

The impact of the fall 1997 debate about global warming on American public opinion

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Although global warming has been the subject of some public discussion since the turn of the 20th Century, it was pushed into the national spotlight during the fall of 1997, when President Bill Clinton's administration instigated a campaign to build public support for the Kyoto treaty. To examine the effect of this campaign and the debate it sparked, we conducted two national surveys, one immediately before and the other immediately after the campaign. We addressed three questions: (1) What were Americans' beliefs and attitudes about global warming before the debate? (2) Did the debate catch the public's attention? and (3) Did the debate change people's beliefs and attitudes about global warming? We found that a majority of the American general public and of the global warming "issue public" endorsed the views advocated by President Clinton before the media campaign began. The debate did attract people's attention and strengthened the public's beliefs and attitudes. The debate produced almost no changes in public opinion when the nation's population is lumped together. But beneath this apparently calm surface, strong Democrats came to endorse the positions advocated by the Clinton administration, while strong Republicans were less inclined to endorse the administration's views.

1. Introduction

In an effort to combat global warming, representatives of the United States and many other nations met in Kyoto, Japan, in early December 1997 to sign an international treaty to limit greenhouse gas emissions. Prior to this conference, the Clinton administration took dramatic steps to build public support for the treaty by informing Americans of the scientific consensus that global warming was a real threat and was caused by humans. This pushed the issue of global warming into the national media spotlight and instigated a major national debate concerning scientific evidence about the existence of global warming, its consequences, and solutions for it, which continued until the United States and other nations met in Kyoto.

The research described in this article was designed to assess the impact of this debate on the public's beliefs and attitudes about global warming. We did so by conducting two national surveys asking Americans about their beliefs and attitudes regarding global warming. One of these surveys was conducted in September and October 1997, before the public debate about global warming began, and the other was conducted between December 1997 and February 1998, after the public debate had ended. We address three principal questions in this research: What were the public's beliefs and attitudes before the media campaign began? Did the debate engage the public's attention? And did the debate change beliefs and attitudes about global warming?

We begin by briefly tracing the history of global warming in the scientific community, in the world of politics, and in the news media. Then we describe our approaches to exploring the three questions listed above and the theoretical perspectives from psychology and political science that guided our thinking about these questions. Finally, we describe the methodology of our surveys, present our findings, and discuss their implications.

2. The history of global warming as a scientific and political issue

Before 1997, public attention to the issue of global warming conformed nicely to Downs' "issue-attention cycle."¹ According to Downs, attention to political issues, particularly environmental ones, typically progresses through a five-stage cycle.² Initially, a problem exists, but the public is unaware of it. For global warming, this was the case during most of the 20th century. The possibility of global warming was first raised in 1896 by Svante Arrhenius, a Nobel Prize-winning Swedish chemist, who noted that the industrial revolution was increasing atmospheric levels of carbon dioxide and predicted that further increases would lead to an increase in Earth's temperature.³ However, relatively little public or media attention was paid to the issue until nearly a century later.

When a dramatic event occurs that brings the problem to the public's attention, the problem moves into the second stage of Downs' cycle, and this occurred for global warming in the late 1980s. Although some scientists had been trying to focus public concern on global warming during the 1970s and much of the 1980s, they received little attention from the American media and the public. In the summer of 1988, however, a dramatic event, the worst drought to face the U.S. in 50 years, brought more attention to the issue. The drought and the fact that 1987 had been the hottest year on record received major news coverage, much of it speculating about whether global warming was responsible for the drought. Congressional hearings on global warming held at that time contributed to a surge in coverage of the issue and a plan to negotiate an international treaty to combat global warming.

In the third and fourth stages of Downs' cycle, people come to recognize the substantial cost of solving the problem and the threats posed by proposed solutions, and later become bored with the problem, leading to a decline in public concern about the problem. In the case of global warming, members of President George Bush's administration expressed opposition to an international treaty to deal with global warming in 1989,⁴ and their opposition sparked a heated debate in the media about whether or not global warming was occurring. This debate, coupled with the end of the 1988 drought and the emergence of another environmental crisis (the 1989 Exxon Valdez oil spill) resulted in a dramatic decrease in public discussion of the issue of global warming.⁵ Eventually, the public shifted its attention to other problems during the early 1990s, marking the onset of Downs' fifth stage.

Throughout all of this, the scientific community was divided about the existence and likely causes and consequences of global warming. Respected governmental or scientific groups had often speculated that global warming might be occurring and might be the result of human activities. For example, in 1971, a report to the United Nations proposed for the first time that humans might be responsible for causing global warming. In 1976, the Scientific Unions International Council issued a report that forecasted an atmospheric buildup of CO₂ and subsequent alterations in the world's climate. The Federal Council on Environmental Quality did the same in 1979. In 1989, the National Academy of Sciences urged President Bush to put the threat of global warming high on his agenda. And in 1992, the United Nations Intergovernmental Panel on Climate Change (IPCC) reported that global warming might have very negative consequences for the world's ecosystems. In the early 1990s, a modest but steady flow of media coverage of global warming continued to convey lack of consensus

among scientists.

But in September 1995, the IPCC issued a report that changed everything, stating that a new international consensus among scientists had emerged that global warming was real and the result of human action.⁶ The 1995 agreement therefore represented a dramatic and substantial shift in the message that the scientific community sent to the public about this potential problem. And media coverage of this report conveyed the new consensus to the public. For example, on September 10, 1995, the *New York Times* reported:

“In an important shift of scientific judgment, experts advising the world’s governments on climate change are saying for the first time that human activity is a likely cause of the warming of the global atmosphere. While many climatologists have thought this to be cause, all but a few have held until now that the climate is so naturally variable that they could not be sure they were seeing a clear signal of the feared greenhouse effect...”⁷

During the year after the 1995 report was published, many countries accepted the report’s assertions and set a course toward reducing global warming. And the Kyoto conference was planned for late 1997 to respond to this new consensus and to develop an international treaty to address the problem.

