debate in the short term and undermining trust in scientists among those who already did not believe in climate change over the long term. The event appears to have had little residual impact on trust in scientists among the overall American population.[29]

The gentle rise in belief in climate change since then has been attributed to increasingly severe weather conditions such as powerful storms and the major droughts of 2012, which Americans associate with climate change.[30] Indeed, numerous studies have shown that personal experiences with extreme weather, both direct (such as locally warmer temperatures and intense storms) and indirect (such as news coverage of hurricanes, droughts, and wildfires), increase individual belief in climate change.[31]

Looking beyond aggregate opinion polls, social scientists have found that the demographics for climate change belief mirror the traditional demographics for environmental concern in general: they are more female than male,[32] more young than old,[33] more liberal than conservative, more college educated than less educated, more affluent than poor,[34] more urban than rural, and more on the coasts than in the middle of the country.[35]

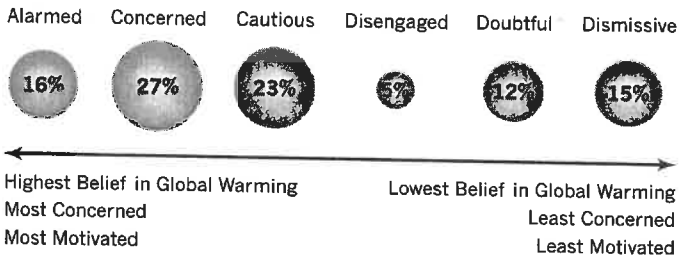
But of all these variables, political party affiliation is found to be the strongest correlate for individual beliefs about climate change. In one study by McCright and Dunlap, the percentage of Republicans who believe that "the effects of global warming have already begun" declined from 49 percent in 2001 to 28 percent in 2010, while the corresponding percentage for Democrats increased from 60 to 69 percent in the same period.[36] Follow-up surveys by the Pew Research Center show a slight reversal of this trend: Republicans who believe that "global warming evidence is solid" increased from 35 percent in 2009 to 50 percent in 2013, and the corresponding number for Democrats rose from 75 to 88 percent in the same period (62% of Independents share that belief).[37]

This consistent partisan divide is the most visible sign of the cultural dimensions of the climate change issue. And it is this divide that raises the most interesting questions from a purely

sociological point of view. Are Republicans and Democrats exposed to different types or levels of science education? No. Instead, this data shows a clear connection between a position on the issue and cultural identity. There are contrarians in other parts of the world, but they don't map onto the political landscape as vividly as they do in the United States and therefore do not have as strong a cultural identity on the issue.

Looking beyond the partisan split, we see that positions on climate change are not binary but rather on a continuum; some people are open to discussion and evidence, while for others no amount of evidence will sway their opinion. The Yale PCCC has been conducting a segmentation analysis of American beliefs on climate change since 2008 and has divided the population into six groups, which they call "Six Americas,"[38] shown in Figure 1.1.

On the concerned end of the spectrum are two segments. The *Alarmed* are the most worried about climate change and see it as a personal threat. This group tends to be moderate to liberal Democrats who are active in their communities. They are more likely to be women, older middle-aged (55–64 years), college educated, and upper income, and to hold relatively strong egalitarian values, favoring government intervention to ensure the basic needs of all people. The *Concerned* also believe that climate change is happening, although they are less certain and see it less as a personal threat



November 2013; *n* = 830; *proportion represented by area.*

FIGURE 1.1

But these are objective and gradual trends. What kinds of discrete, personally salient, and evocative events might precipitate cultural change? What will drive our awareness that we are living in a "new normal"? One answer is that the impacts of climate change must be monetized. According to the NOAA's National Climatic Data Center, 2012 was the second costliest year since 1980, with a total of more than $110 billion in damages throughout the year due, in large part, to eleven weather and climate disaster events, each with losses exceeding one billion dollars in damages. The year 2005 still stands as the most expensive: four devastating land-falling hurricanes inflicted damages of $160 billion.[16] Munich Re reports that worldwide, natural catastrophes have both increased and become more erratic in number and costs since 1980.[17] Looking to the future, a 2014 Government Accountability Office report warned that the energy infrastructure in the United States is at risk of diminished water supplies, warming temperatures, and damage from severe weather.[18]

As the costs of increased storm damage enter the market and costs begin to rise for both business and the consumer, people will be increasingly open to the reality of climate change. People in some coastal areas saw sharp increases in their property insurance rates following Hurricane Katrina. Some insurance companies have withdrawn or restricted policies in other coastal areas, such as Cape Cod, in the wake of Hurricane Sandy. Entergy Corporation, a large utility, filed for bankruptcy after incurring the costs of infrastructure damage from Hurricanes Katrina and Rita. These changes send ripples through the economy. A disruptive shift in the market might take the form of three Hurricane Sandy–sized events in the same year. This would have calamitous effects on insurance markets and force a national debate over what has changed. The shift in public consciousness would be dramatic. In the end, it is only this kind of event, one that affects the affluent 20 percent of the world's population who consume 86 percent of the world's resources, that will drive deep cultural change.

