Civic Society and Climate Change

Explaining Public Conflict and Consensus on the Climate

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As MEDIA ATTENTION TO CLIMATE change increased dramatically in the past 25 years, so did public concern. But the problem has remained a relatively low priority for the American public despite grave warnings from scientists about the consequences of inaction. Furthermore, a scientific consensus on the risks of climate change has not prevented sharp divisions of public opinion reflecting partisan and ideological polarization on the issue among political leaders.

In this chapter, I discuss the changing state of public attitudes toward climate change since the issue entered public consciousness in the 1980s. During this period, the public has been exposed to ongoing debate on a complex scientific topic, with opposing sides providing contrasting interpretations of evidence and competing policy recommendations. The divergent perspectives represented in this debate have fractured the public. Whether these social and political differences can be bridged to enable action on policy solutions is one of the central political issues of our time.

In addressing this question, I evaluate attitudes, beliefs, and policy preferences, and I provide a model for explaining the dynamics of conflict and consensus. I also discuss the impact of scientific information, the economy, and the effects of framing on opinions. We will see that on the broad themes of climate change—its causes, the views of experts, the need for policy action—a plurality or majority of the public generally gets it right, in the sense of being on the same side as the scientific authorities. There are also favorable trends suggesting that knowledge of the effects of human action on the atmosphere and climate, although not sophisticated, have progressed significantly compared to past generations and that skepticism toward climate change will be harder to sustain among new generations that have a stronger environmental consciousness.

Although I focus on the state of public opinion, I will also emphasize that the obstacles to significant government action transcend shortcomings of public attention. An active conservative countermovement has attempted to reduce public concern over climate change, and the perpetuation of a business–environment dichotomy has hindered policy solutions. Achieving a more general public consensus on the issue requires both greater elite leadership on the status and implications of climate change and creative policies that reconcile competing values and economic interests underlying partisan and ideological polarization.

Consensus and Conflict

Over the course of the last century, there have been many significant shifts in public assumptions about the relationship between human actions and the climate. Scientists were already exploring in the late 1800s the idea that industrial production of CO_2 could gradually warm the Earth's atmosphere and affect the climate. By the middle of the 20th century, people had become increasingly conscious of the capacity of humans to alter and disrupt nature. Humans were no longer regarded to be merely in thrall of nature; they could significantly change the environment around them, especially through pollution of the atmosphere and water.[1] In the 1950s, scientists began to warn of the effects of CO_2 on the earth's climate and developed a reliable method to measure the amount of CO_2 in the atmosphere, which produced disturbing evidence of steadily increasing levels.

Mounting concern about CO_2 emissions and global warming in the 1980s factored into energy policy discussions and the 1990 Clean Air Act, as scientists testified to Congress about the dire consequences of inaction. Early climate models were used to forecast how global temperatures would rise if CO_2 concentrations continued to increase, leading to potentially catastrophic outcomes. In 1988, global warming was featured on the front page of the *New York Times,* with a report on testimony by James Hansen (head of NASA's Goddard Institute for Space Studies at the time) to a congressional hearing that climate change was almost certainly caused by greenhouse gas emissions and that its effects would be measurable within the next decade. The unusually hot summer of 1988 and other weather-related events produced a spike in news stories about global warming, further increasing public awareness of the concept. Also in 1988, the Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations to gather and clarify scientific information about the climate, and it quickly became the authoritative voice on climate change among scientists.

Then as now, the priority given to global warming in the media fluctuated with events, especially the state of the economy and party politics. The frequency of media stories in newspapers and magazines and on television all peaked between 1989 and 1990 before dropping off in the early 1990s.[2]

In the 1990s, a shift from determining whether global warming was happening to deciding how to deal with the problem turned climate change into a political and economic issue. The George H. W. Bush administration moved cautiously and expressed reservations about the scientific evidence and the economic consequences of international agreements to reduce greenhouse gas emissions. Business interests represented by organizations such as the Global Climate Coalition fought back against the growing consensus on global warming by challenging the science and emphasizing the costs of solutions, claiming policies would increase energy prices, slow economic growth, and force the United States to bear greater costs than the developing world.[3]

Consciousness, Concern, and Causes

The political and economic divisions that emerged in the 1990s became manifest in public opinion and have persisted in current public attitudes toward climate change. Data gathered over the last 30 years allow us to track multiple dimensions of attitudes toward climate change: awareness of the issue, comprehension and knowledge, perceptions of scientists and scientific evidence, concern about the consequences of global warming, priorities between environmental protection and economic growth, and attitudes toward policy measures and specific international agreements.[4]

The development of public consciousness of global warming can be traced directly to the amount of media coverage of the issue in the mid to late 1980s. Public awareness grew as the summer of 1988 brought record temperatures to many parts of the United States and generated discussion of changes in the climate. By the mid-1990s, awareness of the concept of the *greenhouse effect* had diffused to about 80 percent of the population; today, recognition of this idea surpasses 90 percent. Gallup polls summarized in Figure 5.1 show that about two-thirds of the public prior to the 2008 economic crisis worried a great deal or a fair amount about global warming. Somewhat higher proportions registered in Pew national surveys—ranging from two-thirds to three-quarters of the public—consider global warming to be a very or somewhat serious problem.

Attribution of the causes of global warming has been a more contentious issue. As shown in Figure 5.2, Gallup polls over the past decade have found that about 50–60 percent of the public believes that global warming is due more to human activities (anthropogenic causes) than to natural temperature fluctuations. This segment decreased about 10 percent during the post-2007 recession (the absolute levels vary by polling organization, but the trend appears consistent across organizations), but has since recovered partly to earlier levels. Since 2009, the public has become more likely to trace the primary cause of global warming to human actions, although there are significant ideological differences in belief, with conservatives

FIGURE 5.1   Personal Worry About Global Warming, 1989–2013

I'm going to read you a list of environmental problems. As I read each one, please tell me if you personally worry about this problem a great deal, a fair amount, only a little, or not at all. First, how much do you personally worry about [global warming]?
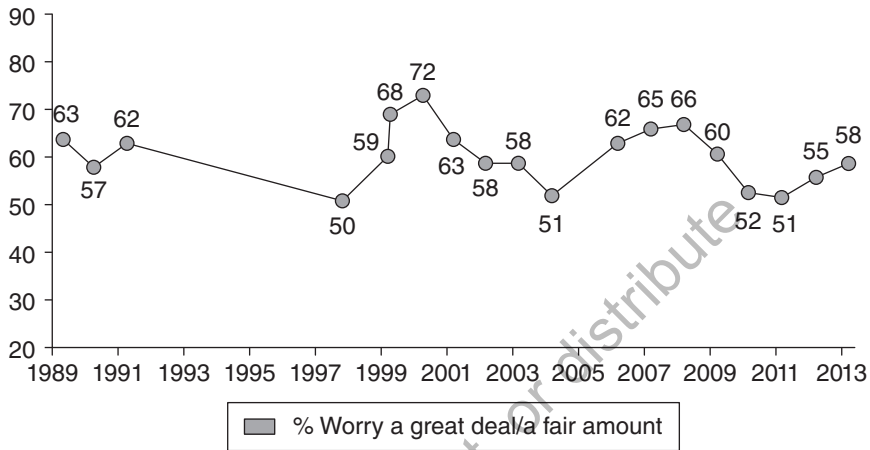
Source: Lydia Saad, "Americans' Concerns About Global Warming on the Rise," *Gallup Politics* (April 8, 2013), http://www.gallup.com/poll/161645/americans-concerns-global-warming-rise.aspx.

far more likely to point to natural fluctuations in temperatures as the source of warming (see below).