The Clinton administration’s campaign in the fall of 1997 to build public support for this treaty began on October 6, 1997, with the White House Conference on Global Climate Change. During this conference, government, industry, and scientific experts shared their ideas about global warming in a nationally televised series of presentations. And between then and early December 1997, the American media focused a great deal of news coverage on global climate change and the debate being waged over whether the phenomenon poses serious threats or even exists. The media coverage included hundreds of newspaper, television, magazine, and radio news stories, as well as editorials, editorial cartoons, and letters to the editor. The debate was further amplified in advertisements, paid for by business and other advocacy groups, as well as radio talk shows and numerous World Wide Web sites. Coverage and debate continued until the U.S. and other nations met in Kyoto in mid-December to sign the climate treaty, after which the media turned away from global warming to focus on other issues.

To document the increase in media coverage of global warming during this time, we gathered transcripts of national and regional newspaper stories and television news stories on ABC, CBS, NBC, and CNN about global warming between July and December 1997.⁸ A coder, who was blind to the hypotheses of the study, read each story and counted the number people or groups that asserted that global warming exists (e.g., “The world’s temperature is going up.”), the number of people or groups that expressed uncertainty that global warming exists (e.g., “We can’t be sure whether global warming has been happening or will happen.”), and the number of people or groups that expressed skepticism about whether global warming exists (e.g., “Global warming is just a trick politicians are using to gain leverage; everybody knows that nothing is going on.”)

During the three months before the media campaign (i.e., July–September 1997), 214 newspaper stories and 12 television stories dealt with the issue of global warming. But between October and December, 519 newspaper stories and 224 television stories focused on the issue, an increase of about 240 percent for newspaper stories and nearly 1,800 percent for television stories. Thus, the sheer volume of stories surged.

The October–December stories were overwhelmingly dominated by the assertion of global warming’s existence. More than half of these stories (61 percent of newspaper stories and 79 percent of television stories) contained at least one assertion that global warming existed. In contrast, only 17 percent of newspaper stories and eight percent of television stories contained

at least one expression of uncertainty about the existence of global warming. And only 15 percent of newspaper stories and eight percent of television stories contained at least one expression of doubt about the existence of global warming.

Interestingly, the proportions of news stories that included assertions of global warming's existence were a bit lower during October–December than they had been during the prior three months (July–September). During that earlier period, 73 percent of newspaper stories and 83 percent of television stories had contained at least one assertion that global warming existed. But the proportions of stories containing at least one expression of uncertainty about the existence of global warming were substantially higher than during October–December (21 percent of newspaper stories and 33 percent of television stories). And expressions of doubt about the existence of global warming were also a bit more common during July–September (20 percent of newspaper stories and eight percent of television stories contained at least one such assertion).

Thus, there was a dramatic increase in the volume of media coverage of the issue during the fall of 1997, and much of this coverage was consistent with the message that the Clinton administration was trying to communicate—that global warming was a real threat. Our goal in the research discussed here was to explore the effect of this media campaign on the public's opinions and beliefs about global warming.

3. Assessing opinions before the debate

We took two approaches to assessing beliefs and attitudes before the media campaign. First, we gauged the entire American public's opinions about the existence of global warming, its consequences, and what action should be taken to deal with global warming. Second, we examined these beliefs and attitudes among the “issue public” for global warming. According to the issue public perspective, most political issues arouse passionate concern among just a small group of citizens.⁹ Most Americans fall into just a few issue publics, and which issues a particular person is most concerned about appear to be determined by his or her material self-interests, the interests and concerns of social groups and reference individuals with which he or she identifies, and his or her cherished values.¹⁰ On any particular issue, a democratic government's policies may not reflect the opinions of the majority of its citizens but rather may reflect the preferences of issue-public members, because they are most likely to exert pressure on government to heed their wishes.¹¹

The beliefs and attitudes of issue-public members often differ from the beliefs and attitudes of nonmembers. The attitudes of issue-public members are often more extreme than nonmembers,¹² and they are often in greater agreement with government policy about an issue. This has been demonstrated for a wide range of policies, including U.S. foreign policy toward Israel, gun control, abortion, the Equal Rights Amendment, and domestic science policy.¹³ Furthermore, across issues, Monroe found public opinion in the nation as a whole was more highly related to public policy when the issue public for that issue was larger, presumably reflecting their greater influence.¹⁴ Therefore, to fully understand public opinion about global warming before the fall 1997 debate, it is important to document the attitudes and beliefs of issue-public members.

We did so with our survey data, identifying issue-public members using the most frequently employed measurement tool—people's assessments of the personal importance of the issue to them. A great deal of previous research has shown that people for whom a political issue is personally important are more cognitively and behaviorally involved in the issue.¹⁵ When an issue is personally important, people's policy preferences regarding it are more accessible in their memories and are therefore more likely to come to mind to direct thinking and action.¹⁶

Furthermore, more important attitudes are more resistant to change and are therefore more stable over long periods of time.¹⁷

People for whom an issue is more personally important are more likely to seek out information about it and to think deeply about that information, leading them to accumulate large stores of accurate information about the issue.¹⁸ As a result, people for whom an issue is important perceive political candidates' positions on that issue more accurately than people for whom the issue is not important, and the former individuals use these candidate positions to determine for whom they will vote in elections.¹⁹ Most significantly, individuals for whom an issue is personally important are also more likely to engage in attitude-expressive behaviors than those for whom the issue is not personally important—writing letters and making telephone calls to government representatives, joining and supporting lobbying organizations, and more.²⁰ We therefore gauged the views of these individuals in order to assess the signals the American government was likely to have been receiving from its citizens prior to the White House Conference.

