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HOW PEOPLE UPDATE BELIEFS ABOUT CLIMATE CHANGE: GOOD NEWS AND BAD NEWS

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People are frequently exposed to competing evidence about climate change. We examined how new information alters people's beliefs. We find that people who are not sure that man-made climate change is occurring, and who do not favor an international agreement to reduce greenhouse gas emissions, show a form of asymmetrical updating: They change their beliefs in response to unexpected good news (suggesting that average temperature rise is likely to be less than previously thought) and fail to change their beliefs in response to unexpected bad news (suggesting that average temperature rise is likely to be greater than previously thought). By contrast, people who strongly believe that man-made climate change is occurring, and who favor an international agreement, show the opposite asymmetry: They change their beliefs far more in response to unexpected bad news (suggesting that average temperature rise is likely to be greater than previously thought) than in response to unexpected good news (suggesting that average temperature rise is likely to be smaller than previously thought). The results suggest that exposure to varied scientific evidence about climate change may increase polarization within a population due to asymmetrical updating. We explore the implications of our findings for how people will update their beliefs upon receiving new evidence about climate change, and also for other beliefs relevant to politics and law.

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People are exposed to a great deal of variable information with respect to climate change.¹ Within the United States, the Environmental Protection Agency stated, "Increases in average global temperatures are expected to be within the range of 0.5°F to 8.6°F by 2100, with a likely increase of at least 2.7°F for all scenarios except the one representing the most aggressive mitigation of greenhouse gas emissions."² That range is extremely wide: 0.5°F is quite modest, whereas 8.6°F would be catastrophic.³ It is easy to find projections near the lower end of the range, and it is even easier to find projections near the highest end, or even above it.⁴

Moreover, projections of anticipated warming have changed significantly over time.⁵ There are also sharp disagreements about the likely effects of different levels of warming.⁶ For example, the three integrated assessment models, used by the United States government under President Obama to project the social cost of carbon, offer dramatically different estimates of those effects, and they too change over time.⁷ Some experts believe that those projections greatly understate the existence of uncertainty and are therefore essentially worthless.⁸ In their view, exceptionally wide ranges

¹ For one account, see Michael Greenstone et al., *Developing a Social Cost of Carbon for US Regulatory Analysts: A Methodology and Interpretation*, 7 REV. ENVTL. ECON. & POL'Y 23 (2013). The social cost of carbon was upheld against a variety of legal challenges in *Zero Zone, Inc. v. U.S. Dep't of Energy*, 832 F.3d 654, 677–80 (7th Cir. 2016).

² See U.S. ENVTL. PROT. AGENCY, *FUTURE OF CLIMATE CHANGE* (Jan. 18, 2017) <https://www3.epa.gov/climatechange/science/future.html> [<https://perma.cc/KKU8-5JAG>].

³ See Martin L. Weitzman, *Fat-Tailed Uncertainty in the Economics of Catastrophic Climate Change*, 5 REV. ENVTL. ECON. & POL'Y 275, 277–79 (2011).

⁴ See, e.g., WILLIAM NORDHAUS, *THE CLIMATE CASINO: RISK, UNCERTAINTY, AND ECONOMICS FOR A WARMING WORLD* 42–49 (2013); Weitzman, *supra* note 3, at 277–79.

⁵ For a good overview, see NORDHAUS, *supra* note 4, at 42–66.

⁶ *Id.* at 69–146 (discussing, for example, the impacts on ecological systems and human health).

⁷ See Greenstone et al., *supra* note 1, at 23–25.

⁸ See, e.g., Robert S. Pindyck, *Climate Change Policy: What Do the Models Tell Us?* (Nat'l Bureau of Econ. Research, Working Paper No. 19244, 2013), <http://www.nber.org/papers/w19244.pdf> [<https://perma.cc/9TV4-CJ5G>].