Agreement that global warming is occurring is also different from belief in the proximity of damages. Although scientists have been emphasizing the imminent effects of climate change, the public is inclined to think the problem will affect other areas and nations more than their own and that the effects will strike future generations more than themselves. Figure 5.3 shows that about two-thirds of the public believes that global warming will not pose a serious threat in their lifetimes. Since Gallup began asking this question in 1998, the proportion believing in an imminent threat has increased, but it has never exceeded 40 percent.

Global warming is not the highest priority of the public, even within the general class of environmental issues. For a majority of the public, environmental concerns in turn fall below concerns about the economy, health care, and US involvement in foreign wars. Among environmental issues, the priority placed on global warming trails water pollution—specifically concern about the purity of

FIGURE 5.2   Belief in Human vs. Natural Causes of Global Warming, 2003–2013

And from what you have heard or read, do you believe increases in the Earth's temperature over the last century are due more to — [the effects of pollution from human activities (or) natural changes in the environment that are not due to human activities]?
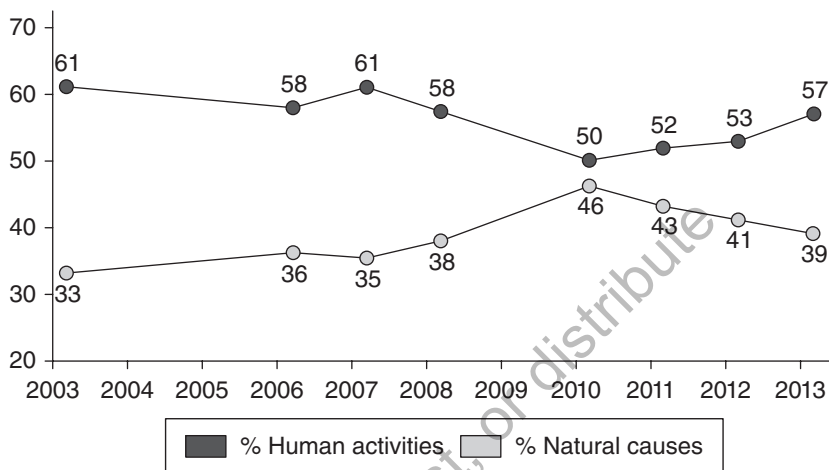
Source: Saad (2013).

drinking water, streams, rivers, and lakes. The public may believe that global warming will cause weather-related natural disasters with greater frequency, but the location of those disasters is generally thought to be remote in time and geography. (This may soon change in the aftermath of recent severe hurricanes Katrina and Sandy, which caused enormous destruction in highly populated metropolitan areas.)
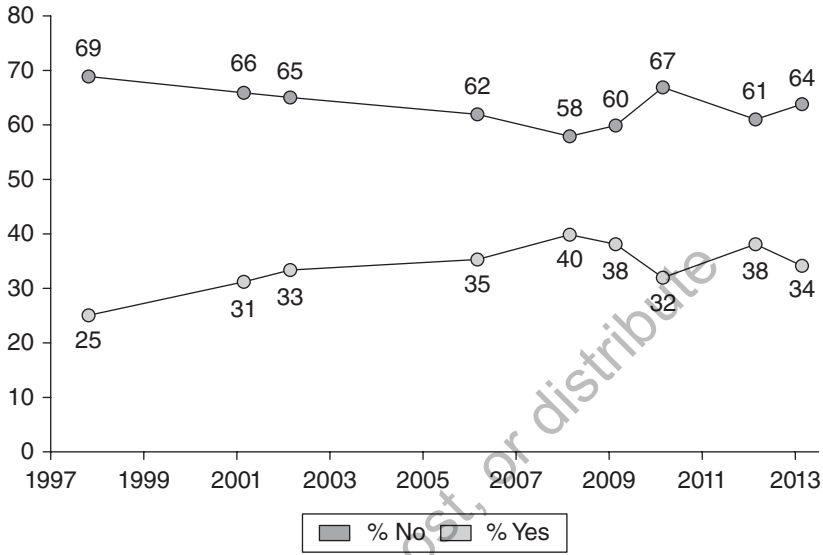
Knowledge

Awareness of global warming does not imply or require scientific understanding. Objective knowledge is challenging to acquire given the scientific dimensions of the issue. Many people claim fair or moderate knowledge of the issue, while less than 30 percent of the public (in Gallup polls) claims to understand climate change "very well." This still represents about a 10 percent increase from eight to ten years ago, which suggests growing comprehension of the issue.

Whether we consider the public to be well or poorly informed naturally depends on our point of reference for making such evaluations. A 2012 knowledge

Figure 5.3   Proximity of the Threat of Global Warming, 1997–2013

Do you think that global warming will pose a serious threat to you or your way of life in your lifetime?

Source: Saad (2013).

survey, originating out of the Yale Project on Climate Change Communication, asked a broad set of questions testing knowledge levels in the general public. Although the researchers gave low letter grades to the public based on absolute scores (percentage correct), today's public is surely far more knowledgeable about climate, energy, and environmental issues than was the population in the decades prior to the emergence of global warming as an issue.

The Yale survey shows the American public to be reasonably informed about basic issues related to climate change, such as the connection between greenhouse gases and global warming, the effect of burning fossil fuels on carbon dioxide levels, the identification of coal and oil as major fossil fuels, the regional variation in effects of global warming on precipitation and temperatures, and the increased rate of melting of glaciers. Even though only about 50 percent say that global warming is mostly caused by human activities, large majorities agree that cars and trucks and burning fossil fuels for heat and electricity contribute a lot or some to global warming. A small plurality of 26 percent even correctly answered that global sea levels

rose six to nine inches in the 20th century. When respondents were asked to estimate the average temperature of the Earth's surface 150 years ago (relative to its current average temperature of 58 degrees Fahrenheit), the median response of the public was 54 degrees, not significantly different from the IPCC estimate of between 56 and 57 degrees!

The public also accurately detects the convergence of scientific opinion on the problem of global warming. From 1994 through 2006, the proportion of the public that believed there was a scientific consensus that global warming was occurring more than doubled, from the mid–20 percent range to over 60 percent. Almost no one thinks most scientists dismiss or discount global warming. Instead, the remaining 40 percent of the public believes that scientists are divided on this question. Ideology is a major divider of perceptions, but conservatives and liberals are not diametrically opposed about the degree of scientific consensus.[5] Liberals are far more likely to say that scientists agree that the Earth is warming and that humans are responsible. Conservatives do not claim that scientists generally believe otherwise but instead maintain that scientists are "divided," which suggests they know the scientific majority disagrees with their own position (i.e., there is a limit to their motivated reasoning). A good test would be to ask people, "What percentage of scientists believe that global warming has been affected significantly by human behavior?" This would avoid the ambiguous meaning of *divided,* which could mean a 50–50 split or a 95–5 split.

A positive sign that augers well in the long run for the consensus view of global warming is that the carriers of that message—namely scientists—are members of one of the most trusted professions in society. According to a 2008 Yale/George Mason poll, climate scientists are trusted (strongly or somewhat) by 74 percent of respondents, a level exceeded only by other science organizations. Only a quarter of the public says they have little or no trust in scientists regarding the environment. By comparison, general distrust of politicians, religious leaders, and the media is far higher.