4. Assessing whether the debate engaged the public

In order for the debate to change beliefs and attitudes about global warming, the debate must have reached into the public's consciousness. We took two approaches to assessing whether it did so. First, we gauged exposure to media coverage of global warming; our content analysis suggests that more people should have been exposed to stories about the issue more often after the White House Conference than before. But exposure alone does not mean that news stories engaged people, a necessary precondition for attitude and belief change.

To assess whether the media coverage engaged people, we tapped a number of indicators. First, we asked people how much they had thought about global warming, expecting to see an increase from before October to afterward. And if this thinking led people to consolidate their beliefs and attitudes into coherent systems, we would expect them to be held with greater confidence and to come to mind more readily (meaning they were more accessible).²¹ Finally, if the debate taught the public new information about the issue, we would expect people to report being more knowledgeable after October than before. To the extent that people's opinions were increasingly the subject of thought, were held with greater confidence, were more accessible, and were bolstered by more knowledge, these opinions would have become stronger, increasing the likelihood that they would drive people's thinking and action in the domain of politics, perhaps demanding conformity to them from government.²² Along the same lines, engagement in the issue may have led people to recognize that their material interests, reference groups or individuals, or values were relevant to the issue, thereby leading to an increase in the size of the issue public for global warming.

5. Assessing the impact of the debate on beliefs and attitudes

To assess whether a large volume of media coverage of an issue changed public opinion, the traditional analytic approach has been to measure the percentage of Americans who held various views before and after exposure. Most previous research examining the impact of the media in this way has found little evidence that the media strongly affect attitudes, a finding referred to as "minimal effects." In an early study, Lazarsfeld, Berelson, and Gaudet found that citizens were primarily exposed to attitude-congruent information during an election campaign, so exposure reinforced existing beliefs and attitudes rather than changing them.²³ Much additional research during the ensuing decades reinforced this same conclusion.²⁴

If the percentage of Americans who held various views before and after exposure to information on a certain subject stayed the same, most analysts would conclude that opinions did not change, because (1) people failed to notice the debate, (2) the information offered to people lacked either credibility or novelty, and/or (3) people's opinions were so strongly crystallized that they were nearly impossible to budge. However, recent research has recognized the value of identifying the conditions and characteristics that lead some people to change their attitudes in one direction in response to a media message, lead other people to change their attitudes in the opposite direction, and leave others completely unchanged.²⁵ When these sorts of processes unfold simultaneously, no net change can be observed using traditional statistical methods, yet very real change may have occurred.²⁶

We examined two sets of factors that we thought might regulate opinion change in response to the 1997 debate on global warming. When contentious debates between politicians and policy experts unfold on an issue, the public often takes its cues from the few political leaders they trust most.²⁷ Because President Clinton and Vice President Al Gore championed the global warming cause while many prominent Republicans and conservatives expressed skepticism, Democratic/liberal citizens might have moved toward the administration's point of view at the same time that Republican/conservative citizens moved away. If these two groups of citizens moved in opposite directions in about equal numbers, these changes would have cancelled each other out at the aggregate level, producing no net change. Therefore, we assessed opinion change separately among Democrats and Republicans.

6. Summary of our hypotheses

In sum, we sought to: assess the distribution of opinions about global warming in the general American public and in the global warming issue public before the 1997 debate; assess whether the debate engaged people (as indexed by media exposure, thinking, certainty, accessibility, knowledge, and personal importance); assess whether aggregate distributions of opinions changed during the fall of 1997; and assess whether cross-cutting changes occurred among opposing partisan groups.

7. Methods

The two national surveys we conducted assessed attitudes and beliefs about global warming, before the fall 1997 debate and again immediately afterward. We asked identical questions in both surveys so that we could assess changes over time in Americans' beliefs and attitudes about the issue.

Sample

Wave I. Computer-assisted telephone interviews lasting 30 minutes on average were conducted with a representative sample of 688 American adults by the Ohio State University Survey Research Unit between September 17, 1997, and October 5, 1997. The sample was generated via random digit dialing, and the cooperation rate was 67 percent. Within-household sampling was done by asking the adult resident with the most recent birthday to participate.

Wave II. Computer-assisted telephone interviews lasting 35 minutes on average were conducted with a representative sample of 725 American adults by the Ohio State University Survey Research Unit between December 20, 1997, and February 13, 1998. The sample was

generated via random digit dialing, and the cooperation rate was 71 percent. Within-household sampling was also done by asking the adult resident with the most recent birthday to participate.

Representativeness. To assess whether the samples for each of our surveys were representative of the nation as a whole, we compared their demographic characteristics to those of the nation, as ascertained in the March 1997 Current Population Survey (CPS) done by the U.S. Census Bureau.²⁸ As is apparent from Table 1, the correspondence of the survey sample to the nation's population is generally quite close. People with incomes exceeding \$60,000 were under-represented, as were people with less than a high school education. People with a bachelor's degree or more education were over-represented. To correct for these small discrepancies, our data were weighted to match the 1997 CPS demographic percentages shown in Table 1.

