimensionless, spherical molecules that are not subject to friction and exhibit no intermolecular attraction.”¹²⁹ Even though no actual gas shares these properties, scientists have been able to “get a reasonably good approximation of the behavior of a real gas by applying Charles’ Law *as if* these assumptions were true.”¹³⁰ The language used to describe scientific theories routinely describes “idealized structures,” or models, that incorporate assumptions that do not strictly correspond to the actual world.¹³¹ Scientific models draw on mathematics, visual and three-dimensional models, and, increasingly, computer-based simulations.¹³² But whatever the form, they frequently incorporate idealizations designed to simplify or “exemplify” some property of

120. *See id.* (“[S]cience works, therefore it is (at least approximately) true.”).

121. *See id.* at 2; *see also* STATHIS PSILLOS, SCIENTIFIC REALISM: HOW SCIENCE TRACKS TRUTH 70–71 (1999).

122. PSILLOS, *supra* note 121, at 71 (quoting HILARY PUTNAM, 1 PHILOSOPHICAL PAPERS: MATHEMATICS, MATTER AND METHOD 73 (1975)).

123. STALEY, *supra* note 99, at 167.

124. *See id.*

125. *See* discussion *supra* Section I.A.

126. *See* PSILLOS, *supra* note 121, at 276–77.

127. *See* STALEY, *supra* note 99, at 46–47.

128. *Id.* at 46.

129. Catherine Z. Elgin, *Is Understanding Factive?*, in EPISTEMIC VALUE, *supra* note 93, at 326.

130. STALEY, *supra* note 99, at 47.

131. *See id.*

132. *See id.* at 45.

interest.¹³³

The use of these fictions casts considerable doubt on the epistemic status of scientific knowledge as knowledge. After all, given the truth condition, most epistemologists would characterize knowledge as factive. Scientific theories that incorporate idealizations are not factive because they do not correspond to a fact about the actual world.¹³⁴ Moreover, scientific theories that fail to provide complete explanations of natural phenomena may fail the “truth” test. But few would deny that scientific inquiry is cognitively valuable and that scientific theories have advanced human understanding of the world.

For these reasons, perhaps scientific *understanding*, rather than scientific knowledge, is a more accurate way of describing the end goals of science. Indeed, philosopher Catherine Elgin makes such an argument from within the discipline of epistemology.¹³⁵ She argues that scientific understanding is not factive and therefore unlike knowledge, but that it is nonetheless “cognitively valuable.”¹³⁶ Though idealizations like Charles’ Law are fictions, they give scientists “epistemic access to matters of fact that are otherwise difficult or impossible to discern.”¹³⁷ She argues that even falsehoods that purport to be true but are later proved false can be “felicitous” if they respond to a “body of information in a way that answers to the evidence better than” previous scientific accounts.¹³⁸ She uses Copernicus’s understanding of the Earth’s orbit as circular as an example.¹³⁹ Copernicus’s belief is today considered false, having been replaced first by the notion that Earth’s orbit is elliptical and later by theories of relative motion.¹⁴⁰ Each step, she argues, is a “cognitive advance” that improves our understanding of planetary motion even if “no one claims that science has as yet arrived at the *truth* about the motion of the planets.”¹⁴¹

The critical point of the philosophical literature is that scientific knowledge is epistemologically different from other forms of knowledge. If empirically successful scientific theories reflect only “approximate truth,” absolute truth cannot be the metric for evaluation of scientific claims. Unlike a deductive argument, a true premise in an inductive argument does not guarantee the truth of the conclusion.¹⁴² Inductive arguments are matters of degree; if the premise

133. See Elgin, *supra* note 129, at 327–28 (explaining how idealizations serve as “exemplars” of “features they share with the facts” but are difficult to directly observe or otherwise access).

134. See *id.* at 327 (recognizing that “many of the propositions that fall within the scope of ‘the current state of scientific knowledge’ are not strictly *knowledge* because they are not true”—for example, scientific theories about the behavior of gases are based on assumptions about an “ideal gas” that does not actually exist).

135. See *id.*

136. *Id.* at 329.

137. *Id.* at 327.

138. *Id.* at 329.

139. See *id.*

140. See *id.* at 325–26.

141. *Id.* at 326 (emphasis added).

142. See *Deductive and Inductive Arguments*, INTERNET ENCYCLOPEDIA OF PHILOSOPHY, <http://www.iep.utm.edu/ded-ind> [<https://perma.cc/64JY-H6MJ>].

is indeed true, the conclusion is not *likely* to be false.¹⁴³

But although inductive arguments are matters of degree, scientists and philosophers nevertheless evaluate the strength of inductive arguments using a number of tools. Even Thomas Kuhn recognized that some methodological values remain constant and do not change with paradigm shifts in scientific theory.¹⁴⁴ Scientists routinely value a theory's predictive accuracy, consistency, simplicity, breadth, and fruitfulness.¹⁴⁵ In addition, scientific methods persist even when theories change.¹⁴⁶ Moreover, even when one theory is supplanted by another, the new theory may nonetheless continue to recognize the significance of past evidentiary observations.¹⁴⁷ And scientists tend to use similar reasoning when evaluating the strength of a given theory.¹⁴⁸ Indeed, scientific realists defend their view—that the best explanation for an empirically successful theory is that it is approximately true—by noting that it mirrors how scientists evaluate the strength of any given theory.¹⁴⁹ That is, “scientists themselves accept, in any given domain, the theory that offers the best explanation of the phenomena in that domain.”¹⁵⁰

If we assume that sound methods produce reliable scientific data or observations, we still need to know how to measure the strength of an inductive inference from the scientific evidence. In other words, we need to be able to assess which theory provides the best explanation in the sense that the evidence supports a given hypothesis more than others. Contemporary scientists speak in terms of whether the evidence “confirms” a given hypothesis, often using probability theory to assess the strength of this inductive inference.¹⁵¹ For example, Bayesian probability theory, favored by philosophers of science, seeks to measure the “degree of belief” a scientist has in a given hypothesis upon discovery of particular evidence.¹⁵²

Another (and more widely used) strain of probability theory, frequentism, “understands probability statements as statements about the relative frequency with which a certain outcome would occur under repeated execution of some

143. *See id.*

144. *See* KUHN, *supra* note 108, at 184.

145. *See id.* at 184, 204. Other philosophers have suggested similar lists of qualities that enhance a theory's explanatory value. *See, e.g.*, PSILLOS, *supra* note 121, at 171 (describing qualities such as “coherence with other established theories, consilience, completeness, unifying power, lack of ad hoc features and capacity to generate novel predictions”). As one philosopher argues, these qualities “capture the *explanatory power* of a theory, and explanatory power is potentially confirmatory.” *Id.*

146. *See* STALEY, *supra* note 99, at 69.

147. *See id.* at 68.

148. *See id.* at 172.

149. *See id.*

150. *Id.* This is a form of reasoning called “inference to the best explanation.” *Id.* (emphasis omitted). In this mode of reasoning, scientists “infer from the premise that a given hypothesis would provide a ‘better’ explanation for the evidence than would any other hypothesis, to the conclusion that the given hypothesis is true.” *Id.* (internal quotation omitted).

151. *See* Franz Huber, *Confirmation and Induction*, INTERNET ENCYCLOPEDIA OF PHILOSOPHY, <http://www.iep.utm.edu/conf-ind> [<https://perma.cc/DG9C-6SGK>].

152. *See* STALEY, *supra* note 99, at 111.

process.”¹⁵³ Frequentist approaches employ statistical analyses to test particular hypotheses, usually against each other or a target hypothesis called the “null hypothesis.”¹⁵⁴ As often applied, an outcome—for example, a correlation between a drug and reduced health risk—is determined to be “statistically significant” if the statistical analysis shows a probability value of less than .05.¹⁵⁵ This means the observed result (here, a beneficial health effect) would occur by chance only one out of twenty times.¹⁵⁶

The takeaway from all of this is that probability theories share a common objective: they seek to test the relative strength of theories or hypotheses so that scientists can continually refine their theories. Application of the various strands of probability theory requires knowledge of the underlying mathematics and the assumptions embedded in the mathematical models. Fortunately, to appreciate that the epistemic value of scientific understanding does not depend on absolute truth, we need only a basic understanding of the process of scientific inquiry and the ultimate objective of scientific understanding, which is not truth per se, but something that approximates truth and is always open to revision through the processes of confirmation. Legal doctrine should be based on this basic understanding of the inherent nature of scientific knowledge rather than on inapplicable notions of absolute truth versus falsity.

B. DISTINGUISHING SCIENTIFIC UNCERTAINTY FROM UNRELIABLE SCIENCE

If we accept that what we understand as “truth” in the context of scientific knowledge necessarily involves uncertainty, how do we assess statements about the uncertainty of scientific knowledge and inquiry? When a speaker asserts that scientists are not certain whether the burning of fossil fuels has contributed to climate change, this statement is “true” in the sense that all scientific knowledge is premised on some uncertainty. But it is a false—or at best, misleading—representation of the current state of scientific knowledge. According to an overwhelming majority of scientists, the theory that anthropogenic emissions have caused increased warming is the best explanation for observed warming, a conclusion that results from the processes of confirmation by reliable scientific methods.

Of course, if a scientific finding results from *unreliable* scientific methods or cannot be confirmed in subsequent studies, that finding is uncertain or simply

153. *Id.* at 135.

154. *See id.* at 140–42.

155. *See* Kelly Servick, *It Will Be Much Harder To Call New Findings ‘Significant’ if This Team Gets Its Way*, SCIENCE (July 25, 2017, 2:30 PM), <http://www.sciencemag.org/news/2017/07/it-will-be-much-harder-call-new-findings-significant-if-team-gets-its-way> [<https://perma.cc/J2H2-C2P7>] (noting “the long-standing use of a probability value (p-value) of less than 0.05 as the gold standard for significant results” and discussing the objections of some scientists to the use of a specific threshold). Although scientists commonly use frequentist statistical methods to analyze data, philosophers of science typically favor Bayesianism “as based on a more coherent set of principles.” STALEY, *supra* note 99, at 135.

156. *See* Servick, *supra* note 155.

false, and it would be misleading to describe it otherwise. Imagine, for example, that the results of a preclinical study of a new drug designed to treat cancer suggest that the drug increases the likelihood of remission in patients. But the study's investigators did not conduct a "double-blind," placebo-controlled study; in other words, the investigators recording the data knew which subjects had taken the drug and which had not. This presents the problem of confirmation bias, which means that the researchers were more likely to see the results they were hoping to see.¹⁵⁷ The unreliable methodology calls the results into question. Moreover, if the study's findings cannot be reproduced in subsequent experiments by other researchers, the findings are even more unreliable.

This is not simply a hypothetical problem. In recent years, various scientific disciplines have been rattled by accusations that their published scientific studies are subject to bias and unreliable methodology. The problem is well documented in the field of biomedical research where the majority of published findings—an estimated 75% to 90% for preclinical studies—cannot be reproduced.¹⁵⁸ Scientific journals are beginning to address concerns regarding methodology and bias. For example, in 2013, the well-respected journal *Nature* announced that it would impose editorial safeguards to address problems of reliability and reproducibility in the life sciences.¹⁵⁹ Among the changes are measures that encourage authors' thorough and transparent reporting of data, methodology, and statistical analysis.¹⁶⁰

These issues are a real and pressing concern for all fields of science because the conditions that produce them are endemic. Academic recognition and funding structures place considerable pressure on researchers to report "new" findings; most published studies confirm "favorite" hypotheses, and few incentives exist to publish findings that undermine or confirm previous findings.¹⁶¹ Confirmation bias subjectively influences what researchers see, and publication bias influences what journals publish, jointly resulting in the selective reporting of findings that confirm the latest big idea.¹⁶² The end result can be an inaccurate picture of the support for a given scientific theory. Indeed, biases, unreliable methods, and flawed experimental design can lead to findings that are simply false.¹⁶³ And although scientific findings that are reliably confirmed cannot claim absolute truth or certainty, they can and should be distinguished from findings based on bad science. The uncertainty inherent in scientific inquiry is not the same as the uncertainty of a theory based on unreliable or biased scientific studies.

157. See C. Glenn Begley & John P.A. Ioannidis, *Reproducibility in Science: Improving the Standard for Basic and Preclinical Research*, 116 CIRCULATION RES. 116, 117 (2015) (citing studies).

158. See *id.* at 116.

159. See Editorial, *Reducing Our Irreproducibility*, 496 NATURE 397, 398 (2013).

160. See *id.*

161. See Begley & Ioannidis, *supra* note 157, at 120.

162. See *id.* at 117, 120; Jonah Lehrer, *The Truth Wears Off*, NEW YORKER, Dec. 13, 2010, at 52, 55.

163. See Lehrer, *supra* note 162, at 55–56.

C. FACT OR OPINION: THE LINE BETWEEN SCIENTIFIC DISCOURSE AND CORPORATE
SPEECH ABOUT SCIENCE

Given the complexity involved in evaluating statements regarding scientific knowledge, we might wonder whether antifraud laws can be coherently applied to corporate speech about scientific knowledge. But corporate entities frequently make claims about the scientific efficacy and safety of their products and services. And agencies, courts, and juries routinely evaluate corporate speech under federal and state consumer protection and unfair competition laws, as well as laws regarding wire fraud and securities disclosures. Courts applying antifraud provisions to this type of corporate speech must therefore grapple with whether corporate claims regarding scientific knowledge constitute unlawful misrepresentations.

Given the epistemic issues discussed above, it is not surprising that courts sometimes struggle to identify the factual assertions in these claims. Like the political discourse surrounding the investigations into ExxonMobil's representations regarding climate science, court opinions sometimes fail to distinguish scientific debate from corporate speech that purports to represent that debate. Failure to make this distinction leads to the incorrect classification of corporate speech about science as pure opinion devoid of factual assertions. This characterization of speech as opinion raises obstacles under both the law of fraud and the First Amendment. To ensure that this threshold question is answered correctly, this section explains how corporate speech about science often contains factual assertions that can subject companies to liability if they are false or misleading.

Understanding the fact–opinion distinction requires some knowledge of the law of fraud generally. Because courts use the common law of fraud as a reference point when analyzing statutory antifraud provisions, the basic common law elements are useful background. The newest Restatement of Torts defines fraudulent misrepresentation as follows: “One who fraudulently [that is, knowingly]¹⁶⁴ makes a material misrepresentation of fact, opinion, intention, or law, for the purpose of inducing another to act or refrain from acting, is subject to liability for economic loss caused by the other’s justifiable reliance on the misrepresentation.”¹⁶⁵ A “misrepresentation is material if a reasonable person would give weight to it in deciding whether to enter into the relevant transaction, or if the defendant knew that the plaintiff would give it weight (whether reasonably or not).”¹⁶⁶ This rules out cases of corporate spin or what the

164. The Third Restatement of Torts identifies three ways a misrepresentation can be “fraudulent”:

A misrepresentation is fraudulent if the maker of it (a) knows or believes that the matter is not as he represents it to be, (b) knows that he does not have the confidence in the accuracy of his representation that he states or implies, or (c) knows that he does not have the basis for the representation that he states or implies. RESTATEMENT (THIRD) OF TORTS: LIAB. FOR ECON. HARM § 10 (AM. LAW INST., Tentative Draft No. 2, 2014); *see also* RESTATEMENT (SECOND) OF TORTS § 526 (AM. LAW INST. 1977) (containing a similar definition of “fraudulent” in the context of business transactions).

165. RESTATEMENT (THIRD) OF TORTS: LIAB. FOR ECON. HARM § 9.

166. *Id.* § 9 cmt. d.

Restatement calls “puffery,” defined as “a seller’s broad and predictably exaggerated statements about the quality of an item, as distinct from particular claims of fact.”¹⁶⁷ The materiality requirement as it applies to corporate speech about science therefore dovetails with the misrepresentation element; if a statement amounts to puffery, it is arguably not misleading and therefore not a misrepresentation.

The Restatement acknowledges that “fraud” is often used in a more general way to mean “knowing misrepresentation” without incorporating all the elements of the tort.¹⁶⁸ Indeed, as discussed in Part I, state attorneys general may often enforce state securities and consumer protection laws on the basis of material misrepresentations or omissions without proving reliance, damages, and, in some cases, intent.