Generational Change

Another dynamic that foreshadows public opinion trends is the demographics of believers and skeptics. Age cohort differences are evident in the data on climate change opinion—young people are significantly more likely to believe in global warming and support environmental protection. A 2012 Gallup report identified large age cohort differences in priority assigned to economic growth and environmental protection (see Table 5.1). Among respondents 18–29, priority is given to the environment by 53 to 35 percent. All other age cohorts give priority to the economy, but the margin favoring the economy increases with age, with a 27 to 62 percent distribution among those 65 and older.

Table 5.1   Priority for Economic Growth or Environmental Protection by Selected Demographic Groups

Higher Priority for Economic Growth or Environmental Protection, by Subgroup, 2012

	%Environment	*%Economy*
Republicans	27	66
Independents	44	43
Democrats	50	42
18 to 29 years	53	35
30 to 49 years	43	50
50 to 64 years	37	51
65+ years	27	62
Conservatives	29	64
Moderates	48	41
Liberals	56	35

Source: Jacobe (2012).

The generational changes in attitudes toward climate change mirror the dynamics of opinion change on controversial social issues. Pew studies show a broad-based generation gap in attitudes toward the role of government, trust in government, and opinions on specific issues such as gay rights, immigration, environmental regulation, and global warming. The tide is turning against the opposition on all of these issues. A 2011 Pew survey shows a generational divide especially between millennial (18–30-year-olds) and silent generation (66–83-year-olds) Americans in both their belief in global warming and their belief about the human causes of warming. But this generational conflict is exclusive to the Republican Party (see Figure 5.4). Consequently, there are partisan differences within every age cohort, but the ideological conflicts are smaller in the youngest cohort. Among millennial Republicans, almost 50 percent believe there is "solid evidence" the Earth is warming, whereas 75 percent of millennial Democrats are convinced that global warming is real. By comparison, the partisan gap is 41 percent in the silent generation. Such cohort differences are precursors of

FIGURE 5.4   The Partisan Divide on Climate Change by Age Cohort

% saying there is solid evidence Earth is warming
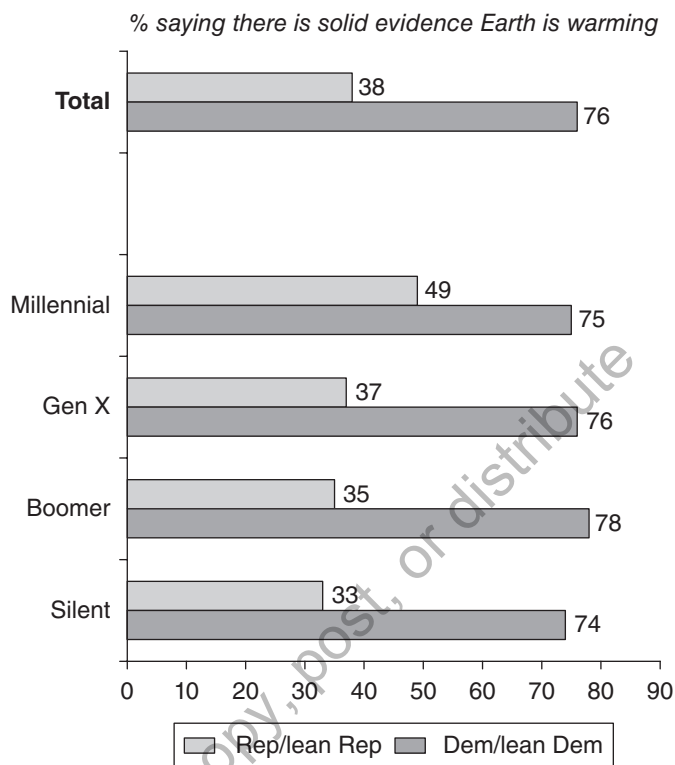
Source: Pew Research Center for the People and the Press, *The Generation Gap and the 2012 Election* (Washington, DC: Pew Research Center, November 3, 2011), http://www.people-press .org/2011/11/03/section-8-domestic-and-foreign-policy-views/.

social change and portend the gradual development of a popular consensus on the issue.

Policy Preferences

The public's division over the cause of global warming does not preclude generally higher levels of agreement and support for a variety of policy measures aimed at addressing the problem. We can discern from responses to policy questions that people have been warned sufficiently about global warming to express concern, and many have gotten the message that society needs to invest more heavily in renewable energy sources and depend less on fossil fuels. The public also is quite willing

in the abstract to say they would pay for reduced dependence on fossil fuels, but this willingness declines when concrete costs are mentioned. The behavioral intentions expressed by the public are not meaningless—indeed they may reflect changing attitudes that predict eventual behavioral changes—but they are largely symbolic expressions of support for concepts—clean energy, sustainability, energy efficient cars—that have been discussed favorably in public forums. Nonetheless, the clear direction of public sentiment on many of these issues shows that environmental consciousness is socially desirable, and there is potentially a large reservoir of support for action on climate change policies.

For example, a 2012 national survey shows that sizable majorities feel that Congress, corporations, and citizens should all be doing more to address global warming. Public opinion on more concrete policy proposals indicates majorities of varying sizes (from slightly over half to three-quarters) that support developing clean energy, research on renewable energy sources (73 percent), tax incentives to purchase energy efficient vehicles and solar panels (73 percent), and substituting renewable energy for fossil fuels.[6] (See also Chapter 7 on public support for climate change policies through initiatives and referendums.)

These results are consistent with repeated Gallup and Pew surveys on policy preferences showing large majority support for higher fuel efficiency standards, mandatory controls on CO_2 emissions by businesses, stricter standards on auto emissions, and the like. There are, however, also apparent contradictions in public attitudes on the issue, as majorities simultaneously call for increased exploration for and development of oil, coal, and gas out of a desire for independence from foreign sources of energy.[7]

In general, public enthusiasm for policy action tapers when costs are presented. Measures that involve higher taxes on gasoline or electricity, increased airfares, or increased taxes to subsidize clean energy receive tepid support. For example, in the 2012 national survey cited above, two-thirds (68 percent) of the public claim to support moderate- to large-scale efforts to reduce global warming, even if such actions require corresponding moderate to large costs. But only 10 percent strongly support a carbon tax on companies that produce or import fossil fuels if that would result in a $180 annual cost to the average household.

Many policy questions are undoubtedly only partially comprehended by respondents and constitute "doorstep opinions," referring to when household surveys more commonly were conducted in person, and people gave their opinions on issues they were possibly hearing about for the first time. For a number of years, surveys have included questions about cap-and-trade and carbon tax policies, with the results showing stronger support for cap-and-trade. However, when questioned in 2009, only 23 percent of the public knew that cap-and-trade was related to energy and environmental policy. An equal percentage thought cap-and-trade pertained to banking or health care, and almost half the sample admitted outright they did not know.

Attitudes and Actions

The public's motivation to take costly action will remain low until the problem is seen as impinging on people's everyday lives. In addition to being placed low in priority relative to other social and environmental problems, global warming has not been regarded as a looming personal threat compared to the perceived risk of heart disease and cancer. Public expressions of the threat posed by global warming refer more distantly or abstractly to societal problems that are removed from one's personal life.[8]

Abstract support for action, however, is strong in the United States, as it is across countries of the world.[9] But, as expected, studies in the United States and other European nations show that people's willingness to change their behavior or support a measure is inversely related to its cost or inconvenience.[10] For example, relatively high percentages of individuals claim they would drive or fly less frequently to reduce their contribution to carbon emissions, even if they would not pay higher gas prices or airfares. People are generally willing to make easy or inexpensive changes in their lifestyles to address climate change, but they discount the effect of changing their personal behavior and place most of the responsibility on government to take action.