Measures

The questions asked in these surveys were carefully constructed to avoid several types of bias. First, the questions used balanced wordings that equally legitimated all viewpoints (see the Appendix for the exact question wordings). Second, all the questions were written so that the response options indicating that global warming was a more serious problem (e.g., that global warming is happening and is bad) were offered to respondents first in each list of response choices for categorical items and last for rating scale items. People are slightly biased toward choosing the response option presented last in categorical questions and toward choosing the response option presented first in rating scale questions when the questions are read aloud to them (as in this survey).²⁹ Therefore, our presentation orders minimized the proportions of people who said they thought global warming was real and problematic.

Third, because respondents who say "don't know" in response to survey questions usually do have opinions but choose to avoid the cognitive work entailed in retrieving those opinions from memory and reporting them to an interviewer (i.e., survey "satisficing"), "don't know" responses were probed with the following: "I'll record that, but if you had to choose, what would you say?"³⁰

Existence. During all interviews, respondents were asked whether they thought global warming had been happening in the past and whether global warming would occur in the future if nothing were done to stop it.

Seriousness. Respondents were asked how serious a national problem they thought global climate change and various other national problems will be.

Attitude toward global warming. Respondents were asked if they thought global warming would be good, bad, or neither good nor bad. Respondents who said global warming would be good or bad were then asked if they thought it would be very good/bad or somewhat good/bad. Respondents who said it would be neither good nor bad were then asked if they leaned toward thinking it would be good or leaned toward thinking it would be bad.

Attitude features related to strength. Respondents were asked how much they had thought about global warming, how much they knew about global warming, how personally important the issue of global warming was to them, and how certain they were about their opinions about global warming. In addition, interviewers measured the length of time it took respondents to

Table 1. Comparison of survey respondents' demographic characteristics with the population.

Characteristic	1997 Current Population Survey	Wave I survey	Wave II survey
<i>Age</i>			
18–19	4%	2%	4%
20–29	19	16	19
30–39	22	27	21
40–49	20	22	25
50–59	13	13	13
60 and up	21	20	18
<i>Race</i>			
White	84%	84%	81%
African American	12	7	9
Other	4	9	10
<i>Gender</i>			
Female	54%	58%	53%
Male	46	42	47
<i>Household income</i>			
Less than \$9,999	6%	12%	11%
\$10,000 to \$19,999	12	14	15
\$20,000 to \$29,999	14	16	15
\$30,000 to \$39,999	14	15	13
\$40,000 to \$49,999	13	11	10
\$50,000 to \$59,999	11	6	9
\$60,000 and up	29	19	22
<i>Education</i>			
Less than high school	18%	6%	7%
High school degree	33	27	25
Some college or AA degree	26	34	33
BA degree or higher	22	34	35
<i>Region</i>			
New England	6%	5%	6%
Mid-Atlantic	14	12	15
East North Central	18	19	17
West North Central	10	9	10
South Atlantic	20	20	19
East South Central	6	5	6
West South Central	10	12	11
Mountain	6	5	6
Pacific	11	12	10
<i>N</i>	47,133	688	725

report their attitudes toward global warming after being asked the question, which is a measure of the accessibility of these attitudes in people's memories.

Ameliorative effort and policies. Respondents were asked how much the U.S. government, foreign governments, U.S. businesses, and average people should do about global warming, and how much each of these groups were doing then about global warming. Respondents were also asked about the effectiveness of one potential method for combating global warming:

whether they believed reducing air pollution would reduce future global warming.³¹ People were also asked whether they supported specific policies to reduce air pollution: whether the federal government should limit air pollution from U.S. businesses, whether the U.S. should require countries to which it gives foreign aid to reduce air pollution, and whether respondents would be willing to pay more for utilities to reduce air pollution.

Activism. Respondents were asked about any actions they had taken to express their attitudes toward global warming—by writing a letter to a public official, giving money to an organization, or attending a group meeting.

Consequences of global warming. To identify the effects people might think global warming will have, we content-analyzed news media stories, conducted focus groups in cities around the country, and examined the findings of relevant previous studies.³² We then selected a set of the most commonly-mentioned effects to ask our respondents about, involving sea levels, water shortages, food supplies, the number of types of animals in the world, the number of types of plants in the world, and the frequency of hurricanes and tornadoes.

Demographics. Respondents were asked a series of demographic questions to assess political party identification, age, race, household income, and education. The interviewer coded the respondent's gender, and the respondent's telephone number revealed the region of the country in which he or she lived.

8. Results

Americans' opinions in September–October 1997

According to our first wave of data, huge majorities of Americans shared President Clinton's beliefs about global warming before the fall debate.³³

Existence of global warming. In September–October, 77 percent of people said they thought the world's temperature probably had been rising during the last 100 years, and 74 percent of people said they thought the world's temperature will probably go up in the future if nothing is done to stop it.

Attitudes toward global warming. A majority of Americans (61 percent) believed that global warming would be bad; 15 percent of people thought it would be good; and 22 percent thought it would be neither good nor bad.

Consequences of global warming. When asked about a series of specific possible consequences of global warming, most respondents said it would cause undesirable outcomes—more storms (69 percent), reduced food supplies (57 percent), more water shortages (54 percent), rising sea levels (52 percent), and extinction of some animal species (52 percent) and plant species (50 percent). Nineteen percent said global warming would not affect storms, 26 percent said it would not affect food supplies, 22 percent said it would not affect water shortages, 18 percent said it would not affect sea levels, and 34 percent and 23 percent said it would not affect animal and plant species, respectively. The remainder of respondents either said that global warming would have an effect opposite of the undesirable outcomes listed above or that global warming would have effects in both directions.