Under all antifraud laws, courts must confront the misrepresentation element of fraud when they evaluate the truth or falsity of corporate speech. Although the most obvious kind of misrepresentation is a false statement of fact (for example, when a seller falsely states that a house is free of latent defects), the Restatement makes clear that misrepresentations can arise from opinions that imply facts or assertions that are false, as well as “ambiguous statements and half-truths.”¹⁶⁹ Liability in these cases depends on the context, but the Restatement notes that false implication cases “are best resolved by asking whether the defendant’s statements included or implied any assertions that are capable of being proven false.”¹⁷⁰ Furthermore, a statement that expresses an opinion, of either the speaker or a third party, is itself a statement that the speaker believes she or someone else holds that opinion.¹⁷¹

Thus, even at common law, the distinction between facts and opinions is not the critical one.¹⁷² Rather, a statement could be fraudulent if it expressed an insincerely held opinion or if it implied facts or conveyed a level of confidence that the speaker knew to be false. For example, if ExxonMobil were to claim today that the link between greenhouse gas emissions and a warming planet is uncertain, a plaintiff could argue that the statement is fraudulent for two reasons: (1) ExxonMobil does not sincerely believe the statement or (2) the statement implies assertions—namely that the scientific support for this link is highly contested—that the plaintiff can prove are false. The first theory of liability requires evidence that corporate agents held views contrary to their public statements, as was the case in the federal litigation against tobacco

167. *Id.*

168. *See id.* § 9 cmt. a.

169. *See id.* § 9 cmt. c; *see also* RESTATEMENT (SECOND) OF TORTS § 529 (explaining when a statement is misleading because it is incomplete).

170. RESTATEMENT (THIRD) OF TORTS: LIAB. FOR ECON. HARM § 9 cmt. c.

171. *See* RESTATEMENT (SECOND) OF TORTS § 525 cmt. c.

172. Opinions that are sincerely held and do not contain implied assertions are actionable in limited circumstances, such as when the speaker is a fiduciary. *See* RESTATEMENT (THIRD) OF TORTS: LIAB. FOR ECON. HARM § 14. Because these kinds of opinions are not at issue in the cases relevant to corporate speech regarding science, I do not discuss the applicable law here.

companies for fraudulent public statements regarding the link between smoking and lung cancer.¹⁷³ Under the second theory, the plaintiff must establish the falsity of factual assertions implied by the public statements.

The second theory is central to the Supreme Court's recent interpretation of Section 11 of the Securities Act in *Omnicare, Inc. v. Laborers District Council Construction Industry Pension Fund*.¹⁷⁴ Section 11 creates a cause of action for the purchaser of a security when a company's registration statement (required for a public offering) contains "an untrue statement of a material fact or omit[s] to state a material fact . . . necessary to make the statements therein not misleading."¹⁷⁵ The statements at issue in the case expressed the company's views about whether its contracts complied with federal and state laws.¹⁷⁶ Because the statements began with the phrase "We believe," the Court treated them as opinions, but acknowledged the two bases discussed above for liability under the common law.¹⁷⁷ *Omnicare* could therefore be liable if it did not sincerely believe it had complied with the law (a theory the plaintiffs did not assert) or if a reasonable investor would understand the statement to imply facts "about the speaker's basis for holding that view."¹⁷⁸

The Court found support for its interpretation of the omissions clause in common law principles regarding implied misrepresentation: An opinion statement can be misleading if it omits facts that would correct the reasonable investor's false inferences from implied assertions.¹⁷⁹ Hence, if *Omnicare* never consulted a lawyer, contrary to the reasonable inference to be drawn from its statement about legal compliance, its opinion statement could be misleading.¹⁸⁰ In remanding, the Court directed the lower courts to first review the plaintiffs' complaint for allegations that *Omnicare* had, in fact, omitted a material fact and then to inquire whether the omitted fact rendered the statement misleading when considered in the context of the information *Omnicare* provided in the registration statement.¹⁸¹

The Court's analysis in *Omnicare, Inc.* applies to disclosures regarding scientific information as well. Just as *Omnicare*'s statement regarding legal compliance implied that the company consulted with an attorney, a statement regarding the findings of a particular scientific study implies that the company consulted with relevant experts. Hence, if a pharmaceutical company were to claim that a given scientific study "demonstrated" a drug's efficacy for a given purpose, a reasonable investor could infer that the company consulted the

173. See *infra* note 421 and accompanying text.

174. 135 S. Ct. 1318 (2015).

175. 15 U.S.C. § 77k(a) (2012).

176. See *Omnicare, Inc.*, 135 S. Ct. at 1323.

177. See *id.* at 1325–27.

178. *Id.* at 1328.

179. See *id.* at 1328–29.

180. See *id.* at 1328.

181. See *id.* at 1333.

scientists who conducted the study and had a reasonable basis for making such a strong claim.

Courts struggle, however, to differentiate corporate statements *about* scientific findings from scientific debate itself. For example, in one shareholder class action under the securities laws, the plaintiffs alleged that a pharmaceutical company failed to disclose the serious methodological problems of a scientific study.¹⁸² These allegations included failure to disclose that the study was not double blinded and that the results were not statistically significant—facts that, if true, would undermine the strength of the study’s findings.¹⁸³ Moreover, the defendants stated that the study “demonstrated” a statistically significant effect.¹⁸⁴ Despite these omissions, the court concluded that the plaintiffs had failed to plead facts showing that the company’s statements were false or misleading.¹⁸⁵

To reach this conclusion, the court confused speech about science with scientific debate. It treated the defendants’ characterizations of the study as within a range of reasonable views and therefore a matter of reasonable disagreement.¹⁸⁶ The court decided that the defendants need not “second-guess” a study’s methodology, noting that scientists can disagree about matters of method and interpretation.¹⁸⁷ The court also observed that the study “was published in a peer-reviewed journal, indicating that specialists in the field believed it had some scientific value.”¹⁸⁸ But this question of value is the contested issue in the case: the value that scientists would assign to the study’s findings is relevant in determining whether the defendants’ statements regarding the study are misleading. If the study’s flaws completely undermine the defendants’ statements regarding the study’s value, the defendants arguably lack a basis for those statements under *Omnicare, Inc.*

A false advertising case decided by the Second Circuit in 2013 further illustrates the dangers of treating corporate speech about scientific research as part of the larger scientific, academic discourse on a given issue. In *ONY, Inc. v. Cornerstone Therapeutics, Inc.*, a manufacturer of a surfactant used to treat the underdeveloped lungs of premature infants sued the manufacturer of a competing surfactant, alleging that the defendant had sponsored, disseminated, and promoted a journal article that contained false statements about the efficacy of

182. See *Padnes v. Scios Nova Inc.*, No. C 95-1693 MHP, 1996 WL 539711, at *2 (N.D. Cal. Sept. 18, 1996). Although this action was brought under different securities laws, the relevant statutory language is like that at issue in *Omnicare, Inc.* See *id.* at *3 (“Rule 10b-5 makes it unlawful ‘[t]o make any untrue statement of fact or to omit to state a material fact necessary to make the statements, in light of all the circumstances in which they were made, not misleading.’” (alteration in original)).

183. See *id.* at *2.

184. *Id.*

185. *Id.* at *5–6.

186. See *id.* at *5.

187. *Id.*

188. *Id.* at *6.

the defendant's surfactant relative to the plaintiff's surfactant.¹⁸⁹ The plaintiff alleged that the article omitted critical data that would qualify its conclusions, failed to cite contrary studies, and contained other methodological problems, including the use of biased data.¹⁹⁰

The court had to determine whether any of the defendants' actions constituted "false or misleading description[s] of fact, or false or misleading representation[s] of fact" under the Lanham Act.¹⁹¹ In doing so, it focused on the journal article, rather than the acts of disseminating and promoting the article.¹⁹² Not surprisingly, the court struggled with the fact–opinion distinction in the context of scientific research. After noting how "empirical facts" are subject to ongoing scientific scrutiny, the court ultimately concluded that scientific research more closely resembles "ideas" or "opinions," reasoning that "the trial of ideas [should] play[] out in the pages of peer-reviewed journals" rather than the courts.¹⁹³

As the discussion of scientific knowledge in section II.A demonstrates, the court was correct to conclude that scientific discourse is closer to opinion than fact.¹⁹⁴ The court's focus on the article is, however, another example of the tendency to conflate scientific discourse with corporate speech about scientific findings. The "trial of ideas" contemplated by the court did, at least in part, play out in the pages of the peer-reviewed journal that published the first article. The journal later published letters challenging the article's conclusions and methodology, as well as a response to the letters by the article's authors.¹⁹⁵ Conversely, when the defendant disseminated and promoted the article to practicing doctors, it did not include this or other contrary authority, thereby failing to place the article in its academic context.¹⁹⁶ A practicing physician may be unaware of an ongoing debate and unable to devote the time necessary to uncover methodological problems, particularly if exposed only to a press release or other promotional material.¹⁹⁷ Dissemination and promotion of an article can be misleading when the intended audience lacks this context.

189. See 720 F.3d 490, 493–94 (2d Cir. 2013).

190. See *id.* at 494–95.

191. *Id.* at 496 (quoting 15 U.S.C. § 1125(a)(1) (2012)).

192. See *id.* at 496–97.

193. *Id.* at 497.

194. Of course, scientific theories may be based on empirical facts, but the theories that interpret these facts surely look more like ideas and opinions than verifiable facts. Karl Coplan, for example, has described climate science as more of "an idea than an objective fact." Karl S. Coplan, *Climate Change, Political Truth, and the Marketplace of Ideas*, 2012 UTAH L. REV. 545, 570. Any governmental attempt to silence dissenting views on climate change within the public sphere would therefore violate fundamental First Amendment principles. See *id.*

195. See *ONY, Inc.*, 720 F.3d at 495.

196. See *id.* (noting the plaintiff's allegation that the article did not contain citations to contrary literature known to the defendants and that the letters responding to the article were published after the district court dismissed the complaint).

197. See Recent Cases, *ONY, Inc. v. Cornerstone Therapeutics, Inc.*, 720 F.3d 490 (2d Cir. 2013), 127 HARV. L. REV. 1815, 1820–21 (2014).

In another case, the Fifth Circuit recognized this critical distinction and distanced itself from the Second Circuit's approach under the Lanham Act.¹⁹⁸ In this case, the court declined to treat "commercial statements relating to live scientific controversies" as opinions rather than facts.¹⁹⁹ Instead of focusing on the underlying scientific article, the panel followed the district court and focused on the promotional statements regarding the article, emphasizing that these statements were directed at consumers rather than scientists.²⁰⁰ To determine whether the statements, which made scientific claims regarding the plaintiff's product, were misleading, the jury had to consider expert testimony regarding various lab tests.²⁰¹ But as the panel noted, juries frequently consider competing evidence regarding scientific claims.²⁰² If this were enough to shield companies from liability under the Lanham Act, the statute would lack relevance because "many, if not most, products may be tied to public concerns with the environment, energy, economic policy, or individual health and safety."²⁰³

Real world examples that support the court's line drawing—between scientific debate and corporate speech about science—abound. Scientific research enables the design of the products, drugs, and technologies on which society depends, but these innovations are not without risks. Since the dawn of the chemical age at the beginning of the twentieth century, industry has introduced thousands of new chemical substances into the market.²⁰⁴ Today, over "80,000 chemicals are registered for use in the United States."²⁰⁵ Scientists rarely speak directly to the public about scientific assessments of risk. Rather, the public depends heavily on the corporate agents that make, market, and distribute products to convey truthful information about a product's safety and efficacy.

False advertising, unfair competition, and other antifraud laws ideally operate to ensure that consumers and the market typically make decisions based on accurate information. To further this objective, however, courts must separate scientific discourse from corporate speech regarding science. Although scientific theories are not easily understood in truth terms, speech that seeks to represent the state of scientific understanding is a different matter.

Once this distinction is clear, a corporate speaker cannot characterize speech about science as opinion to avoid liability. Moreover, a First Amendment

198. *Eastman Chem. Co. v. Plastipure, Inc.*, 775 F.3d 230 (5th Cir. 2014).

199. *Id.* at 236.

200. *See id.* at 236.

201. *See id.* at 238–39.

202. *See id.*

203. *Id.* at 236 (quoting *Cent. Hudson Gas & Elec. Corp. v. Pub. Serv. Comm'n*, 447 U.S. 557, 563 n.5 (1980)).

204. *See generally* ALFRED D. CHANDLER, JR., *SHAPING THE INDUSTRIAL CENTURY: THE REMARKABLE STORY OF THE EVOLUTION OF THE MODERN CHEMICAL AND PHARMACEUTICAL INDUSTRIES* (2005) (detailing the emergence and growth of the chemical and pharmaceutical industries in the twentieth century).

205. *About NTP*, NAT'L TOXICOLOGY PROGRAM, U.S. DEP'T OF HEALTH & HUMAN SERVS., <https://ntp.niehs.nih.gov/about/index.html> [<https://perma.cc/29SY-C3RG>].

defense to a fraud action will turn not on an “artificial dichotomy between ‘opinion’ and fact” but on whether the speech implies factual assertions that a reasonable factfinder could conclude are false.²⁰⁶ That corporations are making statements about scientists’ opinions when they make statements about scientific studies or evidence does not turn their representations into nonactionable opinions. If this were the case, commercial actors could easily evade liability for statements misrepresenting public health risks by simply speaking in terms of science.

III. EVALUATING THE ACCURACY OF STATEMENTS REGARDING SCIENTIFIC KNOWLEDGE

Assuming corporate statements regarding scientific knowledge are a category of speech separate from the scientific discourse or debate on which they draw, we need a coherent approach to the question of when they are false or misleading. This Part draws on court opinions interpreting federal and state antifraud laws to delineate the key issues surrounding how to evaluate speech about science. Confusion about how to approach speech about science is at the heart of many of the unresolved questions under federal advertising, labeling, and unfair competition laws—particularly as these laws apply to representations made by pharmaceutical and supplement companies. These different statutory schemes are often analyzed in isolation, making it difficult for courts and scholars to see how the truth of a claim regarding scientific knowledge differs from one context to the next. This Part identifies common themes in judicial analyses of misleading speech under these various statutory schemes and uses them to draw conclusions about what factors should guide judicial evaluations of corporate speech regarding scientific knowledge.

The following sections lay out an approach designed to guide judicial decision making. The first section illustrates how the misleadingness inquiry depends on an assessment of what the speaker is saying *explicitly* about the underlying science. The second section makes the argument that this assessment often requires an analysis of not only the speaker’s words but also the costs and benefits of the speech and sometimes the regulatory context. The final section explores how people process and understand scientific information about risk. Because cognitive biases and cultural values can distort risk perception, a contextual analysis of corporate speech about science must acknowledge these barriers to effective risk communication.

A. EXPLICIT STATEMENTS REGARDING THE STRENGTH OF SCIENTIFIC EVIDENCE

Though scientific understanding is often contingent and dependent on an ongoing process of confirmation, statements regarding a particular scientific study or the state of science with regard to a particular issue can be more or less

206. *Milkovich v. Lorain Journal Co.*, 497 U.S. 1, 19, 21 (1990).

true at a given moment in time. To say today that the science linking climate change to human activities is uncertain would be less true than if the same statement were made thirty years ago. This is so because the overwhelming majority of scientists currently believe that this link is well established. This consensus does not mean that dissenting views are nonexistent. Indeed, we cannot rule out the possibility, however small, that these dissenting views might someday gain greater prominence within scientific circles. Such a development would make the statement about scientific uncertainty an accurate representation, but only in hindsight.

The relationship between the consumption of eggs and heart disease illustrates how the accuracy of corporate speech representing scientific knowledge depends on a given moment in time. In 1977 the Seventh Circuit reviewed a Federal Trade Commission (FTC) order that prevented an egg-industry trade association from making statements that “there is no scientific evidence linking the eating of eggs to an increased risk of heart and circulatory disease.”²⁰⁷ In reviewing the administrative record, the court emphasized the “large body” of scientific evidence supporting the theory that consumption of eggs, which contain large amounts of dietary cholesterol, can increase cholesterol in the blood stream of many people, which can in turn lead to heart disease.²⁰⁸ The trade association had argued that some scientists and doctors did not believe that the scientific evidence supported the link between egg consumption and risk of heart disease, but the association did not dispute that many experts would support the theoretical link based on a “large body” of scientific work.²⁰⁹

The court had little trouble agreeing with the FTC’s conclusion that the trade association’s characterization of the scientific evidence was false and misleading. By explicitly stating that “no” scientific evidence supported the link, the trade association had made false factual statements regarding the state of relevant scientific knowledge:

The various scientific studies and the expert opinions on those studies constitute evidence, not merely in the legal sense, but in the commonly understood sense of that word. That a given expert is not persuaded by the studies does not remove them, or another expert’s contrary opinion, from the category of evidence.²¹⁰

Although the trade association could make statements describing contrary points of view, it could not do so without clearly disclosing that many experts believe that the scientific evidence suggests a link between egg consumption and the risk of heart disease.²¹¹

207. Nat’l Comm’n on Egg Nutrition v. Fed. Trade Comm’n, 570 F.2d 157, 160 (7th Cir. 1977).

208. *See id.* at 160–61.

209. *See id.* at 161.

210. *Id.*

211. *See id.* at 164.