The validity of public intentions to pay for policies that address climate change is difficult to ascertain. Responses may reflect the strength of people's attitudes on a subject rather than their economic evaluations. Indeed, studies have repeatedly found that willingness to pay (WTP) correlates with proenvironment attitudes and engagement, socioeconomic status, perceived efficacy of a policy, certainty of belief in climate change, expected future temperature and precipitation levels, and perceptions of other people's behavior.[11]

A Canadian review of research comparing data on people's expressed willingness in the abstract to pay for certain products (e.g., energy-saving home appliances) with consumers' actual behavior found wide discrepancies between the intentions conveyed in surveys and actual choice behavior in the marketplace.[12] A number of reasons can explain inflated WTP estimates. Individuals are less likely to behave as if they have a budget constraint when answering hypothetical questions. They may also want to please the interviewer or show they are generous or concerned about public goods. WTP scenarios also tend to exaggerate in the respondent's mind the connection between individual choices and social benefits. In real-world situations, where mutual cooperation is required, individuals may doubt that all parties will do their part to achieve a collective goal.

Complex WTP scenarios demand cognitive effort to understand what is being asked, and many respondents lack the skills or motivation required to provide reliable and valid responses.[13] Studies that present remote hypothetical scenarios involving, for example, reductions in emissions probably offer too little context for people to judge the tangible implications of these changes on the quality of their

lives. Collecting valuation data may nevertheless help the policy-making process by identifying the most important features of environmental goods, the relevant trade-offs in considering a policy, the short- and long-term interests at stake, and the relevant audiences or stakeholders. Placing a monetary value on trade-offs may be superior to alternative approaches that use opinion measures of value trade-offs based on the direction and intensity of opinion.[14]

Berk and Fovell's paper is an exemplary study of how people respond sensibly to hypothetical but relevant changes in their local environments, in this case the Los Angeles metropolitan area. The design of their experiment ensured participants were more highly motivated (and capable) of answering questions about their willingness to pay for different outcomes. Respondents in warmer (Pasadena) and cooler (Marina Del Rey, Santa Monica, Malibu) areas of LA were presented with scenarios of climate change in their own areas using average temperatures and precipitation in those areas as baselines. Pasadena residents, for example, were presented with scenarios in which average summer temperatures climbed or fell, and average rainfall increased or decreased, and asked their willingness to pay for measures that would counteract or prevent these changes. In this manner, respondents were given realistic scenarios of climate shifts they could relate to, and the results identified which aspects of local climate change (more or less rain, higher or lower summer temperatures) were felt most acutely and which types of changes would prompt the greatest willingness to pay for preventive measures.

Explaining the Dynamics of Opinion Formation

Most discussions of public opinion on climate change assume a simple dynamic in which the public learns about the issue through media coverage and the messages communicated by opinion leaders through the media. The beliefs that people form depend on their evaluation of the stream of messages they receive. These are the key elements of the theory of "social learning" pioneered by McGuire (1968) and elaborated upon by Zaller's receive-accept-sample (RAS) model, in which the public takes its cues from trustworthy sources assumed to be informed about an issue and able to provide guidance in how to think about it.[15] According to this theory, people have different likelihoods of being exposed to any particular discussion of an issue. Furthermore, their acceptance of information is conditional upon the substance and cues of the message and the strength and direction of their political dispositions (i.e., their party identification and political ideology).

The key components in analyzing opinion formation are therefore the following:

- the strength, direction, and source of the message(s)
- the probability (P) of exposure (E) to that message (which is a function of political awareness or engagement with politics)

- the probability (P) of accepting (A) the message (which depends on the recipient's partisanship and recognition of the ideological or partisan cues contained in the message)

To see the dynamics of the model, consider an idealized model of the political environment:

Assume two political parties that send out messages (arguments) that are either similar or opposed to each other. Assume further that the members of the public have varying partisanship and degrees of attentiveness.

Scenario 1. Political elites are united in support of a policy. How does the public respond to the messages emanating from political elites through the media?

For any individual: P (adopting a belief) = P (exposure to an argument advocating the belief) x P (accepting the argument conditional upon exposure).

For Democrats, Republicans, and Independents, this means the probability of exposure will vary by their attentiveness (as indexed by interest, education, knowledge). The probability of acceptance will be high across the board, because the message has bipartisan support. If we assume that individuals look to their party leaders for cues (information shortcuts), then Democrats will look to Democratic leaders for guidance, and Republicans will look to Republican leaders. Independents will be more open to the views of both parties, but the message is the same no matter which way they turn. Everyone is persuaded to accept the message by his or her elite reference group.

When P(E) is multiplied by P(A given E), we find that support for the policy is a function of attentiveness, with more attentive individuals being the most supportive.

Scenario 2: Democratic leaders and Republican leaders take opposing positions on the policy.

Once again the P (exposure to elite messages) is correlated with attention to politics. But now we have mixed messages. For Democrats, the probability of acceptance of a Democratic message will be high, but probably higher among more knowledgeable Democrats, because they will more easily recognize that the message they have heard is indeed a Democratic message. Conversely the P (acceptance of a Republican message) among Democrats will decline with sophistication, because sophisticated Democrats know that they are receiving a partisan message from the opposing party. The same logic, adjusting for details, applies to the response of Republicans, leading to polarization between Democrats and Republicans with increasing exposure to elite communications. Independents are more likely to accept arguments originating from both sides, and will be most responsive to the relative loudness of the competing messages.
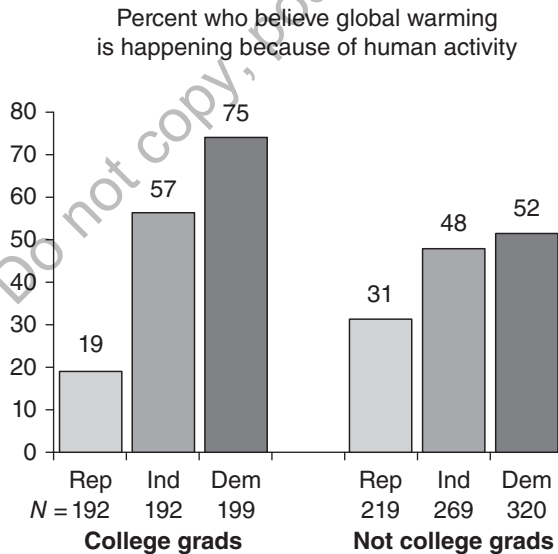
The applicability of the model to the climate change debate is apparent in Figure 5.5, based on a 2008 Pew national survey, which shows that college-educated Democrats and Republicans are further apart in their beliefs about the causes of

global warming than are Democrats and Republicans who did not attend college. Education is a proxy for exposure to political debate. Therefore, Figure 5.5 shows that politically aware Republicans and Democrats are selectively accepting messages about global warming that are consistent with their predispositions. Partisans who are less educated are not as far apart, because they are receiving fewer polarizing messages and are less discriminating in their evaluation of those messages. Last, note that college-educated independents believe more strongly in the human causes of global warming, thus reflecting the stronger influence of the dominant scientific viewpoint in society.