THE FULL SCOPE OF THE ISSUE

Climate change is part of a large-scale shift that is taking place in human history. That larger shift is called the Anthropocene, a new geologic epoch in which human activities have a significant impact on the earth's ecosystems. While this term has yet to acquire formal, geological recognition, the notion is an acknowledgment that we are now occupying a place in the ecosystem that is without historic precedent. The Anthropocene began with the industrial revolution of the eighteenth century, but became more acute in what is called the "Great Acceleration" around 1950 onwards. According to Paul Crutzen, the Nobel Prize laureate and chemist who, with Eugene Stoermer, first proposed the term in 2000, the epoch is marked by the reality that "human activity has transformed between a third and a half of the land surface of the planet; Many of the world's major rivers have been dammed or diverted; Fertilizer plants produce more nitrogen that is fixed naturally by all terrestrial ecosystems; Humans use more than half of the world's readily accessible freshwater runoff."[19] Carbon dioxide levels are above 400 parts per million and rising; we are introducing synthetic chemicals to terrestrial and aquatic ecosystems at levels that cause dead zones and chromosomal abnormalities. Consider for a moment that there are measurable levels of ibuprofen in the Mediterranean Sea and scientists are even more concerned over the impact of birth control pills and antidepressants in aquatic ecosystems. These chemicals are altering the flora and fauna in the environment and finding their way back to human populations through municipal water systems that cannot handle them. Think about these facts for a minute. How does this change your sense of who we are as humans and how we relate to the world around us?

The answer to this question is synonymous with the new reality created by climate change. Whether we like it or not, we have taken a role in the operation of many of the earth's systems. This brings a fundamental shift in how we think about ourselves and

the world we occupy. Recognizing this emerging reality commences a cultural shift akin to the Enlightenment of the seventeenth and eighteenth centuries. The Enlightenment marked a disruptive period in which knowledge was advanced through the scientific method rather than tradition, superstition, and religion. Placing climate change on this scale helps to understand the truly disruptive aspect it presents. The scientific method is no longer singularly adequate for understanding the world as it now exists.

Further, it illuminates the great challenge that is required in communicating the details of its science. People cannot really learn about climate change through personal experience. While extreme weather patterns have increased the social consensus on the issue, a real appreciation of climate change requires an understanding of large-scale systems through "big data" models. And both the models and an appreciation for how they work are generally unavailable to the average individual. John Sterman, system dynamics professor at MIT, points out that people would need to be taught about complex dynamic systems and the ways in which feedback loops, time delays, accumulations, and nonlinearities operate within those systems if they were ever to understand the climate change issue.[20]

THE ULTIMATE GOAL

In May 2014, the U.S. government released the third National Climate Assessment, which presented grave warnings that "climate change, once considered an issue for a distant future, has moved firmly into the present" and included an assessment of the effects of climate change on important sectors such as health, water, energy, and agriculture, as well as impacts on urban areas, rural communities, and indigenous peoples. As to be expected, a rhetorical war immediately followed the release of the report, which was interpreted as either a serious warning or seriously flawed. In an editorial, the *New York Times* wrote that "apart from the

disinformation sowed by politicians content with the status quo, the main reason neither Congress nor much of the American public cares about global warming is that, as problems go, it seems remote. Anyone who reads the latest National Climate Assessment, released on Tuesday, cannot possibly think that way any longer."[21]

The premise of this statement is a faulty one. This has been the central message of this book. More science, though important, will not by itself change people's minds and create the collective will to act. Those who disbelieve the science will not be compelled by yet another scientific report. The debate over climate change is not about greenhouse gases and climate models alone. It is about the competing worldviews and cultural beliefs of people who must accept the science, even when it challenges those beliefs. When engaging the debate, we must think not only of the science of climate change, but also about the sociopolitical processes and tactics necessary to get people to hear it.

When you find yourself engaged in a debate over climate change with an uncle over the holiday dinner table, think carefully about your theory of change. Rather than immediately presenting more data to secure victory, you might do well to consider where your relative is coming from. How will you gain his trust? What segment of the Six Americas might he fit into? Does he fully understand the science? What other issues is climate change triggering for him—big government, the liberal agenda, distrust of scientists, belief in God? How will you address any distrust he may have for the message, messengers, process, or solutions proposed? What messengers might you invoke to make your arguments? Does he understand the state of scientific consensus that exists? What kinds of broker frames might best appeal to him—national security, health, economic competitiveness? Can you frame a few proposed solutions in a way that appeals to his sense of a desired future?

These are the questions to ask before instinctively providing more data to make your case. Through all of these considerations

you might find ways to draw your uncle into a middle ground where all-out domination and capitulation are not the only acceptable outcomes. And if your answers to these questions lead you to determine that you cannot gain your uncle's trust or that he is in the Dismissive segment of the Six Americas spectrum and interested only in the pessimistic, win–lose path of debate, perhaps it would be best to enjoy your family dinner and talk about football instead. Know your theory of change and enact it.

NOTES

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