National seriousness of global warming. When asked how serious a problem climate change is likely to be for the country, 33 percent said that it would be a very serious or extremely serious problem. Other problems we asked about were considered likely to be more serious. For example, 76 percent of respondents said the crime was a very or extremely serious problem; 58 percent said people being able to get good health care was a very or extremely serious problem; 51 percent said that education was a very or extremely serious problem; 44 percent said that having enough good jobs was a very or extremely serious problem; and 38 percent said that the cost of things was a very or extremely serious problem. Thus, climate change was viewed as less serious than many other problems.

Effort to combat global warming. When asked how much should be done to combat global warming, a majority of Americans advocated significant effort. Fifty-nine percent said the U.S. government should do “a great deal” or “quite a bit;” 58 percent said the same about other countries’ governments; and 59 percent said so about U.S. businesses. Less than half of Americans (44 percent) said so about average people. Interestingly, few people believed these various groups were in fact doing “a great deal” or “quite a bit.” 11 percent regarding the U.S. government, four percent regarding foreign governments, seven percent regarding U.S. businesses, and five percent regarding average people.

Support for specific action to deal with global warming. In September–October, 80 percent of respondents thought that reducing air pollution would reduce future global warming. A large majority of Americans (88 percent) said the U.S. government should limit the amount of air pollution that U.S. businesses can produce. Likewise, a substantial proportion of people (71 percent) thought the U.S. should require countries to which it gives money to reduce their air pollution production. A large majority (77 percent) of people said they would be willing to pay more money for utilities each month in order to reduce the amount of air pollution utility companies produce.

The unusually large size of these majorities becomes clear when we compare them to the size of majorities supporting various other policies popular among Americans (see Table 2). For example, 72 percent of respondents in the national 1996 General Social Survey thought the U.S. should do more to exclude illegal immigrants; 64 percent thought the U.S. should limit foreign imports; 69 percent thought that women should not be given preferences in hiring and promotion; 71 percent thought the death penalty should be used for persons convicted of murder; 80 percent thought that there should be a law requiring a person to obtain a permit before he or she buys a gun; and 58 percent thought that African American and white school children should not be bused from one school district to another. The majorities of Americans supporting ameliorative efforts regarding global warming exceeded most of these.

The issue public in September–October

Nine percent of respondents said global warming was an extremely important issue to them personally and therefore composed the issue public for this issue. Although this figure may seem small, it is typical of the size of issue publics for many prominent and widely debated issues. Shown in Table 3 are the proportions of Americans falling into various issue publics in recent years, according to the 1983–1987 General Social Surveys and the 1996 National Election Study, large, national surveys. Although the issue publics for some issues were quite sizeable (e.g., 31 percent for abortion), the issue public for global warming was comparable in size to issue publics for issues such as race relations (nine percent), pornography (11 percent), and women’s rights (11 percent).

Table 2. Percentage of Americans who supported various policies.

Policy	Percentage of respondents who favor the policy	N
The U.S. should do more to exclude illegal immigrants	72%	1367
The U.S. should limit foreign imports	64%	1367
Women should not be given preferences in hiring and promotion	69%	995
The death penalty for persons convicted of murder	71%	2904
A law requiring a person to obtain a police permit before he or she could buy a gun	80%	1923
African American and white school children should not be bused from one school district to another	58%	991
The U.S. should limit air pollution by U.S. businesses	88%	688
The U.S. should require recipients of foreign aid to reduce air pollution	71%	688
Would be willing to pay more in utility bills each month to reduce air pollution	77%	688

The 1996 General Social Survey was used as a source for the first seven issues in this table. The policies and percentages in bold at the bottom of the table come from our October–December survey.

Table 3. The sizes of various issue publics.

Issue	Proportion of Americans in the issue public	N
Abortion	31%	1714
Government social service programs	26%	1714
Helping blacks	22%	1714
The environment	18%	1714
U.S. defense spending	18%	1714
Gun control	17%	484
Capital punishment	14%	484
Women's rights	11%	1458
Pornography	11%	1459
Race relations	9%	802
Global warming (September–October survey)	9%	688

Note. Percentages for abortion, government social service programs, the environment, U.S. defense spending, and helping blacks come from the 1996 National Election Study. Respondents in this survey were asked to indicate whether an issue was extremely important, very important, somewhat important, not too important, or not important to them personally. Shown above are the proportions of people who said “extremely important.” The percentages for gun control, capital punishment, women's rights, pornography, and race relations come from the General Social Surveys from 1983 to 1987, collapsed across year. Respondents in these surveys were asked to indicate whether each issue was one of the most important to them personally, important to them, not very important to them, or not at all important to them. Shown above are the proportions of people who said “one of the most important.” The last line of the table reports a result from our September–October survey.

Existence of global warming. Ninety-one percent of issue-public members believed that global warming had been happening, compared to only 78 percent of nonmembers, a significant difference ($\chi^2 = 5.62$, $p < 0.05$).³⁴ Similarly, 84 percent of issue-public members thought that global warming would occur in the future, compared to only 76 percent of nonmembers, a sizable, but not quite significant difference ($\chi^2 = 2.01$, $p = 0.16$).

Consequences of global warming. Seventy-seven percent of issue-public members believed that global warming would be bad, whereas significantly fewer (59 percent) nonmembers

believed this ($\chi^2 = 6.25, p < 0.05$). As compared to nonmembers, more issue-public members thought that global warming would lead to more storms (88 percent vs. 68 percent for members and nonmembers respectively; $\chi^2 = 9.43, p < 0.005$), reduced food supplies (76 percent vs. 55 percent; $\chi^2 = 8.34, p < 0.005$), fewer animal species (63 percent vs. 51 percent; $\chi^2 = 3.51, p < 0.10$), and fewer plant species (61 percent vs. 48 percent; $\chi^2 = 2.89, p < 0.10$). Though not quite significantly, more issue-public members than nonmembers believed that global warming would cause increased water shortages (63 percent vs. 53 percent; $\chi^2 = 1.89, p = 0.17$). And issue public and nonmembers did not differ in their beliefs about whether global warming would cause sea levels to rise (53 percent vs. 52 percent thought so; $\chi^2 = 0.00, p = 0.99$).