Media Balance in the Flow of Information

The social learning model traces the dynamics of public opinion on any issue to the flow of information in society. In the mid- to late 1980s, global warming was not the established partisan and ideological issue that it became subsequently. Scientists were the predominant group speaking on the issue in the media, and their scientific reports became the basis of news stories that set the agenda. The confluence of a

FIGURE 5.5   Belief in the Cause of Global Warming by Party Identification and Education, 2008 Pew Survey

Percent who believe global warming is happening because of human activity

	College grads			Not college grads		
	Rep	Ind	Dem	Rep	Ind	Dem
Percent	19	57	75	31	48	52
N =	192	192	199	219	269	320

Source: Pew Research Center for the People and the Press, *A Deeper Partisan Divide Over Global Warming* (Washington, DC: Pew Research Center, May 8, 2008), http://www.people-press .org/2008/05/08/a-deeper-partisan-divide-over-global-warming/.

hot, dry summer across the nation in 1988 with media reports of that year greatly magnified attention to the issue.

The various media organizations influenced one another in their decisions to focus on climate change. Television coverage lagged behind print coverage, but television was a powerful catalyst in bringing the issue to public attention after it had been explored in greater detail in print. As the public became more concerned about climate change, the media stayed on the story.[16] However, the debate quickly shifted from the science of global warming to potential policy responses, as political and economic commentators moved to the forefront of the discussion in the media. Climate change became less of a scientific news story than a political story with political and economic coalitions beginning to take sides on the issue.

Despite the scientific consensus that global warming is caused largely by burning fossil fuels, the American public continues to be exposed to the minority views of contrarians or skeptics in politics, business, media, and policy organizations. The elite presses often balance their stories with opposing viewpoints that challenge the science of climate change, giving credence to the idea that climate change may be explained by naturalistic fluctuations rather than human action. Boykoff and Boykoff (2004) found that between 1988 and 2002 half of the news stories in several major newspapers gave comparable attention to the view that human actions were responsible for global warming and the contrary view that warming could be explained by natural variation of temperatures.[17] However, it is worth noting that a large proportion of stories coded in their study presented only the anthropogenic side, and hardly any stories represented the naturalistic side exclusively. Therefore, the scientific consensus predominated, but the contrarian position was sufficiently represented in stories to sustain and reinforce a solid minority oppositional view.

Ironically, media "objectivity"—in the sense of presenting opposing arguments without regard to their scientific status—gives audiences a distorted picture of reality, because it misrepresents the overwhelming majority view of experts on the subject. When there are competing streams of information, individuals tend to believe the sources they find more credible. In the terminology of psychology, audiences have to engage in more effortful "systematic" or "central route" processing of arguments to assess their validity, but they typically avoid such effort when the subject matter is difficult to comprehend or remote to their lives.[18] In the case of competing scientific claims, most individuals do not have the ability to evaluate the merit of opposing claims, but they often can evaluate the sources of those claims.

Criticism of the view that global warming is caused by humans has been more pronounced in the US media than in the UK media.[19] Dissenters from the scientific consensus have had greater influence in the United States than in the UK, perhaps because they have been affiliated with American think tanks and universities. The detractors have worked actively to promote a skeptical attitude toward

climate research by making contrary claims and arguing that the state of knowledge is tentative and based on inadequate data. This is a common tactic in political campaigns, and it appears to be unavoidable in an open market of ideas. Scientists have inadvertently weakened their arguments by stating their conclusions in qualified terms, using the language of probabilities that promotes perceptions of uncertainty in the evidence. This practice contributes to public confusion over whether the "theory of climate change" is only a speculative idea or if it is supported by evidence.

The presentation of competing interpretations or framings of issues in media coverage is the norm, and many of these competing frames will be deceptive.[20] Should we expect the climate change policy debate to be any different from other realms of policy? As is the case with other debated policy issues, misleading claims about the science of climate change is a legitimate, normal feature of democratic politics. Unfortunately, research on framing and persuasion has found that strong frames can be specious frames, and the climate debate is yet another example of how misleading claims can be perceived by the public to be strong arguments because of their intuitive plausibility or the perceived credibility of their sources.

The Conservative Countermovement

Public opinion would show far greater consensus behind climate change had not the conservative movement against the scientific consensus been able to get its message out and gain credence for its contrarian viewpoint. This movement tried to reduce climate change to a nonproblem—which Freudenberg calls "consciousness-lowering" activity.[21] People who dissent for whatever motivation (e.g., economic, ideological) need reasons to support those views. As Kunda pointed out, rationalization cannot occur without adequate rationales.[22] The skeptics offered such reasons by arguing that the climate also changed in the past, well before humans appeared on Earth, and that there is no scientific consensus on climate change.

Global warming as an issue did not simply run its course and fade from the media as other issues took priority; instead it was countered by a well-organized and well-financed opposition that argued global warming was not a problem, scientific research was erroneous, the effects of global warming were not serious, and proposed policy solutions would lead to harmful outcomes.[23] Conservative think tanks used repetition of false claims to reinforce skepticism of global warming.

Conservative organizations had an ally in the 1994 Congress, in which Republicans regained control of the House for the first time since 1954. Partisan divisions in Congress on climate change following the 1997 US signing of the Kyoto Protocol coincided with growing partisan differences on environmental issues generally. After taking office in 2000, Republican President George W. Bush expressed

doubts about climate change and also took the extreme action of withdrawing the United States from the Kyoto Protocol, which dealt a major blow to international efforts to address climate change.

The results from McCright and Dunlap's (2011) analysis confirm that, since 2000 and especially since 2008, there has been increased ideological and partisan polarization of beliefs and concern about global warming.[24] Gallup data between 1997 and 2008 show that aggregate increases in the proportion who believe that global warming is a serious problem are attributable to attitude change among Democrats. In contrast, Republicans over time have become less convinced that global warming is already occurring and more likely to believe that the media have exaggerated the seriousness of the problem. Worth noting however is that even Republicans have become more likely to believe that global warming will be a serious future problem, and they have become more likely to recognize that scientists agree that global warming is occurring.

Correlations between party identification and a variety of attitudes toward the timing, seriousness, threat, and causes of global warming have increased over time, indicating that clear partisan elite differences are being picked up by attentive members of the general public.[25] A further indication that individuals are evaluating messages using partisan cues is that the partisan divide is greatest among those who claim to understand the issue best. Exposure to conflicting information therefore leads to polarization rather than moderation, as individuals discount messages that originate from sources that do not share their ideological and partisan leanings.

Economic Conditions and Bad Weather

While competing elite messages and mass media reporting explain the trends toward polarization of public opinion on climate change, economic conditions and weather events also shape and condition attitudes. Several surveys (including a Pew survey) show that belief in climate change declined sharply from 2008 to 2009. This decline cuts across categories of party identification, although the drop was greatest among Independents and moderate Republicans. Some analyses of opinion data attribute this decline to the economic downturn in this period, which shifted public priorities to improving the economy before dealing with other issues.

Brulle, Carmichael, and Jenkins examined aggregate shifts in public concern in relation to elite cues, media coverage, scientific information, weather patterns, and economic conditions.[26] They constructed a climate threat index based on aggregate survey results between 2002 and 2010. The data show that perceptions of threat climbed in the first half of the time series from 2004 to 2007, but then declined in 2008–09 and returned to early 2002–04 levels by 2010. Fluctuations in public concern correlated with the volume of media coverage of climate change. Economic and political conditions and elite cues were the strongest influences,

while weather changes and the quantity of scientific information about climate change (contained in science publications) were found to have little impact. The economic recession shifted attention away from climate change. Greater unemployment reduced perceptions of threat, while increases in GDP strengthened threat perceptions. Increases in war deaths in Iraq and Afghanistan also lowered perceptions of threat, suggesting competition among issues for public priorities.