Today, the link between dietary cholesterol and the risk of cardiovascular disease is much more contested. Scientific studies have shown that absorption of dietary cholesterol into the bloodstream varies greatly from individual to individual.²¹² And even if dietary cholesterol increases total blood cholesterol, it is not clear that this increase affects the particular classes and subclasses of cholesterol associated with an increased risk of heart disease.²¹³ Most experts today would say that the scientific evidence does not support a link between moderate egg consumption and increased risk of cardiovascular disease in healthy individuals.²¹⁴

Nevertheless, the changing landscape of scientific thought regarding eggs, dietary cholesterol, and heart disease does not necessarily undermine the logic of the Seventh Circuit's decision. Although it would be false to characterize the scientific evidence as corroborative of the theoretical link today, it was a true characterization of the scientific knowledge regarding this issue in the 1970s. This is admittedly a line-drawing exercise that requires courts, juries, and agencies like the FTC to determine whether a statement is an accurate characterization of the current state of scientific knowledge. But if we do not draw lines, corporate speakers will be free to misrepresent the state of scientific knowledge. In the egg case, the trade association's statement happens to be more accurate today than it was when first conveyed, but consumer protection laws should encourage accurate representations of contemporaneous scientific knowledge rather than lucky guesses about the state of scientific knowledge in the future.

Many years ago, after the Supreme Court declared that truthful commercial speech is entitled to First Amendment protection,²¹⁵ Frederick Schauer cautioned that the Seventh Circuit's decision regarding the trade association's speech infringed on the "freedom of characterization."²¹⁶ He rightly observed that reasonable disagreement will complicate a determination of what constitutes *evidence* and how much or little of it qualifies as "*no evidence, some evidence, or substantial evidence.*"²¹⁷ Although he was correct to note the difficulty of drawing these lines in some cases, his concern is likely overstated. To say *no evidence* exists, for example, when most scientists in the relevant field would disagree is a false statement. We can similarly address his concern regarding advertisements that use words such as "excellent" (for example, an advertisement for a car with excellent gas mileage) to describe results from field

212. See Karen Collins, *The Debate About Dietary Cholesterol: Should Nutrition Recommendations Set a Limit?*, AM. C. CARDIOLOGY (Aug. 20, 2015), <http://www.acc.org/latest-in-cardiology/articles/2015/08/19/12/57/the-debate-about-dietary-cholesterol> [https://perma.cc/57X6-PEZT].

213. See *id.*

214. See *id.*; *Eggs*, HARV. T.H. CHAN SCH. PUB. HEALTH, <https://www.hsph.harvard.edu/nutritionsource/eggs> [https://perma.cc/S9DX-37LQ].

215. See *Va. State Bd. of Pharmacy v. Va. Citizens Consumer Council, Inc.*, 425 U.S. 748, 770–73 (1976).

216. Frederick F. Schauer, *Language, Truth, and the First Amendment: An Essay in Memory of Harry Canter*, 64 VA. L. REV. 263, 297 (1978).

217. *Id.*

or laboratory tests.²¹⁸ As Schauer notes, this claim “may not be confirmed with the same degree of objectivity because of the subjectivity inherent in the word used.”²¹⁹ But this is precisely why courts have treated language that makes such “bald assertions of superiority” as nonactionable puffery.²²⁰ Although an advertisement that a car gets forty miles per gallon is a factual statement representing the results of various tests, qualitative statements of superiority are usually treated as nonactionable opinions.²²¹

Conversely, a statement that purports to represent the state of scientific evidence or knowledge on a given issue is not a subjective opinion, but a factual representation of the state of scientific knowledge. As such, it can be explicitly misleading (as in the egg case) or implicitly misleading if a reasonable consumer would draw false inferences regarding the strength or weakness of scientific support for the claim. Schauer imagines a cigarette advertisement that “[t]here is evidence that cigarettes are not harmful” and concludes that the statement is literally true even though it is incomplete in failing to represent the contrary position.²²² This is a telling example of an implicitly misleading statement; tobacco companies were (at the time Schauer wrote the article) making this and similar claims, which courts later adjudicated as fraudulent.²²³ The claim is fundamentally misleading because it implies that *enough* scientific evidence exists to make the health consequences of smoking uncertain. As society later discovered, not even the tobacco companies believed this to be true.²²⁴ In addition, as the next section explains, whether corporate speech about science carries implied assertions that are misleading requires a contextual analysis.

B. IMPLIED MISREPRESENTATIONS REGARDING SCIENCE: A CONTEXTUAL ANALYSIS

1. Analyzing the Costs and Benefits of Speech

Consumer protection laws have long grappled with the misleading nature of implied falsehoods. For example, when Kraft advertised that its cheese slices contain five ounces of milk, consumers understood this claim to imply that the slices also contain the amount of calcium typically found in five ounces of

218. *See id.*

219. *Id.*

220. *See, e.g.,* *Pizza Hut, Inc. v. Papa John’s Int’l, Inc.*, 227 F.3d 489, 496 (5th Cir. 2000).

221. *See, e.g.,* *Am. Italian Pasta Co. v. New World Pasta Co.*, 371 F.3d 387, 393–94 (8th Cir. 2004) (holding the phrase “America’s Favorite Pasta” was nonactionable puffery); *Pizza Hut, Inc.*, 227 F.3d at 496, 499 (characterizing the claim “Better Ingredients. Better Pizza.” as unquantifiable and therefore nonactionable opinion).

222. *See* Schauer, *supra* note 216, at 298. Of course, the law of fraud has never settled for what Schauer characterizes as the “literal” truth. *See id.* Incomplete statements and half-truths can be misleading and actionable. RESTATEMENT (THIRD) OF TORTS: LIAB. FOR ECON. HARM § 9 cmt. c (AM. LAW INST., Tentative Draft No. 2, 2014).

223. *See, e.g.,* *United States v. Philip Morris USA Inc.*, 566 F.3d 1095, 1124 (D.C. Cir. 2009).

224. *See id.*

milk.²²⁵ This inference was false because the processing of the cheese depleted some of the calcium.²²⁶ Without information to the contrary, however, people may reasonably assume that the information supplied is relevant and supported by adequate evidence.²²⁷ In the case of Kraft, the inference regarding calcium is reasonable because the explicit statement regarding the amount of milk would have no relevance to a consumer in its absence.²²⁸ Similarly, consumers interpreting the statement “[t]here is evidence that cigarettes are not harmful” would reasonably infer that the information is relevant to their decision whether to smoke and that it is “as informative as required”—which requires, at the very least, the inclusion of directly conflicting, relevant information.²²⁹

Indeed, as legal scholars have noted, empirical research suggests that implied assertions are potentially more persuasive than explicit statements because “consumers develop stronger beliefs when they persuade themselves by following implications to their natural conclusions.”²³⁰ Research also suggests that consumers tend to remember implied assertions as if they were explicit and directly communicated.²³¹ Moreover, because people tend to form stronger beliefs when they reach their own conclusions, an inference drawn from an omission or incomplete statement can have a lasting, misleading effect.²³² For example, an advertisement that claims one product is the best at something can imply that specific competitors’ products are inferior.²³³

Assuming that statements carry an implied assertion that they are supported by adequate evidence, we face the question of what is adequate. As Richard

225. See Richard Craswell, *Taking Information Seriously: Misrepresentation and Nondisclosure in Contract Law and Elsewhere*, 92 VA. L. REV. 565, 603 (2006).

226. See *id.* Not surprisingly, the FTC concluded that these ads communicated a false “implied” claim that the cheese slice contained the same amount of calcium as milk. See *In re Kraft, Inc.*, 114 F.T.C. 40, 123–25 (1991).

227. See Craswell, *supra* note 225, at 602. In his discussion of the “adequate evidence” assumption, Craswell draws from Paul Grice’s work and, in particular, from Grice’s “Cooperative Principle,” a general principle that governs rational discourse. See PAUL GRICE, *STUDIES IN THE WAY OF WORDS* 26 (1989). The principle is as follows: “Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.” *Id.* Requirements of relevance and adequate evidence follow from the principle. See *id.* at 26–27.

228. See Craswell, *supra* note 225, at 603.

229. See *id.* at 602–03 (discussing the theory of the Cooperative Principle and its implications).

230. Rebecca Tushnet, *Running the Gamut from A to B: Federal Trademark and False Advertising Law*, 159 U. PA. L. REV. 1305, 1322 (2011).

231. See *id.* at 1322 & n.62 (citing articles discussing relevant research).

232. See *id.* at 1322–23, 1322 n.60 (citing studies).

233. See, e.g., *Clorox Co. P.R. v. Proctor & Gamble Commercial Co.*, 228 F.3d 24, 35–36 (1st Cir. 2000) (holding a factfinder could conclude that commercial for laundry detergent claiming “[w]hiter is not possible” conveyed message that detergent could whiten clothes better than chlorine bleach). Tushnet therefore criticizes the implicit–explicit distinction developed under the Lanham Act and notes the lengths to which courts go to work around it, applying, for example, the necessary implication doctrine to avoid the consumer survey requirement for misleading, as opposed to literally false, statements. See Tushnet, *supra* note 230, at 1338–44.

Craswell observes, this question of adequacy “would seem to depend on a balance between the value the asserted information would have if true, and the potential harm that would be caused if the assertion turns out to be false.”²³⁴ This cost–benefit calculus is particularly appropriate in the context of corporate speech about science because the scientific knowledge described by such speech is, at best, only approximately true.²³⁵

Like statements made by the tobacco companies, some of ExxonMobil’s statements appear misleading when we assume an implied assertion of adequate evidence. Consider, for example, the following language from an ExxonMobil paid editorial in the *New York Times* in 2004: “Scientific uncertainties continue to limit our ability to make objective, quantitative determinations regarding the human role in recent climate change or the degree and consequences of future change.”²³⁶ This statement implies that insufficient scientific evidence exists to establish a human role in global warming, a false implication at the time because a scientific consensus regarding this link existed.²³⁷ The statement also exploits the uncertainties latent in climate modeling to obscure the scientific consensus regarding human-caused global warming and the need for mitigation measures. In short, the statement is not supported by adequate evidence.

Moreover, a cost–benefit balancing of ExxonMobil’s speech further supports the conclusion that the 2004 statement is misleading. Assuming members of the public believed it, they would be less likely to support comprehensive legislation toward reduction of greenhouse gas emissions. (In 2010, cap-and-trade legislation did indeed lack the political will to pass in Congress.) They would also be less likely to support administrative regulations related to climate change. The absence of regulations mitigating greenhouse gas emissions in turn increases the severity and likelihood of adverse climate impacts in the future. In other words, the costs of misleading corporate speech in this context are high. Given these costs, the statement must be supported by substantial scientific evidence to satisfy the implied assertion that it is supported by adequate evidence.²³⁸

Other contextual factors are pertinent in analyzing the implied assertions of speech. For example, a growing body of research suggests that a number of

234. Craswell, *supra* note 225, at 605.

235. *See supra* Section II.A.

236. *A Range of Opinions on Climate Change at Exxon Mobil*, N.Y. TIMES (Nov. 6, 2015), <https://www.nytimes.com/interactive/2015/11/06/science/exxon-mobil-global-warming-statements-climate-change.html> [<https://nyti.ms/2vsl9tF>]. ExxonMobil used these paid “advertorials” as well as public statements by leadership to question the scientific consensus regarding global warming and its link to the burning of fossil fuels. For an overview of evidence suggesting that ExxonMobil’s leadership did not sincerely hold this view, see Kaiser & Wasserman, *supra* note 75. For an archive of relevant documents, see CLIMATE FILES, *supra* note 80.

237. *See supra* Section I.A.

238. This calculus shifts with context. For example, ExxonMobil’s statements to investors about the impacts of climate regulation on its business contained implied assertions that they are supported by adequate evidence. What constitutes adequate evidence in the securities context turns on whether the financial costs of potentially untrue statements outweigh the financial benefits of potentially true information.

psychological and cultural factors undermine accurate understandings of risk, a topic explored in more detail below.²³⁹ Moreover, the reasonable inferences that people may draw from speech about science are shaped by the regulatory context for a given product or set of risks.²⁴⁰ When corporate speech includes assertions about public safety, environmental impacts, or product efficacy, the intended audience may reasonably infer that such assertions incorporate the cost–benefit balancing adopted by relevant regulatory authorities. For example, people often believe that if a product or service poses serious health or environmental risks, the Food and Drug Administration (FDA), Environmental Protection Agency (EPA), and other state and federal agencies will block its use—or at the least, prohibit the promotion of the product or service as posing little risk to human health or the environment.²⁴¹

In the context of climate change, the message from regulatory authorities is mixed. Although the Obama Administration made international commitments to limit emissions and finalized several administrative rules to that end, the Trump Administration is already working to roll back many of these initiatives.²⁴² This means that we cannot decide the threshold for adequate evidence by looking to what the regulatory context suggests about the costs and benefits of greenhouse gas emissions. When the regulatory context suggests that an activity or product poses minimal risks, cost–benefit balancing supports the truth of the implied assertion of adequate evidence even when the speech at issue is supported by only some scientific evidence.²⁴³ Conversely, when the regulatory context suggests serious risks, stronger scientific support is required.

239. See *infra* Section III.B.3.

240. See *infra* Section III.B.2.

241. See Sidney M. Wolfe, Editorial, *Direct-to-Consumer Advertising—Education or Emotion Promotion?*, 346 *NEW ENG. J. MED.* 524, 525 (2002).

242. In 2015, the Obama Administration made nonbinding commitments to reduce domestic greenhouse gas emissions under an international agreement—the Paris Agreement—negotiated by 195 countries; under the agreement, the United States pledged to reduce emissions by 26% to 28% below 2005 levels by 2025. See Brad Plumer, *Q. & A.: The Paris Climate Accord*, *N.Y. TIMES* (May 31, 2017), <https://www.nytimes.com/2017/05/31/climate/qa-the-paris-climate-accord.html> [https://nyti.ms/2rpacYn]. In June 2017, President Trump announced his intention to withdraw the United States from the Paris Agreement. OFFICE OF THE PRESS SEC’Y, THE WHITE HOUSE, STATEMENT BY PRESIDENT TRUMP ON THE PARIS CLIMATE ACCORD (2017), <https://www.whitehouse.gov/the-press-office/2017/06/01/statement-president-trump-paris-climate-accord> [https://perma.cc/7VCB-PMRS]. The EPA under the Obama Administration also finalized emissions standards for new power plants and issued rules that would reduce emissions from existing power plants, known as the Clean Power Plan. See Plumer, *supra*. In October 2017, under the Trump Administration, the EPA proposed a rule that would rescind the Clean Power Plan. Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 82 *Fed. Reg.* 48035 (Oct. 16, 2017) (to be codified at 40 C.F.R. pt. 60). For an overview of what the Trump Administration can and cannot do (at least quickly) to undermine these initiatives, see Coral Davenport, *What Trump Can and Can’t Do to Dismantle Obama’s Climate Rules*, *N.Y. TIMES* (Jan. 26, 2017), https://www.nytimes.com/2017/01/26/us/politics/donald-trump-climate-epa.html?_r=0 [https://nyti.ms/2k9pJrV].

243. It would be impossible to make this argument now, however. In 2009, the EPA issued endangerment findings, concluding that greenhouse gases contribute to pollution that threatens public health and welfare. See *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 *Fed. Reg.* 66,496 (Dec. 15, 2009) (codified at 40 C.F.R. ch. 1).

2. Integrating the Regulatory Context into the Cost–Benefit Analysis

Although the regulatory context may not strongly shape messages regarding climate change, it has a significant role to play in other areas where corporations speak about science because it is often a proxy for the costs and benefits of corporate speech about scientific knowledge. In fact, if courts would recognize this simple fact—that the regulatory context shapes the message—they could bring much needed doctrinal coherence to consumer protection litigation. To illustrate how the regulatory context matters, this section looks closely at litigation addressing the truth or falsity of drug and supplement companies’ speech under labeling, advertising, and securities laws. Judicial opinions evaluating the truth of corporate speech regarding drug safety and efficacy illustrate both the need for a more coherent approach and the importance of the regulatory context. They also demonstrate how a cost–benefit analysis can assist in determining whether corporate speech about scientific knowledge is misleading or false.

Perhaps more than any other area of drug litigation, the litigation surrounding off-label promotion of drugs illustrates the need for a contextual analysis of corporate speech about scientific knowledge. Doctors are not prohibited from prescribing drugs or medical devices for uses not approved by the FDA,²⁴⁴ but the legality of companies’ promotion of these unapproved or “off-label” uses is less clear.²⁴⁵ Individuals, state attorneys general, and the FDA have sought injunctive relief and damages for off-label promotion under both state and federal law,²⁴⁶ but courts have struggled to define the boundaries of unlawful off-label promotion, including when such speech is false or misleading.