Was global warming a problem? Sixty-four percent of issue-public members thought that global warming was likely to be a very serious or extremely serious problem, whereas only 30 percent of nonmembers felt this way, a highly significant difference ($\chi^2 = 29.23, p < 0.001$).

Effort to combat global warming. As compared to nonmembers, greater percentages of issue-public members thought that a great deal or quite a bit should be done to deal with global warming by the U.S. government (83 percent vs. 56 percent; $\chi^2 = 9.40, p < 0.005$), by the governments of other countries (81 percent vs. 56 percent; $\chi^2 = 6.65, p < 0.01$), by U.S. businesses (82 percent vs. 56 percent; $\chi^2 = 7.56, p < 0.01$), and by average people (71 percent vs. 41 percent; $\chi^2 = 13.54, p < 0.001$). But the vast majorities of issue-public members and nonmembers agreed that these groups were not doing that much to address the problem.

Support for specific action to deal with global warming. Issue public members and nonmembers did not differ in the percentages who believed that reducing air pollution would reduce future global warming (85 percent vs. 80 percent; $\chi^2 = 0.27, \text{n.s.}$). Issue public members were more likely than nonmembers to think the U.S. should require countries to which it gives aid to reduce air pollution (83 percent vs. 70 percent; $\chi^2 = 3.97, p < 0.05$), but were not notably more likely to think that the government should limit air pollution from U.S. businesses (91 percent vs. 88 percent; $\chi^2 = 0.87, \text{n.s.}$). Nor did the percentages of issue-public members and nonmembers who were willing to pay more for utilities to reduce air pollution differ significantly (71 percent vs. 78 percent; $\chi^2 = 0.47, \text{n.s.}$).

Activism. As expected, significantly greater proportions of issue-public members than nonmembers had written a letter to a public official to express their views about global warming or air pollution (six percent vs. one percent; $\chi^2 = 11.01, p < 0.001$), had given money to an organization concerned with global warming or air pollution (25 percent vs. seven percent; $\chi^2 = 22.33, p < 0.001$), or had attended a group meeting to discuss global warming or air pollution (seven percent vs. two percent; $\chi^2 = 4.02, p < 0.05$).

Summary. In September–October, issue-public members endorsed the views advocated by President Clinton before the fall 1997 debate began, even more so than did the general public. A large majority of the issue public believed in the existence of global warming, believed it would be undesirable, felt efforts should be made to combat it, and supported federal legislation and personal sacrifice as mechanisms for doing so. Nearly a third (31 percent) had taken some sort of action to express their beliefs on this issue. Therefore, the people most likely to influence government on this issue could hardly have agreed more with the president.

Did the debate reach people?

Media story exposure. In September–October, 38 percent of respondents said they had seen a television news story about global warming during the previous four months. This figure rose significantly to 50 percent ($\chi^2 = 18.92$, $p < 0.001$) among people interviewed in December–February.³⁵ In September–October, 28 percent of respondents said they had seen a newspaper story about global warming during the prior four months, and this figure rose marginally significantly to 33 percent ($\chi^2 = 3.03$, $p < 0.10$) in December–February. Thus, the debate did reach people as gauged in this way. And it is quite possible that people were exposed to many more stories than they could later recall, so these may be underestimates of increased exposure.

In September–October, issue-public members were more likely than nonmembers to have been exposed to television news stories about global warming (51 percent vs. 37 percent). Exposure to such stories increased sharply between September–October and December–February among people not in the global warming issue public (from 37 percent to 51 percent; $\chi^2 = 22.61$, $p < 0.001$).³⁶ Recollection of story exposure actually decreased marginally significantly, from 51 percent to 41 percent, among issue-public members ($\chi^2 = 2.91$, $p < 0.10$).

The issue public. The issue public grew significantly from nine percent in September–October to 11 percent in December–February ($\chi^2 = 5.53$, $p < 0.05$). This represents a 22 percent increase in the size of the issue public or more than five million people. Although the absolute increase in the percentage of people who were in the issue public is small, it is statistically significant, so it is unlikely to be attributable to chance variation across the two surveys.

Other strength-related attitude features. When asked in September–October how much thinking they had done about global warming, 54 percent of respondents said either “a lot” or a “moderate amount.” When asked this question in December–February, 65 percent of people gave one of these two answers, representing a statistically significant increase ($\chi^2 = 19.45$, $p < 0.001$). People were significantly quicker at reporting their attitudes toward global warming during the December–February interviews (2.9 seconds on average) than they had been during the September–October interviews (3.3 seconds on average; $t(1247) = 2.28$, $p < 0.05$). And when asked in September–October, 28 percent of respondents were extremely or very sure of their opinions about global warming, and this figure rose significantly to 34 percent in December–February ($\chi^2 = 5.05$, $p < 0.05$). These changes suggested that the thinking people did about the issue during the fall led them to crystallize their opinions on it. However, the proportion of people who felt that they knew a lot or a moderate amount about global warming did not change during the fall of 1997 ($\chi^2 = 0.65$, n.s.), suggesting that people did not acquire new information about the issue.