Prior to 2008, elite cues on balance promoted greater concern about climate change, as Republican voting and statements against environmental measures decreased, and Democratic statements on climate change increased in quantity. Senator John McCain (R-AZ) worked with Democrats to produce legislation to combat climate change before he became the Republican presidential nominee. Al Gore's film, *An Inconvenient Truth,* also received most of its media attention prior to 2008. The subsequent decline in public concern can be traced to the increasingly partisan debate over climate change since 2008.

An additional detail in Scruggs and Benegal's analysis of the effects of the recession is that the public did not simply shift its priorities but also became less likely both to state that global warming was occurring and to link global warming to CO_2 emissions.[27] Therefore, the public seems to be rationalizing its concerns about the economy by questioning the reality of global warming. Furthermore, the relationship between unemployment rates and attitudes toward global warming are reproduced in public opinion in Europe, where there is less skepticism about global warming:

> A shift in the national unemployment rate from 5 to 9% in Europe (approximately the increase in unemployment in the United States during the time period) reduces the percentage of people reporting that global warming is a very serious problem by about 10 points.[28]

At the same time (despite declines in concern), surveys show there continues to be reasonably strong public support in the United States for taking actions to control carbon emissions, which indicates that general beliefs about climate change and support for policies can move independently. We may be paying excessive attention to whether the public recognizes the scientific consensus; the key issue is whether they support action, and they may support action irrespective of their beliefs about the causes of global warming.

Greater influences from weather changes were found by Donner and McDaniels using a measure of temperature variability based on the seasonal and monthly mean temperatures for 1990–2009.[29] Anomalies in temperature in the past 12 months were strongly correlated with beliefs in global warming. For every 1 degree Celsius increase in mean temperature, there was a 7.6 percent increase in the proportion of people who believed in global warming. An increase of

1 degree in the average temperature over the past 12 months led to a 10 percent increase in the proportion of the population that worried a great deal or a fair amount about global warming. Anomalies in seasonal temperatures are also highly correlated with the views expressed in the op-ed articles of major newspapers (*New York Times, Wall Street Journal, Washington Post, USA Today, Houston Chronicle*), which suggests that the media draws connections for the public between high temperatures and climate change. It is difficult to separate out the effects of coincidental events—in 2009, temperatures were colder than normal, but there was also an economic recession and the Climategate controversy over the communications of climate scientists. However, Donner and McDaniels speculate that less knowledgeable individuals with weaker attitudes toward climate change are more susceptible to being influenced by temperature fluctuations. They refer to these "swing voters" as being responsible for the short-term variation in the percentage concerned about climate change.[30]

Information Effects and Motivated Reasoning

Public opinion models start with the assumption that citizens will economize on the time they devote to political choices. The models allow little room for more careful consideration of arguments and their quality. Political arguments are not evaluated for their substance but according to their partisan or ideological sources. Consequently only a consensus among elites will swing opinion uniformly in support of a position. Divided elites produce divided publics.

The dynamics of public opinion on climate change shows that mere exposure to facts tends not to change policy positions when those positions are motivated by strong ideological values. Individuals with conservative leanings will maintain a contrarian position as long as it is championed by sources they find credible and trustworthy. Currently, both sides of the debate can cite elite sources and arguments for their positions, even though most scientists are in agreement.

The concept of motivated reasoning refers to the goals that give people incentives to engage in effortful thinking about a problem or issue. Kunda discussed two broad motivational goals behind reasoning: a desire to achieve a particular outcome (i.e., a directional goal), and a desire to be accurate or objective.[31] Directional motives lead people both to avoid and to discount evidence that runs counter to their prior attitudes and beliefs. In contrast, people may be motivated to be accurate when the issue is important to them (e.g., they may have an interest in making the right choice) or they have to explain or justify their positions to others. In such circumstances, they are more likely to try to be objective in their evaluation of evidence and to make their decision based on careful scrutiny of the credibility of sources and the strength of competing arguments.

Research on political communications shows that strong substantive arguments are able to prevail only when the partisan conflict is moderated. When there is a clear partisan divide, individuals tend to back their own party's position, even when that position is supported by weaker arguments. Druckman et al. (2013) found that individuals were influenced by the strength of arguments for and against oil drilling and the DREAM Act (about immigration reform) only when there were internal party divisions that diluted the partisan cues.[32] When the parties were represented as being polarized on the issue, individuals tended to side with their party and not be influenced by the strength of opposing arguments.

Indeed, Wood and Vedlitz's (2007) study of factors that influence whether people are concerned about global warming confirms that exposure to information about climate change in a nonpartisan context is more likely to be processed accurately.[33] Two survey experimental manipulations of information were tested. One manipulation varied the proportion of the public (40, 60, or 80 percent) that was said to be concerned about global warming. A second manipulation provided information stating that scientists have produced definite evidence of rising temperatures, melting icecaps, and rising sea levels but varied the number of degrees (either 2 or 5 degrees) the Earth's temperature would rise and the number of inches (6 inches or a foot) that sea levels would rise.

Both treatments had some impact on heightening concern for global warming. Varying the quantitative details in the second treatment had no further impact—perhaps not surprisingly, as people do not have an adequate reference point for evaluating more precise temperature and sea level quantities. Overall, these results suggest that social influence and factual information may affect individual priorities if they are not dominated by partisan cues. However, the information treatment was a one-sided message that did not account for the polarized atmosphere surrounding global warming. The problem facing efforts to raise concern for global warming is there is an active political opposition that seeks to muddy the scientific consensus and to undermine the credibility of scientists. If this experimental treatment were presented to a sample of strongly identified Republicans, the respondents would be more likely to counterargue against the claim and to discount its validity.

An example of directional bias in the evaluation of scientific evidence is a study by Sherman and Kunda involving scientific research on caffeine's effect on disease.[34] Some subjects read that caffeine facilitated progression of a serious disease; others read that caffeine inhibited progression. Caffeine drinkers were motivated to believe one conclusion over the other, and the reverse was true for low caffeine consumers. The results confirmed this directional bias. Threatened subjects were more likely to challenge the methodology of the research than nonthreatened subjects.[35]

Elaborating on the caffeine study, Kunda writes,

> Of importance is that all subjects were also quite responsive to the differential strength of different aspects of the method, which suggests that they were processing the evidence in depth. Threatened subjects did not deny that some aspects were strong, but they did not consider them to be as strong as did nonthreatened subjects. Thus bias was constrained by plausibility. Taken together, these studies suggest that the evaluation of scientific evidence may be biased by whether people want to believe its conclusions. But people are not at liberty to believe anything they like; they are constrained by their prior beliefs about the acceptability of various procedures.[36]

These are hopeful results, showing that individuals viewing scientific evidence have prior beliefs about appropriate scientific methodologies that can restrict their ability to dismiss research results. People are constrained by their desire to provide explanations for their positions that would convince a "dispassionate observer."[37] Likewise, Pyszcynski and Greenberg speak of our desire to maintain an appearance of objectivity.[38]

By definition, the illusion of objectivity is shattered when no one believes you are seriously considering the available evidence on the issue. As long as Republican elites disagree with the scientific conclusions and can continue to enlist authorities to support their positions, rank-and-file members will fall in line. The more significant turning point will be when the skeptical position on climate change loses legitimacy and plausibility in public circles. It is clear that defenders of smoking cannot point to credible scientific evidence for their position. And it is becoming harder for those who doubt the existence of climate change to do the same. Max Boykoff's (2008) call for more responsible reporting of the status of scientific agreement and knowledge is aimed at reducing the legitimacy of politically motivated opposition:

> Climate change is complex, which makes it a continually vexing problem for reporting, especially for a generalist audience. But in this high-stakes challenge, journalists and editors as well as scientists need to be intensely scrupulous. Media coverage should portray the contours of the varied aspects of climate change—from humans' role in it to whether it is "serious"—because better reporting has crucial implications for furthering understanding and potential public engagement. Granted, news will not provide the answer to climate change, but it does help to address, analyze and discuss the issues.[39]

Framing Public Policy More Effectively

The idea behind framing is that, on any issue, there are aspects or elements of the issue that are more likely to elicit favorable (or unfavorable) reactions from the

public. If advocates or detractors emphasize those aspects of the issue, they become more accessible to the public, and the public is more likely to construe the issue using those selected frames of reference.