The largest suits against drug companies’ off-label promotion have been brought by bipartisan coalitions of state attorneys general, sometimes in collaboration with federal authorities, under state laws prohibiting fraudulent and deceptive business practices.²⁴⁷ Indeed, in 2012, one of these suits resulted in “the largest multistate consumer protection settlement [\$181 million] with a drug company in history.”²⁴⁸ In addition to large monetary awards, settlements have imposed a number of restrictions on off-label promotion that are not required by federal law and would not likely withstand judicial scrutiny if

244. *See* 21 U.S.C. § 396 (2012).

245. Although drug companies’ promotion to prescribers for these off-label uses is not clearly prohibited or fraudulent, the FDA has considered such off-label promotion as evidence of the drug’s or device’s “intended use.” *See* 21 C.F.R. § 201.5 (2017). Furthermore, because a drug or device must contain “adequate directions for use,” as determined by FDA’s approval process, *see* 21 U.S.C. § 352(f), the FDA considers it “misbranded” in violation of the Federal Drug and Cosmetic Act (FDCA) if sold for an intended use not approved by the FDA. *See id.* § 331(a)–(b) (prohibiting misbranding); *United States v. Caronia*, 703 F.3d 149, 154–55 (2d Cir. 2012) (explaining FDA’s policy of prosecuting off-label marketing as misbranding under the FDCA).

246. *See* PAUL NOLETTE, *FEDERALISM ON TRIAL: STATE ATTORNEYS GENERAL AND NATIONAL POLICYMAKING IN CONTEMPORARY AMERICA* 72–80 (2015).

247. *See id.*

248. *Id.* at 79–80.

litigated.²⁴⁹

These large settlements suggest that pharmaceutical companies are legitimately concerned that juries would find their off-label marketing practices fraudulent and deceptive.²⁵⁰ Setting aside the allegations of obvious fraud, such as when prescribers are offered illegal kickbacks like consulting fees and paid trips, closer questions underlie these cases. For example, when, if ever, is it misleading to provide prescribers with a copy of a scientific study or to sponsor a continuing medical education program about the benefits of an off-label use? The settlements suggest that some people may find these practices misleading under certain circumstances. To understand why, we need to consider how the regulatory context shapes the messages conveyed.

FDA approval to market a drug can take several years of costly preclinical and clinical trials that must meet rigorous standards for reliability (for example, trials must be double blind and placebo controlled).²⁵¹ FDA approval signals that the drug is safe and effective for a particular indication (its “on-label” use) and that the benefits of use for that indication outweigh the risks.²⁵² Although doctors likely understand when a drug company is promoting an off-label use, they also know that the drug has been subjected to clinical tests and is safe for at least some conditions, at some dosages, and for some subset of the population. They may therefore assume that the drug is safe for other uses. Indeed, legal commentators have made this assumption, arguing that FDA approval reduces the health risks of off-label prescribing.²⁵³

But this assumption is simply not true. FDA approval does not mean that reliable scientific evidence establishes that the drug is safe and effective for all indications, for all populations, and at all dosages. Indeed, individuals have been harmed by off-label uses of drugs and devices. We need only remember tragedies caused by drugs like thalidomide, a prescription sedative that resulted in serious birth defects in babies born to mothers who had taken it during pregnancy.²⁵⁴ A more recent example is the pervasive, off-label use of the pain medication OxyContin, one of the drugs responsible for today’s opioid epidemic.²⁵⁵ Moreover, even if patients do not suffer direct harms from unsafe

249. *See id.* at 77–80.

250. For example, after losing motions to dismiss and for summary judgment, Warner-Lambert settled with state and federal authorities for over \$430 million dollars in criminal fines, state losses, corrective advertising, and educational programs. *See id.* at 76–77.

251. *See* 21 U.S.C. § 355(d) (2012); 21 C.F.R. § 314.126(b) (2017); *The FDA’s Drug Review Process: Ensuring Drugs Are Safe and Effective*, U.S. FOOD & DRUG ADMIN., <https://www.fda.gov/drugs/resourcesforyou/consumers/ucm143534.htm> [<https://perma.cc/F9VX-9FPS>] (last updated Nov. 6, 2014).

252. *See* 21 U.S.C. § 355(d); 21 C.F.R. § 314.50(c)(2)(ix).

253. *See, e.g.*, Kathryn Bi, Comment, *What Is “False or Misleading” Off-Label Promotion?*, 82 U. CHI. L. REV. 975, 997 (2015).

254. *See* Bara Fintel et al., *The Thalidomide Tragedy: Lessons for Drug Safety and Regulation*, HELIX (July 28, 2009), <https://helix.northwestern.edu/article/thalidomide-tragedy-lessons-drug-safety-and-regulation> [<https://perma.cc/9NDE-72BT>].

255. *See* Mark A. Ford, Note, *Another Use of OxyContin: The Case for Enhancing Liability for Off-Label Drug Marketing*, 83 B.U. L. REV. 429, 444–49 (2003) (detailing the allegations in litigation

applications, they are nevertheless harmed when off-label uses are ineffective because the decision to prescribe the drug likely delayed or prevented the consideration of other treatment options.²⁵⁶

Given this regulatory context, when a drug company disseminates a scientific study that purports to show the benefits of an off-label use, a prescriber may reasonably infer that the company believes the drug is safe and effective for that use and that the company has a reasonable basis for that belief.²⁵⁷ When a drug company promotes a drug, it does so against a regulatory landscape designed to permit market access only to drugs determined to be safe and effective; promotional speech carries this implied message. In many cases of off-label promotion, however, the company arguably lacks a reasonable basis for this belief. For this reason, courts should not presume that claims regarding a drug's off-label use are true.²⁵⁸

Instead, courts should acknowledge that the truth of the implied safety and efficacy claim is at best unknown and that the claim may therefore be misleading.²⁵⁹ As Christopher Robertson has argued, this recognition could effectively ban off-label promotion as false and misleading or could lead courts to create a presumption that such promotion is misleading.²⁶⁰ Furthermore, although more speech in the form of disclosures and qualifying language can theoretically correct false implications, the detail and length of necessary disclaimers may undermine their efficacy. Moreover, it is virtually impossible to determine how much information is enough to ensure medical professionals draw the proper

for off-label use of the drug and the harms caused by such use); see also *Prescription Opioid Overdose Data*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/drugoverdose/data/overdose.html> [https://perma.cc/TCF4-VVMX] (last updated Aug. 1, 2017).

256. See Christopher Robertson, *When Truth Cannot Be Presumed: The Regulation of Drug Promotion Under an Expanding First Amendment*, 94 B.U. L. REV. 545, 559–60 (2014).

257. See *id.* at 553, 559 (describing the “core propositional content” of off-label promotion as a claim “that the drug would be safe and effective” for the promoted use).

258. See *id.* at 565–71.

259. When courts reject restrictions on off-label promotional speech, they often note that Congress did not intend to limit the off-label use of drugs and devices by doctors using their medical judgment. See, e.g., *Caplinger v. Medtronic, Inc.*, 784 F.3d 1335, 1344 (10th Cir. 2015). They also note that studies show that off-label uses are significant, making up perhaps 20% or more of all uses. See, e.g., *United States v. Caronia*, 703 F.3d 149, 153 (2d Cir. 2012). In particular, doctors who treat cancer patients rely heavily on off-label uses. See *Off-Label Drug Use in Cancer Treatment*, NAT'L CANCER INST. (Jan. 1, 2014), <https://www.cancer.gov/about-cancer/treatment/drugs/off-label> [https://perma.cc/QR77-CDXC]. This reality supports doctors' free access to information regarding drug studies, but it does not—without more—tell us when promotional speech regarding these studies is misleading.

260. See Robertson, *supra* note 256, at 573–74 (arguing that the FDA approval process for on-label uses establishes the truth of a claim and in its absence courts should place the burden on drugmakers to prove truthfulness as an affirmative defense). The presumption could be easily overcome in cases involving speech about the risks of a drug for an already established off-label use. See John E. Osborn, *Can I Tell You the Truth? A Comparative Perspective on Regulating Off-Label Scientific and Medical Information*, 10 YALE J. HEALTH POL'Y, L. & ETHICS 299, 338–39 (2010) (discussing the regulatory uncertainty manufacturers of Botox face in seeking to communicate safety information regarding accepted off-label uses). When a drug company seeks to convey information about the risks of an already established off-label use, it is acknowledging the safety concerns of the off-label use.

conclusions regarding the science underlying a promotional claim.²⁶¹

Even without a presumption of misleadingness, courts could nevertheless evaluate whether a statement is misleading by employing a context-specific, cost–benefit analysis.²⁶² Indeed, given the uncertainty inherent in scientific inquiry, the FDA appears to be drawing lines in its guidances and misbranding enforcement actions based on an informal balancing of costs and benefits.²⁶³ A cost–benefit balancing would often render off-label promotion misleading, but not always. For example, drugs are sometimes approved to treat some cancers, but not others.²⁶⁴ If a patient with cancer has not responded to other treatments, the off-label use of a drug approved to treat a different cancer may be the patient’s last hope. The life-saving benefits if the drug is effective (making the promotional speech true) are enormous compared to the costs if the speech is false.

Thus, the regulatory context is often a proxy for the costs and benefits of corporate speech about science. The FDA’s rigorous drug approval process is a reflection of a legislative and social judgment that drugs can pose serious risks to human health and safety. Indeed, the harms associated with unregulated marketing of drugs led to the passage of the FDCA and its later amendments.²⁶⁵ In contrast, the FDA does not regulate the labeling of food and supplements as stringently as it does drug labeling. For example, although the FDA requires premarket review for health claims regarding the relationship between a nutrient in a dietary supplement and disease (for example, the claim that calcium may reduce the risk of osteoporosis), the standards for scientific support are more lenient than they are for drug approval.²⁶⁶ Before approving these claims, the

261. The difficulty is easily illustrated by recent litigation between the FDA and the manufacturer of Vascepa, a drug approved to treat cardiovascular disease in some patients. *See* *Amarin Pharma, Inc. v. FDA*, 119 F. Supp. 3d 196, 209 (S.D.N.Y. 2015). Instead of treating the off-label promotional speech as misleading, the court engaged in an elaborate discussion of the FDA’s and the manufacturer’s proposed disclosures and qualifying statements. *See id.* at 231–36. In the end, the court rewrote some of the statements itself, adding and revising language to ensure that potential prescribers have all relevant information relevant to the drug’s off-label use. *Id.* at 232–35.

262. *See* Craswell, *supra* note 225, at 604.

263. One of the FDA’s concerns, for example, in the off-labeling marketing of Vascepa was that it would crowd out effective treatments for cardiovascular disease such as diet and exercise. *See* *Amarin Pharma, Inc.*, 119 F. Supp. 3d at 217. In addition, the FDA’s guidance on scientific exchange acknowledges the value of information regarding off-label uses and identifies best practices for ensuring prescribers have access to information. *See* U.S. FOOD & DRUG ASS’N, GOOD REPRINT PRACTICES FOR THE DISTRIBUTION OF MEDICAL JOURNAL ARTICLES AND MEDICAL OR SCIENTIFIC REFERENCE PUBLICATIONS ON UNAPPROVED NEW USES OF APPROVED DRUGS AND APPROVED OR CLEARED MEDICAL DEVICES: GUIDANCE FOR INDUSTRY (2009), <http://www.fda.gov/oc/op/goodreprint.html> [<https://perma.cc/9ALV-6HA2>].

264. *See* *Off-Label Drug Use in Cancer Treatment*, *supra* note 259.

265. *See* Coleen Klasmeier & Martin H. Redish, *Off-Label Prescription Advertising, the FDA and the First Amendment: A Study in the Values of Commercial Speech Protection*, 27 AM. J.L. & MED. 315, 330 (2011) (noting that the 1962 amendments required an FDA finding of both safety and effectiveness). Exceptions such as “fast track” approval for drugs that treat life-threatening conditions also reflect the need to balance costs and benefits in regulating market access. *See id.* at 329.

266. Conversely, a dietary supplement intended to treat or prevent a disease would be classified as a drug and subject to the drug-approval process. *See* 21 C.F.R. § 101.93 (2017).

FDA reviews the relevant scientific literature to determine whether the health claim is established by “significant scientific agreement.”²⁶⁷ In addition, some dietary supplement claims (most notably, “structure/function” claims) are not subject to FDA premarket review at all.²⁶⁸

Less regulation of structure/function claims makes sense because claims regarding a supplement’s effect on a bodily function or structure usually present fewer risks. Indeed, because the risks are small, defendants in lawsuits over the truthfulness of supplement claims are more likely to contest the issue of harm. For example, in a consumer class action over the claim that “DHA Omega-3 Supports Brain Health,” the defendant challenged the standing of plaintiffs under various state consumer laws on the ground that the plaintiffs had suffered no real injury.²⁶⁹ In fact, the plaintiffs’ only injury was the economic expense of more costly milk, an injury significant only in the aggregate.²⁷⁰

Because these claims carry fewer risks if they turn out to be false, the statute only requires that the supplement manufacturer have “substantiation that such [claim] is truthful and not misleading.”²⁷¹ Not surprisingly, courts have not required conclusive or even substantial scientific evidence to establish that a claim is truthful. Indeed, if some scientific evidence supports the claim but overall the evidence is inconclusive, this is arguably enough to defend against a consumer suit for fraud.²⁷² Unlike the off-label context, a presumption of misleadingness would not be justified in these cases because the reasonable

267. *See id.* § 101.14(c) (2017). The significant-scientific-agreement (SSA) standard reflects the “agency’s best judgment as to whether qualified experts would likely agree that the scientific evidence supports the substance/disease relationship that is the subject of a proposed health claim.” U.S. FOOD & DRUG ADMIN., EVIDENCE-BASED REVIEW SYSTEM FOR THE SCIENTIFIC EVALUATION OF HEALTH CLAIMS: GUIDANCE FOR INDUSTRY (2009), <https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ucm073332.htm> [<https://perma.cc/QT6D-8YR2>]. The agency guidance on the matter recognizes that the strongest evidence of this relationship would come from a randomized, placebo-controlled, double-blinded study often used in clinical drug trials. *Id.* But the guidance also discusses observational studies and the opinions of expert bodies. *Id.* Furthermore, in response to a First Amendment challenge, the FDA clarified that its SSA standard may permit “qualified” health claims on a lesser showing of “credible” scientific evidence. *Id.*

268. *See* 21 U.S.C. § 343(r)(6) (2012). The FDA’s structure/function regulation treats claims regarding “natural states or processes that do not cause significant or permanent harm” as structure/function rather than disease claims. *See* Regulations on Statements Made for Dietary Supplements Concerning the Effect of the Product on the Structure or Function of the Body, 65 Fed. Reg. 1000, 1013 (Jan. 6, 2000) (to be codified at 21 C.F.R. pt. 101). Thus, a claim that a supplement can aid memory is likely a structure/function claim, whereas a claim that it can mitigate Alzheimer’s disease is not.

269. *See In re Horizon Organic Milk Plus DHA Omega-3 Mktg. & Sales Practice Litig.*, 955 F. Supp. 2d 1311, 1319, 1322 (S.D. Fla. 2013).

270. *See id.* at 1326–27 (explaining that consumer plaintiffs adequately alleged that they were injured because they paid more for products with the DHA additive).

271. 21 U.S.C. § 343(r)(6)(B). To ensure consumers understand the FDA’s role, supplements carry the disclaimer that the FDA has not evaluated the truth of the label’s claims and the supplement is not intended to treat disease. *See id.* § 343(r)(6)(C).

272. *See, e.g.,* *Gallagher v. Bayer AG*, No. 14-cv-04601-WHO, 2015 WL 1056480, *9 (N.D. Cal. Mar. 10, 2015) (holding the plaintiffs adequately pleaded falsity of structure/function claims because the defendant’s scientific studies did not prove that the scientific evidence supported the claims or that the evidence was inconclusive).

consumer would infer from the FDA's lack of regulation that the risks are minimal and that limited scientific support is therefore adequate evidence for the claim.

Litigation over drug companies' securities disclosures provides another example of how context affects the threshold for adequate evidence. Investors sometimes sue drug companies for allegedly misrepresenting the safety and efficacy of a drug prior to FDA approval. In some cases, investors allege that a company misrepresented the findings or strength of clinical studies;²⁷³ in others, investors point to alleged misstatements or omissions regarding FDA's communications with the company.²⁷⁴

Most of these cases, however, do not survive the defendant's motion to dismiss. Courts are not easily convinced that investors are misled by a drug company's statements or omissions regarding scientific studies and the premarket approval process. For example, when a study suggested a correlation between a drug undergoing clinical trials and adverse health effects, a court concluded it was not a misrepresentation to deny the existence of evidence that the drug was "directly related" to adverse effects.²⁷⁵ Even when statements or omissions falsely imply strong scientific support for drug efficacy and safety, courts have routinely concluded that they are not actionable because they are not misleading, not material, or not subject to disclosure.²⁷⁶

That courts in securities cases frequently conflate the question of falsity with the question of materiality demonstrates how courts sometimes instinctively evaluate speech in context.²⁷⁷ Both questions require an analysis of the speech from the standpoint of the reasonable investor. To determine whether a state-

273. See, e.g., *City of Edinburgh Council v. Pfizer, Inc.*, 754 F.3d 159, 172–73 (3d Cir. 2014) (holding plaintiffs failed to allege drug company made materially false or misleading statements regarding results of interim clinical trials).