These data also allow us to test the knowledge-gap hypothesis that more educated people gain more knowledge from media coverage of an issue.³⁷ Interestingly, we found no evidence that education moderated the impact of the media campaign on changes in knowledge. The percentage of respondents who said they knew a lot or a moderate amount about global warming did not change for respondents with a high school education or less (from 21 percent to 22 percent; $\chi^2 = 0.03$, n.s.; $N = 149$), for respondents with some college (from 41 percent to 43 percent; $\chi^2 = 0.36$, n.s.; $N = 944$), or for respondents with a college degree or more (from 55 percent to 58 percent; $\chi^2 = 0.26$, n.s.; $N = 311$).

Summary. From all these indicators, it appears the barrage of news coverage about global warming and the accompanying discussions did indeed reach people. People were more likely to have been exposed to news stories; they had thought more about the issue; their attitudes on the issue were more accessible; they were more certain of their opinions; and more people considered the issue to be extremely important.

Did the debate change overall distributions of opinions?

Existence of global warming. When examined on the surface, American public opinion seems to have remained largely unaltered by the fall 1997 debate. In December–February, 79 percent of people said global warming had been occurring, and 75 percent said they thought it would occur in the future if nothing were done to stop it.

Attitudes toward global warming. The same size majority of Americans (58 percent) continued to believe that global warming would be bad for people.

Consequences of global warming. When asked about the consequences of global warming, the percentage of respondents who thought global warming would cause more storms (71 percent), reduce food supplies (56 percent), cause more water shortages (53 percent), cause sea levels to rise (53 percent), and cause the extinction of some animal species (50 percent) and plant species (49 percent) were very similar to the percentages assessed in September–October.

National seriousness. The literature on news media agenda-setting suggests that the increased media coverage of global warming should have instigated growth in the proportion of Americans considering it to be an important national problem.³⁸ Remarkably, we found no evidence of such agenda-setting. In September–October, the percentage of people who thought that global warming was an extremely or very serious problem was 33 percent, and in December–February, it was 32 percent. The percentage of respondents who believed that global warming was a very serious or extremely serious problem continued to be less than the percentage who believed this about people being able to get good health care (58 percent), the cost of things (37 percent), having enough good jobs (43 percent), the natural environment (50 percent), education (51 percent), and crime (69 percent).

Effort to combat global warming. No significant changes were observed in the distributions of beliefs and attitudes about what should be done to deal with global warming or what was currently being done. Fifty-seven percent of respondents believed that the U.S. government should do a great deal or quite a bit about global warming; 58 percent of respondents believed that governments in other countries should do a great deal or quite a bit about global warming; 59 percent of respondents believed that U.S. businesses should do a great deal or quite a bit about global warming; and 43 percent believed that average people should do a great deal or quite a bit about global warming. Twelve percent of respondents believed the U.S. government was doing a great deal or quite a bit about global warming; three percent believed the governments of other countries were doing a great deal or quite a bit about global warming; eight percent believed that U.S. businesses were doing a great deal or quite a bit about global warming; and four percent believed that average people were doing a great deal or quite a bit about global warming.

Specific action to deal with global warming. No change appeared in the percentage of respondents who said they believed reducing air pollution would reduce global warming (80 percent in September–October and 79 percent in December–February; $\chi^2 = 0.27$, n.s.). Statistically significant movement did appear suggesting more public support for legislative solutions and less support for personal sacrifices to combat global warming. For example, 91 percent of people in December–February said the U.S. government should limit air pollution by U.S. businesses, up from 88 percent in September–October ($\chi^2 = 2.73$, $p < 0.10$). Eighty percent of people said the U.S. should require air pollution reductions from countries to which it gives foreign aid in December–February, up from 71 percent in September–October ($\chi^2 = 15.11$, $p < 0.001$). Surprisingly, fewer people were willing to pay increased utility bills to reduce air pollution: 72 percent in December–February, as compared to 77 percent in September–October ($\chi^2 = 5.85$, $p < 0.05$).

Summary. In line with the minimal effects view, very few changes occurred in overall distributions of opinions.³⁹ And this was equally true for issue-public members and nonmembers alike. These results leave unchallenged the general conclusion that the fall 1997 debate had very little impact on public opinion.

Party identification and opinion change

However, this is only part of the story. A look beneath the surface reveals a great deal of crosscutting movement. As expected, Democratic citizens moved toward the administration's point of view at the same time that Republican citizens moved away. Consequently, although the gap between strong Democrats and strong Republicans in terms of many beliefs and attitudes in September–October was relatively small, it grew substantially by December–February.

For example, in September–October, 73 percent of strong Democrats thought global warming had been happening, compared to 68 percent of strong Republicans, a gap of five percent.⁴⁰ In December–February, these figures were 87 percent and 69 percent, revealing an increased gap of 18 percent. Likewise, in September–October, only 75 percent of strong Democrats thought global warming will happen in the future, compared to 66 percent of strong Republicans, a nine percent gap. In December–February, these figures were 77 percent and 55 percent, respectively, representing a 22 percent gap.

Another example involves the belief that the U.S. government should limit air pollution by U.S. businesses. Eighty-eight percent of strong Democrats and 84 percent of strong Republicans said so in September–October (a four percent gap), whereas 94 percent of strong Democrats and 80 percent of strong Republicans said so in December–February (a 14 percent gap). And when asked whether the U.S. should require recipients of foreign aid to reduce pollution, 74 percent of strong Democrats and 67 percent of strong Republicans agreed in September–October, a seven percent gap. In December–February, 84 percent of strong Democrats and 70 percent of strong Republicans expressed this view, a gap of 14 percent.