The most celebrated reframing of the global warming issue occurred when Republican pollster and campaign consultant Frank Luntz advised his clients to perpetuate the idea that climate science was inherently uncertain and to stop talking about global warming—which Luntz maintained had ominous implications—and instead to begin referring to "climate change." The term *climate change* had supposedly been found in focus group and polling research to represent a more neutral proposition than *global warming*. In fact, subsequent public opinion research (see below) has offered little support for this claim, but the example remains a vivid reminder of the putative influence of framing.

The use of metaphorical frames appears to have helped the public to comprehend the nature of several environmental problems: *acid rain,* the *ozone hole,* and the *hothouse* or *greenhouse effect* are metaphors that make issues accessible to non-experts. These metaphors relate complex issues to processes or ideas that are familiar to the public. In past surveys (reviewed by Nisbet and Myers, 2007), it appears that when questions describe global warming as the greenhouse effect, respondents are more likely to claim they know something about this issue. The phrase *greenhouse effect* is accessible to nonscientists because people have felt the concentrated heat within a greenhouse. The ozone problem was effectively presented as a hole in a shield that needed to be repaired, which may have made it easier for people to visualize and become concerned about the problem. At the same time, confusion between the hole in the ozone layer and global warming perhaps also corresponds to people's intuitions. A hole in the ozone permits the rays of the sun to penetrate (and not be shielded by the ozone), which might be thought to increase the temperature of the Earth.

Certain claims are more readily acceptable because they are rooted in intuitively plausible stories.[40] When survey questions provide causal mechanisms for global warming—e.g., describing how carbon dioxide and other gases released into the atmosphere trap heat—respondents seem more likely to accept that this process will produce global warming. This illustrates how people need plausible stories to support their beliefs about the world. The greenhouse metaphor has become less salient over time in discussions of global warming, which may have inhibited self-reported knowledge of the problem, because it is a metaphor that makes the problem concrete and comprehensible for nonscientists.

Conversely, the counterclaim of skeptics that recent temperature increases are part of a natural cycle plays on the common belief that the environment is not human-made but part of the natural world and therefore generally outside the control of humans. Another common argument against climate change is that CO_2 is heavier than other air molecules (true) and will therefore fall to the surface rather

than remain in the atmosphere (false). This false but intuitively plausible assertion therefore is a potentially effective frame for those who want to sow doubt about global warming. There is evidence the economy-versus-environment dichotomy can be overcome with the right plausible causal story. CBS and PIPA polls have shown that if the public is presented with the idea that efforts to curb greenhouse gas emissions will improve energy efficiency, respondents are more likely to say they believe such measures will help the economy by reducing energy costs.[41] Of course, these examples raise the intriguing question of where we get our intuitions about how the world works.

Experimental studies of the effect of framing on attitudes toward climate change have begun to identify approaches that may garner greater support for policies. Market-based frames used to describe policies appear to have greater appeal among individuals who give priority to hierarchical and individualist values over egalitarian and communitarian values.[42] Public health frames that emphasize connections between global warming and respiratory problems can make the effects of climate change more tangible and immediate to the public. "The emphasis also shifts the visualization of the issue away from remote arctic regions, peoples, and animals to more socially proximate neighbors and places such as suburbs and cities."[43]

Myers et al. argue that different ways of framing climate change make people more or less hopeful or angry, and in general elicit varying emotional responses from people.[44] They found a national security frame tended to anger those who are dismissive of climate change, while a public health frame tended to make those who were dismissive somewhat more hopeful. Although emotions were stirred by frames, there was no evidence that the environmental, national security, or public health frames could swing opponents around. None of this research however measured effects in a competitive context nor were any party cues presented alongside the frames.

Jon Krosnick compared how the public reacted to the alternative terms *climate change* versus *global warming* and increased "prices" versus increased "taxes" on gasoline in the United States and in Europe and found little difference, thus providing no support for the claims of consultants such as Frank Luntz.[45] Ironically, the term *climate change* elicited somewhat greater concern among Republicans and somewhat lesser concern among Democrats. Therefore, partisan polarization was reduced in reaction to climate change compared to global warming. Framing does appear to affect the priority placed on global warming. Yeager and colleagues (2011) have found that when the public is asked about the most important problem facing the world in the future (in contrast to the most important problem facing the nation today), global warming is more likely to be mentioned in that context.[46]

Research has identified conditions in which framing effects are likely to be mitigated. Of the potential antidotes to framing, the two most relevant in the context of the climate change issue are the effects of partisan communication sources and political competition. A frame—such as an argument that human

actions are responsible for climate change—is most effective when it is received unopposed and without partisan cues. However the same message is far less effective when paired with an opposing frame—e.g., the argument that climate naturally varies over time. Whereas the recipients of one-sided frames are swayed by the considerations emphasized by that frame, the recipients of competing frames (i.e., frames representing alternative pro and con positions) are more likely to construe the issue using the frames that are congenial with their values.[47] Therefore, frames are dampened in politically polarized contexts. As noted earlier, when Democrats and Republicans are sending competing frames on an issue, partisan recipients tend to conform to the partisan position on the issue irrespective of the substance or strength of arguments made by each side.[48]

Reducing the Environment–Economy Conflict

A distinction must be drawn between debates over scientific claims and political conflict. Early disputes over the science of climate change gave way in the 1990s to debates over the economics and politics of national and international solutions. The political and economic debate in turn provided incentives for organized interests to challenge the science of global warming. Ultimately, disputes over interests are a powerful motive for sending conflicting messages to the public on the issue. Lessons can be drawn from Europe in promoting the economic benefits of policies aimed at addressing climate change. The contrast between United States and European public opinion is significant, because it highlights how the alignment of interests sharpens or diminishes the partisan divide.

Media coverage of the issue in Europe has promoted the idea of climate change to the point where skeptical views receive far less exposure than they do in the United States. Moreover, the European press has often been sensationalist in linking weather events such as floods, droughts, and heat waves to climate change without concern for scientific support.

Differences between the flow of information in the United States and Europe appear to be reflected in European public opinion. European Union citizens place a much higher priority on tackling climate change and see it as one of the most important global problems: two out of three respondents in 2011 said that climate change was among the most serious problems in the world, and 20 percent believed it was the world's single most serious problem. A majority ranked climate change as a more serious problem than current economic challenges following the 2008 financial crisis. Almost 80 percent said that policies to combat climate change would boost the economy and create jobs, an increase over 2009 when 63 percent agreed to the same statement.[49]

In Europe, the public faults business interests for not doing enough to address global warming. Ideological differences in Europe are more muted than they are in

the United States. In a 2008 Eurobarometer survey, 66 percent of those who identified themselves as being on the "left" mentioned climate change as one of the most serious problems in the world, whereas 60 percent of those on the "right" did likewise.[50] When Europeans say that combating climate change will boost the economy, this is not a framing effect or a theoretical claim, as there is actual evidence for this relationship. In the United States, there is a persistent belief that the environment and economy must be traded off against each other.