274. See, e.g., *In re Transkaryotic Therapies, Inc. Sec. Litig.*, 319 F. Supp. 2d 152, 156 (D. Mass. 2004) (finding drug company made a material omission when it mischaracterized instructions it was given by the FDA). In *Transkaryotic Therapies*, the company disclosed to investors that the FDA had asked for further explanation and additional data when the FDA had actually recommended the drug manufacturer conduct completely new clinical studies. *Id.* at 256. The court denied the drug company's motion to dismiss, noting that "a recommendation that [the drug company] perform what could amount to years of additional research is certainly material." *Id.* at 161.

275. See *In re Northfield Labs., Inc. Sec. Litig.*, 527 F. Supp. 2d 769, 787 (N.D. Ill. 2007). To reach this conclusion, the court emphasized that correlation is not the same as causation. See *id.* Although technically true, this observation overlooks the strong inference of causation that a significant correlation can suggest.

276. See, e.g., *Kader v. Sarepta Therapeutics, Inc.*, No. 1:14-cv-14318-ADB, 2016 WL 1337256, at *17 (D. Mass. Apr. 5, 2016) ("The interim and indefinite nature of the FDA's reassessment request undermines the notion that Defendants had a duty to disclose it."). Not all material information triggers the duty to disclose. Indeed, as the Supreme Court has made clear, even when information is material, "companies can control what they have to disclose . . . by controlling what they say to the market." *Matrixx Initiatives, Inc. v. Siracusano*, 563 U.S. 27, 45 (2011).

277. Indeed, one commentator has suggested that securities fraud actions simply focus on the question of misleadingness and drop other requirements, such as materiality and reliance. See generally Geoffrey Rapp, *Rewiring the DNA of Securities Fraud Litigation: Amgen's Missed Opportunity*, 44 *LOY. U. CHI. L.J.* 1475 (2013).

ment or omission is misleading, courts ask how a reasonable investor would interpret it.²⁷⁸ Similarly, in litigation under Section 10(b) of the Securities Exchange Act, courts must analyze the materiality of an omission by asking whether it is “substantially likely that a reasonable investor would have viewed this information as having significantly altered the ‘total mix’ of information made available.”²⁷⁹ The materiality analysis situates the interpretation question in the broader context of the market, which courts assume is affected by all available information including information about how regulatory processes work.

One court, for example, concluded that omissions regarding FDA preapproval communications about the methodological weaknesses of clinical trials were not material because the agency’s preferences regarding study design were publicly available and FDA concerns expressed during the drug approval process are not final decisions that trigger a disclosure obligation.²⁸⁰ Although the company had publicly praised the results of the trials, the court emphasized the importance of context in reaching the conclusion that the company’s silence regarding FDA’s concerns did not make its affirmative statements misleading.²⁸¹ Unlike the marketing of drugs to consumers and prescribers, corporate speech directed at would-be investors does not automatically imply that strong scientific evidence supports the drug’s safety and efficacy. Indeed, investors are on notice that if information is otherwise publicly available, a company’s failure to disclose will likely be immaterial. Of course, corporate speech could be *explicitly* false or misleading if it misrepresented specific facts, for example, if it claimed that a clinical trial was placebo controlled and double blind when it was not.

The implications of speech directed at investors shift once a drug is on the market and the potential costs of the speech are greater. After approval, a company’s statements regarding a drug’s safety imply an absence of scientific evidence that raises safety concerns. Whereas a study that associates the drug with adverse effects may not be misleading or material prior to FDA approval, it may be after the drug is approved—even if the study does not follow the rigorous protocols, such as double blinding and randomization.

Indeed, the Supreme Court has recognized this distinction. In *Matrixx Initiatives, Inc.*, the Court emphasized the fact-intensive, contextual nature of the materiality analysis in a case involving scientific reports linking Matrixx’s Zicam Cold Remedy to anosmia, the loss of smell.²⁸² Matrixx argued that the plaintiffs had not stated facts supporting the materiality requirement because the scientific evidence it had failed to disclose was not based on studies with

278. See *Omnicare, Inc. v. Laborers Dist. Council Constr. Indus. Pension Fund*, 135 S. Ct. 1318, 1333 (2015).

279. *Matrixx Initiatives, Inc.*, 563 U.S. at 47 (internal quotations omitted).

280. See *In re Sanofi Sec. Litig.*, 87 F. Supp. 3d 510, 539–42 (S.D.N.Y. 2015).

281. See *id.* at 539.

282. See 563 U.S. at 43.

statistically significant results.²⁸³ Writing for a unanimous Court, Justice Sotomayor noted that medical experts and regulators rely on a range of evidence, not just controlled studies with statistically significant outcomes, to reach conclusions about causation.²⁸⁴ Because consumers armed with this information would likely have decided that the costs outweigh the benefits of taking Zicam, sales would have suffered, and reasonable investors would therefore have viewed this information as material to their trading decisions.²⁸⁵ Not surprisingly, when the costs of nondisclosure are potentially great, the omission of scientific findings is more likely to be misleading and material even when these findings have not been confirmed by customary scientific processes.

In sum, whether corporate speech regarding scientific knowledge is implicitly misleading depends on how the context affects the reasonable expectations of the audience. Those expectations are shaped by a cost–benefit assessment often grounded in a regulatory landscape that sends signals about the safety and efficacy of products and services. The different approaches in cases involving the marketing of drugs and supplements illustrate how the regulatory context and the costs of misleading speech shape the standards for what constitutes adequate scientific support.

Truth in the context of speech about science is therefore relative. Consumers and investors expect such speech to be supported by adequate evidence, but what counts as adequate depends on context. As Steven Shiffrin argued in the early years of First Amendment protection for commercial speech, the determination of whether speech is misleading is a normative judgment: “All language misleads some people to some extent. How many are too many and how much is too much are questions of policy and degree.”²⁸⁶ By focusing on the costs (risks) and benefits of corporate speech about science, courts can avoid ad hoc, inconsistent reasoning and ensure that a coherent analytical framework shapes this normative inquiry.

3. Incorporating How People Understand Scientific Information About Risk

The previous section makes the argument that the misleadingness determination depends on the expectations of the reasonable recipient (consumer, prescriber, investor) of the speech. In addition to separating scientific speech from speech about science, courts should focus on objective factors, such as the regulatory context and cost–benefit assessments, to determine the truth or falsity of corporate speech regarding science. A contextual approach would be incomplete, however, without addressing how people actually understand and process information regarding scientific assessments of risk.

283. *See id.* at 39–40.

284. *See id.* at 40–42.

285. *See id.* at 47.

286. Steven Shiffrin, *The First Amendment and Economic Regulation: Away from a General Theory of the First Amendment*, 78 NW. U. L. REV. 1212, 1219 (1983).

An ever-growing body of literature in psychology and behavioral economics demonstrates that a number of cognitive factors distort our reasoning about risk.²⁸⁷ We are not the rational utility maximizers that economists once imagined us to be. As research in the field of psychology has shown, when we make decisions, we have two modes of thinking: one that is intuitive and instinctive (system one) and one that is deliberative and reflective (system two).²⁸⁸ Drawing on this research, studies in behavioral economics have shown that we frequently rely on system one in making everyday decisions.²⁸⁹ This makes us particularly bad at evaluating risks. We tend to overestimate the probability of a risk when we can recall a recent event—for example, the risk of gun violence in the wake of a mass shooting—and we underestimate risks when recent events do not come to mind.²⁹⁰ This “availability” bias or heuristic can overshadow actual statistical probabilities.²⁹¹ Studies also show that people do not understand risk in terms of statistical probabilities. For example, some view chemical substances as either safe or dangerous in absolute terms.²⁹² Some people also believe that risk can and should be completely minimized.²⁹³

Moreover, confirmation bias can distort our ability to weigh new information by creating a tendency to give more consideration to information consistent with prior beliefs and a propensity toward optimism in assessing outcomes.²⁹⁴ In fact, there is evidence that we are more likely to change or update our views when we receive good news rather than bad (for example, news that Antarctic sea ice is expanding may alter views on climate change in a way that worse-than-expected melt in the Arctic would not).²⁹⁵

Other cognitive limitations complicate the assessment of risks for circumstances, like climate change, that present difficult problems of temporal and spatial scale.²⁹⁶ Even when the eventual costs or benefits are clear, many people

287. See, e.g., DANIEL KAHNEMAN, THINKING, FAST AND SLOW (2013); Paul Slovic, *Perception of Risk*, in THE PERCEPTION OF RISK 220, 222 (Paul Slovic ed., 2000); CASS R. SUNSTEIN, RISK AND REASON: SAFETY, LAW, AND THE ENVIRONMENT (2002); RICHARD H. THALER, MISBEHAVING: THE MAKING OF BEHAVIORAL ECONOMICS (2015); RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS (2008).

288. See THALER & SUNSTEIN, *supra* note 287, at 19–20.

289. See *id.* at 21–22.

290. See Cass R. Sunstein, *The Storrs Lectures: Behavioral Economics and Paternalism*, 122 YALE L.J. 1826, 1851–52 (2013) [hereinafter Sunstein, *The Storrs Lectures*]; see also Cass R. Sunstein, *On the Divergent American Reactions to Terrorism and Climate Change*, 107 COLUM. L. REV. 503, 537–40 (2007) (arguing that people’s probability judgments about terrorism and climate change can be explained in part by the presence or absence of an available incident such as the 9/11 terrorist attacks).

291. See Sunstein, *The Storrs Lectures*, *supra* note 290, at 1851–52.

292. See Nancy Kraus et al., *Intuitive Toxicology: Expert and Lay Judgments of Chemical Risks*, in THE PERCEPTION OF RISK, *supra* note 287, at 285, 291.

293. See Slovic, *supra* note 287, at 226.

294. See Sunstein, *The Storrs Lectures*, *supra* note 290, at 1849–51.

295. See *id.* at 1850.

296. See Travis William Reynolds et al., *Now What Do People Know About Global Climate Change? Survey Studies of Educated Laypeople*, 30 RISK ANALYSIS 1520, 1521 (2010) (citing studies that show people in richer nations view climate change as a “distant threat”).

fail to see the long-term view and instead make suboptimal decisions based on the short term.²⁹⁷ Smoking today is an example of failing to act according to long-term risks, just as not saving a small sum today for retirement fails to account for long-term benefits. But the risks of climate change pose even greater obstacles. Indeed, many U.S. citizens living today will not experience the most detrimental effects of climate change. The dangers of climate change are therefore “off-screen,” whereas the benefits of burning fossil fuels are “on-screen” in the sense that they are more tangible and visible.²⁹⁸ Under these conditions, research shows that people do not correctly weigh the tradeoffs.²⁹⁹ Because only the benefits are tangible, regulation that reduces the burning of fossil fuels looks like an overreaction.

Furthermore, that costs will disproportionately affect more vulnerable populations sometime in the future makes these risks less “salient,” increasing the likelihood that citizens in wealthier countries will undervalue them.³⁰⁰ This lack of salience is in part a result of people’s tendency to focus on apparent risks and benefits in the short term, but it is also a result of global forces that perpetuate inequalities that make climate impacts seem even more distant to citizens of rich nations.³⁰¹ Indeed, according to one study, the reason some people fail to acknowledge environmental problems is that they believe that addressing these problems would challenge the social, political, and economic status quo; denial is a means of defending the current system.³⁰² The mitigation of greenhouse gas emissions challenges the fossil-fuel foundations of the global industrial economy, making it a likely candidate for denial. Loss aversion further enhances this preference for the status quo.³⁰³

Recent work in cultural cognition studies has also illuminated the role that social networks and cultural identities play in shaping how people process information about some scientific risks, including climate risks. As defined by an interdisciplinary group of scholars at Yale Law School’s Cultural Cognition Project, “[c]ultural cognition refers to the tendency of individuals to conform their beliefs about disputed matters of fact (e.g., whether humans are causing global warming; whether the death penalty deters murder; whether gun control makes society more safe or less) to values that define their cultural identi-

297. See Sunstein, *The Storrs Lectures*, *supra* note 290, at 1843–44.

298. See SUNSTEIN, *supra* note 287, at 41.

299. See *id.* at 40–41.

300. See Sunstein, *The Storrs Lectures*, *supra* note 290, at 1846.

301. See Kari Marie Norgaard, *Climate Denial: Emotion, Psychology, Culture, and Political Economy*, in *THE OXFORD HANDBOOK OF CLIMATE CHANGE AND SOCIETY* 399, 409–10 (John S. Dryzek et al. eds., 2011) (“The conditions for denial are supported by the dynamics of global capitalism. Ongoing changes in social organization, especially the twin forces of globalization and increasing inequality creates a situation in which, for privileged people, environmental and social justice problems are increasingly distant in time or space or both.”).

302. See Irina Feygina et al., *System Justification, the Denial of Global Warming, and the Possibility of “System-Sanctioned Change,”* 36 *PERSONALITY & SOC. PSYCHOL. BULL.* 326, 327 (2010).

303. See SUNSTEIN, *supra* note 287, at 42.

ties.”³⁰⁴ Work in this field has called into question the notion that people’s views about climate change are primarily associated with their political party or even their level of science literacy.³⁰⁵ Rather, studies indicate that people who have hierarchical and individualistic values are more likely to reject the scientific consensus surrounding climate change than those who have egalitarian and communitarian values.³⁰⁶ Those with hierarchical and individualistic values tend to oppose restrictions on industry and commerce, whereas egalitarian, communitarian values are associated with negative views of unchecked industry.³⁰⁷

Cultural cognition literature helps explain why the United States is so polarized with respect to climate change. Cognitive biases and routine errors made when assessing risk cannot alone explain why some U.S. citizens choose to accept the scientific consensus while others persist in rejecting it. Cultural cognition studies suggest an answer. In one study, individuals with hierarchical, individualistic worldviews seriously underestimated the expert support for the risks of global warming, lending support to the hypothesis that cultural values influence how readily people can recall instances of expert support for a particular view.³⁰⁸ Cultural cognition theory therefore suggests that cultural values can complicate public risk perception even when people engage in deliberative, reflective modes of thinking.³⁰⁹

As Dan Kahan has argued, this “science communication problem” is a result of a disruption in the norms that typically guide people in recognizing valid science.³¹⁰ These norms, or conventions, are “the *signifiers* of validity implicit in *informal, everyday social processes* that vouch for the good sense of relying on the relevant information in making important decisions.”³¹¹ When these fail to function, people are not failing to comprehend science; they are failing to recognize valid science.³¹²

When an issue suffers from the science communication problem, it is because one’s position on the issue is a marker of loyalty to “competing cultural groups.”³¹³ The costs of defecting from your group’s view can be “punishingly high,” whereas the costs of holding incorrect views about science are quite low

304. THE CULTURAL COGNITION PROJECT, <http://www.culturalcognition.net> [<https://perma.cc/TF7D-U2X9>].

305. See, e.g., Dan M. Kahan et al., Letter, *The Polarizing Impact of Science Literacy and Numeracy on Perceived Climate Change Risks*, 2 NATURE CLIMATE CHANGE 732 (2012).

306. See Dan M. Kahan et al., *Cultural Cognition of Scientific Consensus*, 14 J. RISK RES. 147, 148, 158, 167 (2011).

307. See *id.* at 148.

308. See *id.* at 167.

309. See *id.* at 149–50.

310. See Dan Kahan, *On the Sources of Ordinary Science Knowledge and Extraordinary Science Ignorance*, in THE OXFORD HANDBOOK ON THE SCIENCE OF SCIENCE COMMUNICATION 35, 43 (Kathleen Hall Jamieson et al. eds., 2017).

311. *Id.* at 42.

312. See *id.* at 43.

313. *Id.* at 46.

because one individual cannot meaningfully reduce the risks of climate change.³¹⁴ A person's decision to hold factually incorrect views is therefore perfectly reasonable, a phenomenon Kahan calls "identity-protective cognition."³¹⁵ When the science communication environment is "polluted" by this form of motivated reasoning, people are not likely to recognize valid science until others in their cultural group begin to recognize it.³¹⁶ Of course, though wrong beliefs regarding climate-change risk cost a given individual virtually nothing, such beliefs impose serious costs on the public welfare when collectively held, resulting in a "tragedy of the risk-perception commons."³¹⁷

Studies confirm that large numbers of people do, in fact, hold incorrect views on climate change.³¹⁸ Furthermore, a study in 2009 found that people's disbelief in anthropogenic climate change had intensified since 1992.³¹⁹ This study also found that people's understanding of what climate is (relative to weather) did not improve much from 1992 to 2009.³²⁰ In addition, a substantial number of those surveyed in 1992 and 2009 did not understand that the greenhouse effect is a natural process that "keeps earth from being as cold as outer space," and *more* respondents in 2009 cited natural causes such as solar flares as the primary driver of global warming.³²¹ The authors of the study concluded by calling for better risk communication policies.³²²

The authors' emphasis on better risk communication is supported by research that shows how language affects understanding of risk. The literature on the psychological effects of framing demonstrates how the language used to communicate a risk dramatically affects how that risk is perceived. For example, in experimental settings, people react differently to the statement "[o]f one hundred patients who have this operation, ten are dead after five years" than they do to the statement that ninety patients are alive after five years.³²³ Even though the informational content is the same, people's responses suggest that system-one thinking results in a negative reaction to news of ten deaths.³²⁴ Importantly, the studies show similar effects on doctors; they were more likely to suggest the operation when the information was framed in terms of ninety lives, rather than

314. *See id.*

315. *Id.*

316. *See id.*

317. Kahan et al., *supra* note 305, at 734.

318. *See, e.g.,* ANTHONY LEISEROWITZ ET AL., YALE PROJECT ON CLIMATE CHANGE COMM'N, AMERICANS' KNOWLEDGE OF CLIMATE CHANGE 3 (2010), <http://climatecommunication.yale.edu/publications/americans-knowledge-of-climate-change> [<https://perma.cc/DT52-M8P8>] (finding that "63 percent of Americans believe that global warming is happening, but many do not understand why" and "only 8 percent of Americans have knowledge equivalent to an A or B, [while] 40 percent would receive a C or D, and 52 percent would get an F").

319. *See* Reynolds et al., *supra* note 296, at 1523.

320. *See id.* at 1524–25.

321. *Id.* at 1526.

322. *Id.* at 1537.

323. *See* THALER & SUNSTEIN, *supra* note 287, at 36.

324. *See id.*

ten deaths.³²⁵ Thus, the framing of information about policy-relevant science dramatically affects how it is received.³²⁶

Scholars have not yet addressed whether antifraud laws should respond to the reality of public risk perception, but the research just described suggests that they should. At a minimum, courts should consider whether corporate speech about science deliberately exploits well-understood cognitive biases to distort scientific information about risk. For example, a statement that the human role in global warming is uncertain is misleading precisely because it capitalizes on the cognitive biases and cultural predispositions of some people. When corporations deliberately frame speech about science in ways that exploit cognitive biases and system-one errors in judgment, enforcement of antifraud laws can help correct falsehoods and deter future misinformation about public health and environmental risks.

Furthermore, courts can acknowledge these biases without undermining current notions of “reasonableness.” Liability for fraudulent speech typically turns on whether a “reasonable person” would be misled by the speech, but notions of reasonableness are not static or abstract; they derive meaning from context. So, for example, to determine whether a reasonable investor would be misled by a corporation’s statement, courts examine the statement in the context of the total mix of information available to investors.³²⁷ Courts may therefore ascribe more knowledge and sophistication to the reasonable investor than they do to the reasonable consumer. Indeed, the doctrine of necessary implication under the Lanham Act allows courts to find an advertisement misleading, even if literally true, by considering the assumptions and expectations of consumers.³²⁸ Recognizing the cognitive biases of consumers would be another iteration of the contextual analysis courts routinely engage in to determine how people, such as consumers and investors, actually process speech.

325. *See id.*

326. In addition, some cultural cognition scholars have argued that careful framing of decision-relevant science that suffers from the science communication problem can appeal to diverse cultural values. *See, e.g.,* Robert R.M. Verchick, *Culture, Cognition, and Climate*, 2016 U. ILL. L. REV. 969, 982–84. For example, emphasizing the market-based solutions, innovation, and economic-growth opportunities necessary for a low-carbon future can appeal to those with hierarchical, individualistic values. *See* Dan Kahan, Opinion, *Fixing the Communications Failure*, 463 NATURE 296, 297 (2010); *see also* Hari M. Osofsky & Jacqueline Peel, *Energy Partisanship*, 65 EMORY L.J. 695, 720–24 (2016) (discussing the various ways climate change risk is and could be framed).

327. *See* *Matrixx Initiatives, Inc. v. Siracusano*, 563 U.S. 27, 38 (2011).

328. *See* *Time Warner Cable, Inc. v. DIRECTV, Inc.*, 497 F.3d 144, 158 (2d Cir. 2007) (“Under this doctrine, a district court evaluating whether an advertisement is literally false must analyze the message conveyed in full context” (internal quotation omitted)). Furthermore, in a common law fraud action, the determination of whether a plaintiff justifiably relied on a defendant’s misrepresentation takes the plaintiff’s personal characteristics into account. *See* RESTATEMENT (THIRD) OF TORTS: LIAB. FOR ECON. HARM § 11 cmt. d (AM. LAW INST., Tentative Draft No. 2, 2014) (noting that “a plaintiff’s sophistication may affect a court’s judgments about what dangers were fairly considered obvious”). Although justifiable reliance is based on a recklessness, rather than negligence, standard, it nevertheless establishes the importance of personal differences in analyzing the effects of a fraudulent statement.

IV. THE ROLE OF ANTIFRAUD LAWS IN AN AGE OF CORPORATE SPEECH PROTECTIONS

Just as the behavioral economics literature has illuminated the cognitive biases that affect individuals' risk perception, it has examined the ways in which cognitive biases and organizational cultures influence corporate disclosure of information.³²⁹ Indeed, long before the behavioral turn in economics, traditional economic theory recognized the possibility that corporate managers acting in their own rational self-interest might not always act in the corporation's best interest. The literature in behavioral economics, however, provides a much richer account of corporate decision making that acknowledges the shortcuts of system-one thinking. As managers decide what and how to disclose information, they are subject to the same cognitive biases discussed above, such as confirmation biases that preserve the status quo and bias toward optimistic evaluations of information.³³⁰

These individual cognitive biases can be exacerbated by organizational culture. Overconfidence and optimism, for example, are common in corporate environments.³³¹ As Donald Langevoort observes, if these biases are entrenched in corporate culture, they will worsen the tendency to underestimate risk (consistent with confirmation bias) in deciding when and what to disclose.³³² And once a company commits to a certain path publicly, corporate executives will interpret new information and evidence in a way that supports that path to avoid cognitive dissonance and perceived harm to self-image and reputation.³³³ Of course, in some cases, misleading corporate speech results from deliberate decisions to distort or conceal information, but not all cases are so simple. Institutional factors create multiple opportunities for distortion; before senior management even considers information, it is filtered through the organizational culture and often assessed by middle managers.³³⁴

These tendencies to distort or conceal risk information, along with the psychological and social biases that cloud risk perception, have prompted calls for better corporate disclosure regulations and increased fraud protections.³³⁵ If organizational culture tends to distort risk communication and evaluation, then regulations that require firms to evaluate and report risks in particular ways may be prudent. A relevant example is the Securities and Exchange Commission's (SEC) 2010 guidance on reporting of risks related to climate change; the guidance clarifies that SEC regulations governing disclosures of environmental

329. See, e.g., Donald C. Langevoort, *Organized Illusions: A Behavioral Theory of Why Corporations Mislead Stock Market Investors (And Cause Other Social Harms)*, 146 U. PA. L. REV. 101 (1997); see also Ann Morales Olazábal, *Behavioral Science and Scierter in Class Action Securities Fraud Litigation*, 44 LOY. U. CHI. L.J. 1423, 1424–31 (2013) (summarizing the behavioral law-and-economics literature on corporate decision making).

330. See Langevoort, *supra* note 329, at 135–48.

331. See *id.* at 140.

332. See *id.* at 141.

333. See *id.* at 142–43.

334. See *id.* at 119–26.

335. See *id.* at 157–60.

risks and liabilities apply with equal force to disclosures of risks related to climate change and climate regulation.³³⁶

Moreover, behavioral economics scholars have argued not simply for more information but for disclosure regulations designed to overcome the cognitive biases and shortcuts that prevent people from understanding scientific assessments of risk.³³⁷ To prevent overly optimistic assessments of the personal risks of smoking cigarettes, for example, regulatory authorities could require cigarette labels to display graphic images of diseased lungs.³³⁸ There is evidence that these kinds of warnings can help overcome cognitive biases and improve individual risk assessment.³³⁹

The problem, however, is that these kinds of disclosure regulations are increasingly subject to First Amendment challenges. In fact, tobacco companies recently challenged the graphic-warning approach to communicating the risks of smoking. In 2009, Congress passed legislation directing the FDA to promulgate a rule requiring color, graphic depictions of the negative health consequences of smoking on cigarette labels.³⁴⁰ A divided panel of the Sixth Circuit rejected the companies' argument that Congress's statutory graphic-warnings requirement violated their First Amendment freedom of speech.³⁴¹ Just a few months later, however, a divided panel from the D.C. Circuit held that the FDA rule implementing the legislation violated the First Amendment.³⁴² Although public health groups have sued the FDA to prompt another rulemaking, Congress's preference for graphic warnings on cigarette labels will be blocked by First Amendment litigation for some time.³⁴³

The cigarette-labeling litigation is but one example of many First Amendment challenges to regulations that seek to ensure that corporate speech regard-

336. Commission Guidance Regarding Disclosure Related to Climate Change, 75 Fed. Reg. 6289, 6295–96 (Feb. 8, 2010) (codified at 17 C.F.R. pts. 211, 231, 241).

337. Working from within the tradition of behavioral law and economics, Richard Thaler and Cass Sunstein have argued for a kind of soft architecture of choice that would “nudge” people in directions that further both individual and public welfare. See THALER & SUNSTEIN, *supra* note 287, at 81–100. See generally Cass R. Sunstein, *Empirically Informed Regulation*, 78 U. CHI. L. REV. 1349 (2011) (summarizing the findings of the behavioral economics literature and suggesting regulatory reforms, including approaches to disclosure rules, that would help people make better decisions). Information disclosure is a central component of this architecture provided it is structured to overcome some of the cognitive distortions in people's assessment of risk. See *id.* at 1366.

338. See Sunstein, *supra* note 337, at 1381.

339. See, e.g., Christine Jolls, *Debiasing Through Law and the First Amendment*, 67 STAN. L. REV. 1411 (2015) (examining data on “informedness effects” of legally mandated visual warnings such as the skull and crossbones and arguing that visual images may improve accuracy of risk perception).

340. Family Smoking Prevention and Tobacco Control Act, Pub. L. No. 111–31, 123 Stat. 1776 (2009) (codified at 21 U.S.C. §§ 387–387u (2012)).

341. See *Disc. Tobacco City & Lottery, Inc. v. United States*, 674 F.3d 509, 531 (6th Cir. 2012).

342. See *R.J. Reynolds Tobacco Co. v. Food & Drug Admin.*, 696 F.3d 1205, 1222 (D.C. Cir. 2012) (invalidating the rule because the FDA failed to show that the warnings would directly advance the government's interest in reducing smoking rates), *overruled in part by Am. Meat Inst. v. U.S. Dep't of Agric.*, 760 F.3d 18 (D.C. Cir. 2014) (en banc).

343. See, e.g., Complaint, *Am. Acad. of Pediatrics v. U.S. Food & Drug Admin.*, No. 16-cv-11985 (D. Mass. filed Oct. 4, 2016), 2016 WL 5897500.

ing science (including risk analysis) is not misleading. First Amendment arguments are at the center of the litigation regarding off-label drug promotion discussed above.³⁴⁴ When agencies such as the FDA establish thresholds for how much scientific evidence is necessary to support a particular claim, their decisions are frequently subjected to searching review by courts that characterize these regulatory decisions as paternalistic efforts to restrict speech.

These cases are part of a larger deregulatory trend in First Amendment doctrine. As legal scholars have begun to document, ever since the Court recognized some First Amendment protection for truthful commercial speech in 1976, more and more of the Court's First Amendment docket (as well as litigation in the lower federal courts) is consumed by challenges filed by corporations, rather than individuals.³⁴⁵ In an era when direct command-and-control regulation has given way to information disclosure as a regulatory tool, increased First Amendment protection for corporate entities may mean less economic and consumer-protection regulation. Indeed, some Supreme Court Justices and legal scholars have warned that this new trend in First Amendment jurisprudence resembles the judicial overreach of the *Lochner* era.³⁴⁶ Despite these critiques, it is a trend that will likely continue.

Furthermore, if this trend results in less ex ante regulation of corporate speech about science, ex post enforcement of antifraud laws will be the primary mechanism for policing misleading corporate speech about public health and environmental risks. Although antifraud laws cannot encourage disclosure of information when corporations lack a duty to disclose, they can deter misleading speech, particularly about health and environmental risks, when corporations choose to speak. If courts use the contextual approach to determine whether the speech is misleading, antifraud laws can improve the information people receive about risks to public health and welfare. This is particularly true when the speech in question is commercial speech because the Supreme Court has long held that false or misleading *commercial* speech is not protected speech.

Of course, enforcement of antifraud laws will still prompt First Amendment challenges. To situate these actions within the broader First Amendment landscape, this Part outlines the main doctrinal trends that have increased protections for commercial and corporate speech. It begins with a discussion of how protections for commercial speech have evolved since the 1970s, focusing especially on recent challenges to disclosure laws that seek to compel commercial speech on matters of public interest. Courts today apply heightened levels

344. See discussion *supra* Section III.B.2.

345. See John C. Coates IV, *Corporate Speech & the First Amendment: History, Data, and Implications*, 30 CONST. COMMENT. 223, 223–24 (2015) (citing *Va. State Bd. of Pharmacy v. Va. Citizens Consumer Council, Inc.*, 425 U.S. 748, 770–73 (1976), as the first of these cases).

346. See *infra* Section IV.A.1. Moreover, as John Coates has demonstrated, this trend is all the more concerning because it is unsupported by our legal and political history. See Coates, *supra* note 345, at 232–34.

of scrutiny to burdens on commercial speech, a trend that threatens *ex ante* regulations, including disclosure requirements designed to prevent misleading speech. Moreover, the distinction between commercial and noncommercial speech seems to be fading in importance. Although the Court has not yet decided what level of scrutiny applies to corporate speech that is not strictly commercial (“mixed” corporate speech), the trends discussed in this Part suggest that the Court would impose some limitations on enforcement of antifraud laws against mixed corporate speech. The Article closes with some predictions about how courts are likely to respond to First Amendment concerns regarding the chilling and selective prosecution of mixed corporate speech.

A. COMMERCIAL SPEECH ABOUT SCIENCE

1. First Amendment Challenges to Commercial Speech Regulations

The Supreme Court did not clearly hold that commercial speech is entitled to some First Amendment protection until 1976 when it struck down, as inconsistent with the First Amendment, a Virginia law that characterized the advertising of prescription drug prices by pharmacists as unprofessional conduct.³⁴⁷ In so doing, the Court focused on consumers’ interest in pricing information and on the importance of the “free flow of commercial information” to inform consumer decision making in service of a “free enterprise economy.”³⁴⁸ In a prescient opinion, Justice Rehnquist, the lone dissenter, criticized the Court’s decision as a form of judicial overreach that would threaten legislative judgments regarding social and economic policy.³⁴⁹

A few years later, Justice Rehnquist was again the lone dissenter in the seminal case *Central Hudson Gas & Electric Corp. v. Public Service Commission*, which established the multipart test for reviewing restrictions on commercial speech under the First Amendment.³⁵⁰ Writing for the majority, Justice Powell emphasized the informational justification for commercial speech protection and acknowledged that it supported protection only for nonmisleading commercial speech, leaving false and misleading commercial speech outside of First Amendment scrutiny.³⁵¹ Provided the commercial speech is nonmisleading, the governmental restriction must pass a form of intermediate scrutiny; the restriction survives First Amendment challenge if the state can show that it directly advances a substantial state interest and is “no more extensive than necessary” to further that interest.³⁵²

In *Central Hudson*, the Court majority applied this test to a state prohibition on the promotion of electricity use by electric utilities and held that the

347. *Va. State Bd. of Pharmacy v. Va. Citizens Consumer Council, Inc.*, 425 U.S. 748, 773 (1976).

348. *Id.* at 763–65.

349. *See id.* at 784 (Rehnquist, J., dissenting).

350. *See* 447 U.S. 557, 564–66, 583 (1980).

351. *See id.* at 563.