Frames suggesting a positive connection between climate change policies and economic growth can help to shape public opinion, but more important to the success of such frames is whether business interests are persuaded they can profit from supporting new regulations. The claims contained in effective frames will not diminish elite opposition unless the major interests on the issue accept these claims. Until they do, they will continue to promote counterframes that sustain mass polarization.

Differences between Europe and the United States can be explained by different costs in adapting to lower emissions levels. European governments and businesses see benefits in reduced global emissions, because this would reduce energy demand and the price of energy. In Europe, the energy sector is weaker politically; generally more cooperative government–business relations on environmental policy have led to government regulations requiring changes in business practices that create incentives for businesses to adapt. US businesses have long felt they could successfully fight regulations, which caused businesses to fall behind in their ability to adapt to new environmental standards and, therefore, to be at a competitive disadvantage internationally. An important exception occurred in the campaign to ban chlorofluorocarbons (CFCs), where US business interests were more amenable than their counterparts in Europe, because they had a lower stake in the use of CFCs. US regulations had already forced American business interests to find alternatives, giving them an incentive to seek an international ban that would reduce the advantage enjoyed by European interests.[51]

North American businesses in the 1990s focused their energy on efforts to oppose regulation of greenhouse gas emissions. The Global Climate Coalition and the Climate Council argued against US support for the Kyoto Protocol. They also funded a major public relations campaign to discredit climate science and to argue that the economic costs of limiting greenhouse gases were excessive. The oil and automobile sectors were the most active business opponents along with other materials industries that relied heavily on fossil fuels.

The contrasting responses of businesses in the United States and Europe stem from their varying expectations about government regulation and their estimates of their ability to develop and profit from new technologies:

Senior managers of European companies believed that climate change was a serious problem and that regulation of emissions was inevitable, but they were

optimistic about the prospects for new technologies. . . . American and Canadian companies, by contrast, tended to be more skeptical concerning the science, more pessimistic regarding the market potential of new technologies, and more confident of their political capacity to block regulation.[52]

Over time, the stance of US businesses has changed to recognize the issue of climate change is not disappearing and that they will need to factor it into their business models. Jones and Levy attribute some common movement of American and European countries toward accommodative strategies to be the result of global networks of senior managers, "which tend to induce similar expectations and norms concerning appropriate responses."[53]

American businesses continue to employ a mixed strategy by taking steps to adapt to regulations on carbon emissions but actively working to limit regulations that affect their profitability. In 2009 a well-funded effort by business succeeded in derailing the most significant climate policy bill—the Waxman–Markey American Clean Energy and Security Act. The cost of adapting to regulations on greenhouse gases should decline as technological innovations reduce the cost of compliance. Clean energy and low-emission technologies also will create new economic opportunities. But new regulations introduce uncertainties and risks in the marketplace that can be accepted or resisted. Businesses will be reluctant to change voluntarily if they believe they can delay the pace of change; more likely they will need to be pushed, as they have been in Europe by government action that has changed business incentives and strategies.

As businesses use public relations campaigns to persuade or inform the public of their actions to address climate change, critics contend that these actions are superficial and intended only to reduce public pressure. Nonetheless, we might expect that conciliatory messages originating from business sources such as British Petroleum and other oil companies will contribute to a growing sense of consensus on the need to address emissions and climate issues. At a minimum, these PR efforts represent a step in the process by which mainstream opinions begin to tip decisively to one side.

Conclusion: A Rational Public?

Public attitudes toward global warming conform to general theories of opinion that have been applied to other political issues. The public has a largely reactive role in these theories, as few political issues motivate ordinary citizens to pay more than passing attention to policy debates. The creators of public opinion are found among political elites—the politicians, media figures, journalists, intellectuals, interest groups, and activists that frame and shape debate and public opinion. Public opinion toward climate change therefore reflects patterns of elite communication over time.

A detached public can often make reasonable judgments by following elite cues, even if it lacks the motivation to appraise competing arguments and information on controversial issues. Overall, if we are evaluating the majority tendencies of the public, they are commonly on the correct side of factual issues. In the aggregate, majorities accurately perceive that the planet is warming, that human activities have played a significant role in contributing to the problem, and that most scientists believe that climate change is a real and dangerous phenomenon. There is fairly strong symbolic support for environmental ideas, concepts, and policies, although willingness to pay for climate change policies tapers off as their costs become more concrete and hit close to home. The American public on the whole mostly gets it right, even though virtually all attitudes and beliefs vary by political ideology and partisanship, with Republicans and conservatives being more skeptical about the science of climate change and more opposed to taking government action to address the problem.

Would the public hold the same attitudes and opinions about policy action if they learned the scientific facts and became more intensely involved with the issue? It is arguable a better-informed public might have a significantly different distribution of opinion, but to achieve such change, we require more responsible behavior from political elites and the media to accurately represent the state of knowledge about the issue, which is a different problem than an inattentive or apathetic public.

The public is responsive to the information flows of society.[54] When Democratic voices predominate on the issue, public concern about climate change increases. Conversely when partisan rancor grows, so do doubts about the reality and severity of the problem. Economic conditions influence both concern over climate change and beliefs about whether climate change is a real phenomenon. As the economy fell into recession in 2007, the public wanted government to deal with unemployment and other economic issues (the budget deficit, national debt, home foreclosures) that were felt to be more pressing concerns than climate change policy.

The worldwide economic downturn also made the public in the United States and Europe more skeptical that climate change was occurring and less inclined to attribute it to CO_2 levels, which is evidence of directionally motivated reasoning. Ignoring reality to suit one's desires is irrational, and individuals who do not properly evaluate information that has a bearing on their health may subject themselves to increased risks. The climate change debate belongs in this category as an issue on which motivated reasoning causes people to ignore, misinterpret or underweight real and present dangers in their environment. As Benedick warns,

> By the time the evidence on such issues as ozone layer depletion and climate change is beyond dispute, the damage could be irreversible and it may be too late to avoid serious harm to human life and draconian future costs to society.[55]

In the climate change debate, people are still prone to think climate change will have its greatest impact on future generations and regions other than their own. This long-term perspective is reinforced by contrarian efforts to undermine the validity of scientific arguments. Raising doubt about climate change reduces the relevance of the issue to people's lives and diminishes their motivation to seek and examine evidence on the subject.

However—and this should reassure supporters of government action—a large and growing proportion of the public acknowledges the reality of climate change and its damaging consequences, even if some have doubts about the relative contribution of human actions. Moreover, there are significant generational differences in attitudes, as younger individuals are more likely than older age cohorts to believe climate change is occurring and to endorse policies that address the problem. Generational differences exist because younger individuals are a barometer of the changing ideas and norms of society. The weaker predispositions of young people on the issue of climate change leave them open to recognizing the dominant flows of information in society. Even though competing viewpoints are represented in the media on climate issues, coverage favors the position taken by mainstream scientists. Few media stories present the skeptical view without qualification or opposition. The skeptical view is clearly the rearguard action in our society, and it appears to be losing out most decisively in the youngest generation of people, who also happen to see the world with the least bias.

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