352. *Id.* at 564, 569–70.

prohibition was more extensive than necessary because it suppressed speech that did not undermine the state's asserted interest in energy conservation.³⁵³ In his dissent, Justice Rehnquist once again warned against the deregulatory use of the First Amendment and explicitly invoked the discredited approach of the *Lochner* era "in which it was common practice for this court to strike down economic regulations adopted by a State based on the Court's own notions of the most appropriate means for the State to implement its considered policies."³⁵⁴

Today, legal scholars echo these concerns as courts use *Central Hudson's* test to strike down restrictions on commercial speech,³⁵⁵ and legislatures and agencies grow more reluctant to limit commercial speech to further various economic and social goals, including market efficiency and consumer protection.³⁵⁶ For example, when the Court struck down a federal limitation on pharmaceutical advertising of compounded drugs in 2002, Justice Breyer strongly dissented from the Court's application of *Central Hudson's* test, criticizing the five-Justice majority for discounting the government's interest in consumer health and safety.³⁵⁷ Following this decision, calls in Congress for more regulation of drug advertising, such as FDA preclearance of direct-to-consumer advertisements, diminished because of First Amendment concerns.³⁵⁸ Increased First Amendment scrutiny of commercial speech puts lawmakers and regulators in a difficult position; if they wish to regulate risks to consumers, they may avoid First Amendment challenge only by choosing a more restrictive regulation (such

353. *See id.* at 570.

354. *Id.* at 589 (Rehnquist, J., dissenting).

355. *See, e.g.,* Lorillard Tobacco Co. v. Reilly, 533 U.S. 525, 556–66 (2001) (striking down state restrictions on outdoor advertising of smokeless tobacco and cigars despite state interest in reducing tobacco use); 44 Liquormart, Inc. v. Rhode Island, 517 U.S. 484, 507–08 (1996) (plurality opinion) (striking down state law restricting advertisement of retail liquor prices despite state interest in reducing alcohol consumption). For critical legal commentary, see Coates, *supra* note 345, at 249 (analyzing data set of Supreme Court and federal appellate cases and observing that contemporary cases in the appellate courts "predominantly do not involve expressive businesses, but are attacks on laws and regulations that inhibit 'speech' by other kinds of businesses in areas of activity incidental or instrumental to their core profit-making activity"); Amanda Shanor, *The New Lochner*, 2016 Wisc. L. REV. 133, 158–75 (2016) (examining two historical trends contributing to the First Amendment's deregulatory turn: a pro-business social movement that sought to shape First Amendment doctrine according to libertarian views and the administrative state's shift from command-and-control regulation to other regulatory approaches like disclosure requirements).

356. *See, e.g.,* NOLETTE, *supra* note 246, at 71–72 (noting court decision striking down federal law governing off-label drug promotion stifled further action by FDA and Congress).

357. *See* Thompson v. W. States Med. Ctr., 535 U.S. 357, 378–79 (2002) (Breyer, J., dissenting). Justice Breyer has written other dissents, like Justice Rehnquist before him, comparing the Court's application of the First Amendment to economic regulation with the now-discredited use of the Due Process Clause to limit economic and social regulation in the early twentieth century. *See, e.g.,* United States v. United Foods, Inc., 533 U.S. 405, 429 (2001) (Breyer, J., dissenting).

358. *See* NOLETTE, *supra* note 246, at 69–70 (citing proposed legislation in 2007 and 2008). The Supreme Court's decision also prompted the FDA to seek public comments on the agency's compliance with First Amendment law. *See* Request for Comment on First Amendment Issues, 67 Fed. Reg. 34,942 (May 16, 2002).

as a ban on particular uses of a drug) over a less stringent regulation that restricts promotional speech about a drug's use.

This trend of more stringent judicial scrutiny has also affected compelled commercial speech, an area of considerable doctrinal uncertainty. Although the Court arguably subjected disclosure requirements to less scrutiny than restrictions on commercial speech thirty years ago, courts and scholars have yet to agree on exactly if and when this lesser scrutiny applies. In *Zauderer v. Office of Disciplinary Counsel of the Supreme Court of Ohio*, the Court upheld a state law requiring an attorney who was advertising contingent fees to disclose that clients would pay court costs if their cases did not succeed.³⁵⁹ In reaching this decision, the Court held that mandated disclosure of “purely factual and uncontroversial information” passes First Amendment scrutiny as long as it is “reasonably related to the State’s interest in preventing deception of consumers.”³⁶⁰

Since *Zauderer*, at least two serious doctrinal puzzles have surfaced. First, what is “factual and uncontroversial information”? In striking down FDA’s graphic cigarette warnings, the D.C. Circuit panel split over this question, with the majority characterizing the visual images as not “purely factual” because “they [were] primarily intended to evoke an emotional response.”³⁶¹ A related question is whether *Zauderer* applies to information disclosure outside commercial advertising. For example, a D.C. Circuit panel recently concluded that *Zauderer* does not apply to disclosure mandates under securities laws.³⁶²

Second, for *Zauderer*—rather than *Central Hudson*—to apply, must the state’s asserted interest be preventing consumer deception? In a decision partially overruling the panel decision in the cigarette-labeling case, the D.C. Circuit sitting en banc held that *Zauderer* extended to other government interests and upheld a USDA regulation requiring disclosure of country-of-origin information on meat products.³⁶³ Legal scholars, in particular Robert Post, have

359. See 471 U.S. 626, 655 (1985).

360. *Id.* at 651.

361. *R.J. Reynolds Tobacco Co. v. Food & Drug Admin.*, 696 F.3d 1205, 1216 (D.C. Cir. 2012), *overruled in part by* *Am. Meat Inst. v. U.S. Dep’t of Agric.*, 760 F.3d 18 (D.C. Cir. 2014) (en banc). In contrast, the dissenting judge concluded that emotive content “does not necessarily undermine the warnings’ factual accuracy,” emphasizing the FDA’s finding that graphic warnings can improve a warning’s efficacy in communicating information about health risks. See *id.* at 1230 (Rogers, J., dissenting); see also Ellen P. Goodman, *Visual Gut Punch: Persuasion, Emotion, and the Constitutional Meaning of Graphic Disclosure*, 99 CORNELL L. REV. 513, 562 (2014) (summarizing research that shows that “emotional communication does not bypass the cognitive” but may instead “activate[] cognition”); Rebecca Tushnet, *More Than a Feeling: Emotion and the First Amendment*, 127 HARV. L. REV. 2392, 2430–31 (2014) (arguing that because emotion and rationality are intertwined, legal doctrine should not invalidate regulations simply because they evoke emotion).

362. See *Nat’l Ass’n of Mfrs. v. Sec. & Exch. Comm’n*, 800 F.3d 518, 524 (D.C. Cir. 2015).

363. See *Am. Meat Inst.*, 760 F.3d at 21–22. Other courts have extended *Zauderer* beyond the context of consumer deception. See, e.g., *Nat’l Elec. Mfrs. Ass’n v. Sorrell*, 272 F.3d 104, 113–15 (2d Cir. 2001) (upholding disclosure requirements for lamps with mercury where state had legitimate interest in reducing environmental and health risks caused by mercury contamination).

made persuasive arguments for this conclusion as well.³⁶⁴ This distinction matters because it affects how much deference a court will give the state when reviewing a disclosure requirement. Many courts and commentators have treated the *Zauderer* “reasonable relationship” test as a highly deferential test similar to rational basis review.³⁶⁵ Others, however, have interpreted *Zauderer* as an application of *Central Hudson*, an approach that still requires the state to assert a “substantial” interest, but seems to apply less scrutiny to the relationship between disclosure and achieving the state interest.³⁶⁶

This doctrinal muddle makes judicial review of disclosure requirements susceptible to manipulation.³⁶⁷ Because the appropriate framework for review is contested, judges can more easily choose which framework and even which pieces of the framework best serve the arguments they wish to make. The combination of the trend toward deregulatory outcomes with doctrinal uncertainty threatens existing information disclosure laws and deters regulations that further truthful commercial speech. Given these trends, the problem of misleading commercial speech may be harder to solve with *ex ante* regulations, a reality that elevates the role of *ex post* litigation under the antifraud provisions of various federal and state statutes.³⁶⁸

2. Antifraud Laws as a Backstop: Drawing the Line Between Misleading and Nonmisleading Commercial Speech About Science

Antifraud provisions only deter misleading speech when courts correctly label misleading speech as misleading. In the off-label drug-promotion cases discussed above, courts engage in little to no analysis of whether the off-label promotion at issue is misleading. The assumption is that, in the absence of clear

364. See Robert Post, *Compelled Commercial Speech*, 117 W. VA. L. REV. 867, 898 (2015) (arguing that *Zauderer*'s more deferential scrutiny should apply to disclosure requirements intended by the state to increase public welfare); see also Goodman, *supra* note 361, at 550 (arguing that *Zauderer*'s “uncontroversial” requirement should limit permissible government interests to those consistent with “generally accepted norm[s]”).

365. See, e.g., *Disc. Tobacco City & Lottery, Inc. v. United States*, 674 F.3d 509, 562 (6th Cir. 2012) (treating *Zauderer* scrutiny as “rational-basis analysis”); Post, *supra* note 364, at 883 (arguing that *Zauderer*'s reasonable-relationship language “locates judicial review further toward the deferential end of the spectrum”).

366. See, e.g., *Am. Meat Inst.*, 760 F.3d at 25–27 (“[O]ne could think of *Zauderer* largely as an application of *Central Hudson*, where several of *Central Hudson*'s elements have already been established.” (internal quotation omitted)); Jonathan H. Adler, *Compelled Commercial Speech and the Consumer “Right to Know.”* 58 ARIZ. L. REV. 421, 436 (2016) (“*Zauderer*, properly understood, is but an application of the underlying *Central Hudson* framework to a specific context . . . Preventing consumers from being misled by advertising or other commercial speech is unquestionably a ‘substantial’ state interest under *Central Hudson*.”).

367. See Robert Post, *The Constitutional Status of Commercial Speech*, 48 UCLA L. REV. 1, 42 (2000) (arguing the *Central Hudson* test is vulnerable to varied application because it “remains untethered to any particular First Amendment theory”).

368. Indeed, in making the argument that the SEC's “Quiet Period Rules” would likely fail First Amendment scrutiny, Susan Heyman argues that antifraud provisions of securities laws would sufficiently deter false and misleading speech. See Susan B. Heyman, *The Quiet Period in a Noisy World: Rethinking Securities Regulation and Corporate Free Speech*, 74 OHIO ST. L.J. 189, 231 (2013).

falsehoods, the speech is truthful and therefore entitled to commercial speech protections under the First Amendment.³⁶⁹ The characterization of the speech as not misleading triggers the application of the *Central Hudson* test. Not surprisingly, when a court frames the question as one involving *truthful* speech about scientific studies, the government faces the impossible task of showing that its restriction on truthful speech directly and narrowly advances its interest in ensuring unbiased, truthful speech about science.³⁷⁰ The government enforcement action inevitably fails either because the government's interest is not legitimate or because the action fails to further that interest.

There is, therefore, a pressing need for a coherent analytical approach to the question of misleadingness. As Paul Horwitz observes, “[t]he courts have been reluctant to probe the limits of the ‘false and misleading speech’ exception, particularly the possibility of regulating misleading but otherwise true commercial speech.”³⁷¹ He argues that a more robust approach to this question would confront the weakness of the assumption that commercial speech enables informed, rational decision making by consumers.³⁷²

Because this is especially true when it comes to speech about risk, courts should interrogate the question of misleadingness most closely when the commercial speech conveys information about public health risks. As argued above, this requires a contextualized analysis of the risks and benefits of the speech.³⁷³ Speech that, if false, would pose serious risks is more likely to be misleading. This approach facilitates the identification of misleading speech while providing a framework to guide courts and mitigate the risk of ad hoc judicial decision making.

In addition, a definition of misleading that incorporates a cost–benefit analysis is consistent with relevant Supreme Court precedent regarding commercial speech. In *Milavetz, Gallop & Milavetz, P.A. v. United States*, the Court rejected the argument that the government must prove the misleading nature of commercial speech—either through consumer surveys or other evidence—when the likelihood of deception is “self-evident.”³⁷⁴ The plaintiff in the case, a law firm

369. See, e.g., *Wash. Legal Found. v. Henney*, 56 F. Supp. 2d 81, 85 (D.D.C. 1999) (dismissing the FDA's argument that off-label promotion is “more likely to mislead than to inform”), *vacated in part*, 202 F.3d 331 (D.C. Cir. 2000).

370. See *id.* at 86 (characterizing the government's interest in dissemination of unbiased information to prescribers as a burden on “truthful” speech that is premised on the “paternalistic assumption that such restriction is necessary to protect the listener from ignorantly or inadvertently misusing the information”).

371. Paul Horwitz, *Free Speech as Risk Analysis: Heuristics, Biases, and Institutions in the First Amendment*, 76 TEMP. L. REV. 1, 60 (2003).

372. See *id.* at 59; see also Post, *supra* note 367, at 41 (arguing that the definition of misleading should not focus on the content of speech, but “on the specific conditions that might be understood to render consumers dependent and vulnerable”). The assumption is weak because behavioral psychology and economics research has highlighted the ways in which speech draws on cognitive biases to mislead consumers. See Horwitz, *supra* note 371, at 53–56.

373. See *supra* Section III.B.1.

374. See 559 U.S. 229, 251 (2010).

with a bankruptcy practice, challenged a federal requirement that its advertisements for debt-relief services disclose that such services may involve filing for bankruptcy, which the Court emphasized “has inherent costs.”³⁷⁵ The legislative history documenting “a pattern of advertisements that hold out the promise of debt relief without alerting consumers to its potential cost” was enough to establish a “likelihood of deception.”³⁷⁶ In other words, the Court needed no evidence that people were actually misled—just that people were exposed to what it characterized as “inherently misleading” speech.³⁷⁷ Moreover, the Court’s reference to the costs of misleading speech is consistent with a cost–benefit approach; because consumers misled by the advertisements may incur costs (which are not offset by benefits), the speech is properly characterized as misleading.

B. MIXED CORPORATE SPEECH ABOUT SCIENCE

1. Corporations as Rights Holders

In addition to prompting more stringent judicial scrutiny of restrictions on commercial speech, recent Supreme Court decisions have eroded the distinction between commercial and noncommercial speech. In *Sorrell v. IMS Health Inc.*, for example, the Court struck down a Vermont law that prevented pharmacies from selling prescriber information for marketing purposes without the prescribers’ consent.³⁷⁸ Drug companies challenged the restriction as infringing on their protected speech—namely, speech to market their products.³⁷⁹ Justice Kennedy, writing for the Court, subjected the state law to “heightened judicial scrutiny,” because it imposed content- and speaker-based restrictions on protected speech.³⁸⁰ This application of heightened scrutiny suggests that corporate speech that appears commercial may enjoy increased First Amendment protection if the challenged restriction carves out exceptions for other speakers or types of speech.³⁸¹ For example, *Sorrell* arguably supports increased protection for off-label promotional speech involving scientific studies; if other speakers like academic researchers can disseminate this same information, regulatory restrictions on drug companies will likely trigger heightened scrutiny. Similarly, enforcement of antifraud laws against corporations like ExxonMobil but not against scientists or think tanks for similar speech could trigger this heightened scrutiny.

375. *See id.* at 234, 250.

376. *Id.* at 251.

377. *See id.* at 250.

378. *See* 564 U.S. 552, 557–59 (2011).

379. *See id.* at 561.

380. *Id.* at 566–67. The law contained exceptions; for example, pharmacies could sell the information to academic researchers. *See id.* at 563.

381. *See id.* at 571. Moreover, the Court’s recent decision striking down a municipal sign ordinance contains language that suggests any content-based distinction triggers strict judicial scrutiny even when the government has a neutral justification unrelated to speech. *See Reed v. Town of Gilbert*, 135 S. Ct. 2218, 2226 (2015) (“Content-based laws . . . are presumptively unconstitutional and may be justified only if the government proves that they are narrowly tailored to serve compelling state interests.”).

Sorrell's insistence that commercial speakers cannot be singled out regardless of the state's justification reflects a broader turn toward recognizing corporations as rights holders.³⁸² A few years before *Sorrell*, Justice Kennedy wrote the majority opinion in *Citizens United v. Federal Election Commission*, which struck down campaign finance laws restricting corporate independent expenditures on electioneering communications.³⁸³ In so doing, Justice Kennedy made clear that the political speech of "[c]orporations or other associations" cannot "be treated differently under the First Amendment simply because such associations are not 'natural persons.'"³⁸⁴ This view of corporations as autonomous legal persons with First Amendment rights garnered another five-Justice majority in *Burwell v. Hobby Lobby Stores, Inc.*³⁸⁵ In that case, the Court held that a corporation is a "person" under a federal statute protecting the free exercise of religion.³⁸⁶

These cases imbue corporations with autonomy interests more traditionally understood in the context of individual liberties. They also conflate the marketplace of ideas, a free speech metaphor, with a libertarian, antiregulatory view of the economic marketplace. If the First Amendment does not permit differential treatment of corporate speakers, even restrictions on *commercial* speech seem harder to justify, particularly when the original justification for protecting commercial speech had nothing to do with corporate speakers but was instead grounded in the recipient's interest in accurate information.³⁸⁷ And although these cases inspired strong dissents by a number of Justices, the movement toward greater protection for corporate speech is likely to continue for the foreseeable future.

2. Mixed Corporate Speech About Science: Some First Amendment Predictions for Antifraud Enforcement

One potential consequence of recognizing corporations as First Amendment rights holders is a less expansive view of commercial speech. For example, the Court is less likely to characterize a newspaper ad that expresses ExxonMobil's views regarding climate change as commercial speech. The same is true of speech by corporate executives to the media and shareholders. Previously, the Court has characterized speech that "does 'no more than propose a commercial transaction'" as core commercial speech.³⁸⁸ It has also noted the importance of other factors such as financial motivation³⁸⁹ and has described the distinction

382. See Zoë Robinson, *Constitutional Personhood*, 84 GEO. WASH. L. REV. 605, 622–32 (2016) (discussing cases in which the Court has treated corporations as rights holders).

383. See 558 U.S. 310, 372 (2010).

384. *Id.* at 343.

385. 134 S. Ct. 2751 (2014).

386. See *id.* at 2769–70, 2775.

387. See *supra* notes 347–48 and accompanying text.

388. *Bolger v. Youngs Drug Prods. Corp.*, 463 U.S. 60, 66 (1983) (quoting *Va. State Bd. of Pharmacy v. Va. Citizens Consumer Council, Inc.*, 425 U.S. 748, 762 (1976)).

389. See *id.* at 67–68.

between commercial and noncommercial speech as a “matter of degree.”³⁹⁰ But after *Citizens United*, the Court is likely to limit the category of commercial speech to something close to its core notion to ensure that noncommercial corporate speech is given First Amendment breathing room.

The commercial–noncommercial distinction has always been difficult. For this reason, the Court has declined to “parcel out” speech that contains both noncommercial and commercial elements.³⁹¹ Instead, when commercial speech is “inextricably intertwined” with fully protected speech, the Court treats all the speech as fully protected.³⁹² The paradigmatic case is the speech of a professional fundraiser soliciting donations; although the fundraiser has a financial motivation, “solicitation is characteristically intertwined with informative and perhaps persuasive speech.”³⁹³ The same, of course, can be said about corporate speech regarding the science of climate change and other health and environmental concerns.

Consider again the following language from an ExxonMobil paid editorial in the *New York Times* in 2004: “Scientific uncertainties continue to limit our ability to make objective, quantitative determinations regarding the human role in recent climate change or the degree and consequences of future change.”³⁹⁴ By 2004, the majority of climate scientists would have found this statement misleading.³⁹⁵ But because climate change is indeed a matter of public concern and the statement does more than simply propose a commercial transaction, it is not likely to be commercial speech under contemporary First Amendment doctrine.³⁹⁶ Although the Court has said that commercial speakers “should not be permitted to immunize false or misleading product information from government regulation simply by including references to public issues,” it made this statement in 1983 before the expansion of commercial and corporate speech protections.³⁹⁷

The Court has yet to clarify whether and how the First Amendment limits the application of antifraud laws to “mixed” corporate speech, although it had an opportunity to do so several years ago. It agreed to review the California Supreme Court’s holding that Nike’s speech regarding working conditions in its foreign factories was commercial speech, for which Nike could be liable if the

390. *City of Cincinnati v. Discovery Network, Inc.*, 507 U.S. 410, 423 (1993).

391. *See Riley v. Nat’l Fed’n of the Blind of N.C., Inc.*, 487 U.S. 781, 796 (1988).

392. *See id.*

393. *Id.* (quoting *Vill. of Schaumburg v. Citizens for a Better Env’t*, 444 U.S. 620, 632 (1980)).

394. *A Range of Opinions on Climate Change at Exxon Mobil*, *supra* note 236.

395. *See supra* Section I.A.

396. In fact, ExxonMobil has argued that its speech regarding climate change is political speech entitled to the most stringent First Amendment protection. *See Plaintiff’s Original Petition for Declaratory Relief at 23, Exxon Mobil Corp. v. Walker*, No. 017-284890-16 (Tex. Dist. Ct. Tarrant Cty. Apr. 13, 2016).

397. *See Bolger v. Youngs Drug Prods. Corp.*, 463 U.S. 60, 68 (1983).

speech were false.³⁹⁸ A California resident sued Nike under the state's unfair and deceptive practices law for making false statements about its working conditions, and Nike alleged in responses that its speech on a matter of public concern was noncommercial speech entitled to full protection.³⁹⁹ The Supreme Court granted certiorari, but then dismissed the writ as improvidently granted, leaving questions regarding "mixed" corporate speech unanswered.⁴⁰⁰

Justice Breyer wrote a lengthy dissent from the dismissal arguing that the First Amendment questions should be resolved.⁴⁰¹ Like the corporations (including ExxonMobil) who filed amicus briefs in the case, Justice Breyer would have applied heightened scrutiny under which, he argued, the California false advertising law would fail.⁴⁰² He characterized the speech at issue as a "mixture" of noncommercial speech on matters of public concern and commercial speech.⁴⁰³ Justice Breyer argued the California law, applied to mixed speech, swept too broadly because it imposed liability on the basis of strict liability and negligence and permitted enforcement by private citizens who have suffered no harm.⁴⁰⁴ He cautioned that a corporate speaker concerned about a politically motivated prosecution for accidentally or negligently false speech might refrain from exercising its First Amendment right to engage in public debate.⁴⁰⁵

Despite these concerns, there is no shortage of language in Supreme Court opinions that places fraudulent and even false speech outside the protection of the First Amendment.⁴⁰⁶ The Court's recent decision in *United States v. Alvarez* does not call this basic principle into question. In *Alvarez*, the Court clarified that speech does not lose First Amendment protection simply because it is false, but the decision does not disturb the myriad state and federal antifraud laws that target public harms.⁴⁰⁷

Although the Court issued a splintered opinion in *Alvarez*, six Justices agreed to strike down under the First Amendment a federal statute that imposed criminal penalties on an individual who falsely claims that he or she received a military decoration or medal.⁴⁰⁸ Both the plurality and the concurring opinions distinguished other laws that prohibit false speech by stressing that those laws address identifiable harms, whereas an individual's lie about a congressional medal does not impose a sufficient risk of harm, particularly when truthful

398. See *Kasky v. Nike, Inc.*, 45 P.3d 243, 247 (Cal. 2002), *cert. granted sub nom. Nike, Inc. v. Kasky*, 537 U.S. 1099 (2003), and *cert. dismissed*, 539 U.S. 654 (2003) (per curiam).

399. See *Nike, Inc. v. Kasky*, 539 U.S. 654, 656 (2003) (Stevens, J., concurring).

400. See *id.* at 667 (Breyer, J., dissenting).

401. See *id.*

402. See *id.* at 679.

403. See *id.* at 676.

404. See *id.* at 679.

405. See *id.* at 680.

406. See *United States v. Alvarez*, 132 S. Ct. 2537, 2560–61 (2012) (Alito, J., dissenting) (citing cases with language suggesting that false speech has no intrinsic value).

407. See *id.* at 2545–46 (plurality opinion).

408. See *id.* at 2551 (Breyer, J., concurring in the judgment).

counterspeech could expose the falsehood.⁴⁰⁹ These opinions make clear that the harms targeted by antifraud laws need not look like common law injuries; for example, perjury laws and federal laws that prohibit lying to governmental officials protect against public harms to governmental processes.⁴¹⁰ Arguably, state consumer protection laws that prohibit lying to the public about health and environmental risks would also survive First Amendment objection.

Thus, although the Justices appear to agree that most fraudulent speech is unprotected, the Court has not definitively established what, if any, limitations the First Amendment places on antifraud laws directed at mixed speech. The Court has come close to outlining these limitations, suggesting that they might mirror the heightened scienter and proof requirements imposed in defamation cases brought by public officials.⁴¹¹ Most notably, the Court allowed a state fraud action against professional fundraisers who allegedly made “affirmative statements . . . intentionally misleading donors regarding the use of their contributions.”⁴¹²

In *Telemarketing Associates*, the Illinois attorney general brought common law and statutory fraud claims against professional fundraising organizations.⁴¹³ The complaint alleged that the fundraisers had intentionally misled donors by making statements that donations would go toward specific charitable programs when they knew that only 10% to 15% of the funds would go to the charity and the rest would go to for-profit fundraisers.⁴¹⁴ The state courts dismissed the complaint on First Amendment grounds, but the Supreme Court reversed.⁴¹⁵ The specific elements of the fraud claims were central to the Court’s holding; the state alleged that the fundraisers *knowingly* made false statements of material fact “with the intent to mislead the listener,” which they succeeded in doing.⁴¹⁶ Although “mere failure to volunteer” information about the fundraiser’s fees would not be enough to survive a First Amendment challenge, here the complaint stated a claim because it alleged affirmative statements made with knowledge and an intent to mislead.⁴¹⁷

In addition to emphasizing the element of intent, the Court noted (without necessarily requiring) the other state law protections for defendants in actions based on fraudulent speech. For example, state law required the government to prove the elements of fraud by clear and convincing evidence, a heightened evidentiary showing.⁴¹⁸ The Court also noted that independent appellate review

409. *See id.* at 2545–46 (plurality opinion); *id.* at 2554–55 (Breyer, J., concurring in the judgment).

410. *See id.* at 2546 (plurality opinion).

411. *See Illinois ex rel. Madigan v. Telemktg. Assocs., Inc.*, 538 U.S. 600, 620–21 (2003).

412. *See id.* at 620.

413. *See id.* at 607.

414. *See id.*

415. *See id.* at 606.

416. *See id.* at 620.

417. *See id.* at 624.

418. *See id.* at 620. According to the Third Restatement of Torts, a majority of courts already apply a clear-and-convincing standard to all elements in common law fraud actions. RESTATEMENT (THIRD) OF

of the trial court's findings regarding scienter would provide an additional First Amendment safeguard.⁴¹⁹ Together, these safeguards were more than enough to ensure that the fraud action at issue did not chill protected speech.

This precedent suggests that, at a minimum, the Court is likely to impose a heightened scienter requirement similar to the "actual malice" requirement in defamation cases involving public officials and figures.⁴²⁰ Indeed, in the federal government's fraud litigation against tobacco companies, the D.C. Circuit emphasized that their liability "rests on deceits perpetrated with knowledge of their falsity."⁴²¹ When liability is premised on knowledge or reckless disregard, the Court has indicated that it leaves requisite breathing room for protected speech—which means that some false or misleading speech ends up protected. Heightened proof requirements and de novo appellate review of trial court findings regarding scienter can also guard against the chilling of protected speech.

As a practical matter, then, state attorneys general investigating and prosecuting corporations under broadly worded antifraud provisions,⁴²² as is the case in the ExxonMobil investigation, should interpret these provisions to impose liability only when statements are made with actual malice. This means that a plaintiff enforcing an antifraud law in the context of mixed speech would have to show that the corporate defendant's allegedly misleading statement was made "with knowledge that it was false [or misleading] or with reckless disregard of whether it was false [or misleading]."⁴²³ A complaint that more closely mirrors the fraud claim in *Telemarketing Associates* would allege that the defendant made affirmative statements—not just omissions—with knowledge that they were false and misleading *and* with the intent to deceive. Courts are also likely to require that a plaintiff establish fault (the scienter requirement) by clear and convincing evidence. In addition, given the concern over selective enforcement, suits under state laws by private attorneys general, particularly in the absence of proof of individualized reliance and actual damages, may be subjected to increased First Amendment scrutiny.⁴²⁴

TORTS: LIAB FOR ECON. HARM § 9 cmt. e (AM. LAW INST., Tentative Draft No. 2, 2014). The Restatement's authors, however, recommend that the heightened standard apply only to the element of scienter. *See id.*

419. *See Telemktg. Assocs.*, 538 U.S. at 621.

420. *See Milkovich v. Lorain Journal Co.*, 497 U.S. 1, 14–15 (1990) (discussing relevant precedent).

421. *United States v. Philip Morris USA Inc.*, 566 F.3d 1095, 1124 (D.C. Cir. 2009).

422. *See* SEARLE CIVIL JUSTICE INST., STATE CONSUMER PROTECTION ACTS: AN EMPIRICAL INVESTIGATION OF PRIVATE LITIGATION 9–10 (2009) (describing how state consumer protection laws diverge from federal counterparts by providing "private right[s] of action and different remedies, and . . . relaxed common law limitations").

423. *N.Y. Times Co. v. Sullivan*, 376 U.S. 254, 280 (1964).

424. *See* SEARLE CIVIL JUSTICE INST., *supra* note 422, at 13 (summarizing commentators' concerns regarding private enforcement).

Of course, these added protections would not apply in a purely commercial context where false or misleading speech remains unprotected.⁴²⁵ For example, to the extent ExxonMobil violated securities laws by misleading investors about how climate change may affect the value of its assets, state and federal regulators may proceed under laws that do not require proof of intent to deceive.⁴²⁶ Although commentators have suggested that corporate disclosures under securities laws are protected speech,⁴²⁷ the Supreme Court has previously characterized securities regulation as completely outside First Amendment protection.⁴²⁸ If issuers' disclosures are protected at all, the most compelling arguments support treating them as commercial speech.⁴²⁹ As Wendy Couture has argued, these statements fall within the Court's core notion of commercial speech: "This speech, which is made in order for investors to assess whether to buy, hold, or sell the issuer's securities, falls within the traditional definition of speech that merely 'propos[es] a commercial transaction.'"⁴³⁰ Moreover, eroding this boundary would threaten to undermine the purpose of securities disclosure laws: the promotion of an efficient market through the provision of accurate information.⁴³¹

CONCLUSION

Evaluating corporate speech about science is difficult for many reasons. First, scientific knowledge is not easily evaluated in terms of truth or falsity. The uncertainties inherent in scientific inquiry make claims about science susceptible to manipulation and distortion. But this need not be the case. Once we separate corporate speech about science from scientific discourse, we can more easily evaluate the truth of a claim. This Article provides an approach that prevents corporate speakers from using the idea of scientific uncertainty to make misleading claims about scientific assessments of health and environmen-

425. See Wendy Gerwick Couture, *The Collision Between the First Amendment and Securities Fraud*, 65 ALA. L. REV. 903, 933–39 (2014) (discussing caselaw that suggests that *Sullivan* safeguards, including the actual malice requirement, do not apply to commercial speech).

426. See Bradley Olson & Aruna Viswanatha, *SEC Probes Exxon Over Accounting for Climate Change*, WALL ST. J. (Sept. 20, 2016, 7:55 PM), <http://www.wsj.com/articles/sec-investigating-exxon-on-valuing-of-assets-accounting-practices-1474393593> [<https://perma.cc/7QHK-G2MT>].

427. See, e.g., Heyman, *supra* note 368, at 228.

428. See, e.g., *Ohralik v. Ohio State Bar Ass'n*, 436 U.S. 447, 456 (1978) (listing "exchange of information about securities" as an example of commercial regulation not subject to First Amendment challenge).

429. Recent cases suggest that courts are likely to do so. See, e.g., *Nat'l Ass'n of Mfrs. v. Sec. & Exch. Comm'n*, 800 F.3d 518, 530 (D.C. Cir. 2015) (invalidating SEC rule requiring issuers to disclose whether the minerals they use are "conflict free" under *Central Hudson* commercial speech test).

430. Couture, *supra* note 425, at 930 (alteration in original) (quoting *Ohralik*, 436 U.S. at 456). She concludes, "the vast majority of securities regulations do not run afoul of the First Amendment." *Id.* She argues, however, that First Amendment protections such as a scienter requirement should apply to speech about securities by financial journalists and, in some circumstances, securities analysts and credit rating agencies. See *id.* at 931–32.

431. See Brief of Domini Social Investments LLC et al. as Amici Curiae Supporting Respondent at 14–17, *Nike, Inc. v. Kasky*, 539 U.S. 654 (2003) (No. 02-575).

tal risks. The approach identifies the implicit representations in corporate speech about science through a contextual analysis of the costs and benefits of the speech from the standpoint of the intended audience. This analysis also acknowledges the cognitive biases and cultural values that affect communication about scientific knowledge.

By carefully analyzing whether corporate speech about science is misleading, courts can ensure that the First Amendment is not misapplied. If the speech is purely commercial and misleading, the First Amendment does not protect it. If the speech is a mixture of commercial and noncommercial speech, contemporary First Amendment doctrine will likely provide some safeguards, such as a scienter requirement. These safeguards respond to concerns about the chilling of protected speech and selective prosecution without rendering the myriad anti-fraud protections of consumer protection laws useless. Resolution of these doctrinal issues is critical because, in an era of stronger First Amendment protections for corporations, antifraud laws are essential tools in the policing of corporate speech about public health and environmental risks.