9. Discussion

The fall 1997 debate did indeed focus the American public's attention on the issue of global warming. Only small changes in the distributions of most opinions occurred for the nation as a whole. But consistent with more refined theories of persuasion, underlying these modest shifts were more sizable, crosscutting changes due to the polarization of strong Democrats and Republicans. Even after this polarization, however, large majorities of Americans continued to

believe that global warming had been happening, would occur in the future if nothing were done to stop it and would be bad for people, and that the U.S. government, American businesses, and foreign governments should take significant steps to combat the problem. Thus, the efforts by the Clinton administration might have been unsuccessful and even unnecessary.

But when looked at from a different perspective, these results have a different meaning. Just as a shrewd lawyer never asks a testifying witness a question to which he or she does not already know the answer, it may have been very risky for the Clinton administration to wage a major national campaign focused on a particular policy issue if the American public were not already overwhelmingly on their side. And indeed, this was just the case for global warming. So perhaps changing public opinion was not at all a central goal of the administration.

Instead, the administration's efforts may have been intended primarily to spur growth in the global warming issue public and thereby increase the frequency with which elected representatives in Washington would come under pressure from their constituents to take action to deal with this issue. From this perspective, a 22 percent growth in the issue public represents a tremendous success. More than five million people joined the ranks of those who considered global warming to be an extremely important issue to them personally. That translates into a huge increase in the potential for telephone calls and letters to legislators, letters to the editors of news publications, and so on. And because the global warming issue public overwhelmingly shared the Clinton administration's views on this issue, its growth significantly enhanced the administration's potential for legislative success.

The fact that the U.S. Congress did not promptly ratify the Kyoto treaty after it was signed by the U.S. might seem to contradict that conclusion. But, of course, legislative action is not only the result of public opinion, and inaction in this case may have occurred despite public will to the contrary. However, although our results suggest that public concern about global warming was high and support for some ameliorative action was substantial, the Kyoto treaty's ameliorative approach in particular may not have been especially appealing to members of the issue public. Consequently, public pressure on Congress may not have demanded that particular approach, permitting legislators to take no action on the treaty.

In the course of learning all this, we uncovered evidence addressing a number of theoretical issues of interest in the literature on public opinion. First, consistent with the "minimal effects" view, we saw very little movement in the overall distributions of opinions of the American public as the result of an intense public debate, even though the media campaign clearly was noticed and reached the public. Second, consistent with more refined theories of susceptibility to change, we saw crosscutting attitude change in opposite directions, with respondents taking cues from elites they trusted. This kind of polarization may be particularly likely for a politicized issue like global warming, in which the Democratic and Republican parties take clear sides.

Third, we found no evidence consistent with the knowledge-gap hypothesis, that media coverage of an issue would lead to greater learning among highly educated respondents.⁴¹ This may have occurred because no new information was conveyed to the public at all by the media during October–December. But it may also be that the knowledge gap hypothesis is best tested with factual quiz-question measures of knowledge, rather than self-perceptions of knowledge volume.

Finally, we found no evidence of news media agenda-setting. Although there was a dramatic increase in media coverage and an increase in the accessibility of attitudes relevant to global warming, there was no change in the proportion of respondents who thought that global warming was likely to be an extremely serious national problem. This may be because most past studies of agenda-setting have focused on judgments of a problem's *current* seriousness, whereas we asked about seriousness *in the future*. But it may also be that agenda-setting is not

simply the result of media coverage volume, so future studies should investigate the conditions under which it does and does not occur.

10. Conclusion

In this study, we have focused on the public's opinions about a controversial scientific issue. We have seen that these opinions were largely in line with the consensus of scientific experts on the issue, but they were also subject to influence by politicians divided along partisan-based battle lines. Thus, this is another instance illustrating the basic principle that public understanding of science is the result of a complex of forces. We look forward to future research gauging the impact of similar debates on public understanding and hope that the tools we have proposed for more refined approaches to gauging the impact of such debates may prove useful in such efforts.

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Appendix. Measures and coding

Existence

Has been happening. "You may have heard about the idea that the world's temperature may have been going up slowly over the past 100 years. What is your personal opinion on this? Do you think this has probably been happening, or do you think it probably hasn't been happening?"

Will happen. Do you think the world's average temperature will go up in the future or that it will not go up?"

National seriousness

"I'd like to ask you about a series of specific issues that may challenge this country in the future. You may think some of these are likely to be serious problems and others are not likely to be serious problems. Here are the issues: unemployment, prices, crime, public education, the environment, health care availability, and change in the world's climate. Now I'll repeat each of these issues, and I'd like you to tell me for each one, whether you think it is likely to be no problem at all, a slightly serious problem, a pretty serious problem, a very serious problem, or an extremely serious problem. How serious of a problem do you think changes in the world's climate is likely to be? No problem at all, slightly serious, pretty serious, very serious, or extremely serious?" The order of the issues was varied across respondents.

Attitude toward global warming

“Scientists use the term ‘global warming’ to refer to the idea that the world’s average temperature may be about five degrees Fahrenheit higher in 75 years than it is now. Overall, would you say that global warming would be good, bad, or neither good nor bad? [IF GOOD:] How good do you think global warming would be? Very good or somewhat good? [IF BAD:] How bad do you think global warming would be? Very bad or somewhat bad? [IF NEITHER GOOD NOR BAD:] Do you lean toward thinking it would be good, lean toward thinking it would be bad, or don’t you lean either way?” The figure of five degrees Fahrenheit used in this question was an approximation based on multiple estimates of future climate change in the 1995 IPCC report. These estimates ranged from less than two degrees Fahrenheit to more than six degrees Fahrenheit.

Attitude features related to strength

Thought. “Now I’d like to ask you about how you would describe the amount of thinking you have done about global warming before today. Have you done a lot of thinking, a moderate amount, hardly any thinking, or no thinking at all?”

Knowledge. “People tell us they know a lot about some issues, but very little about others. How much do you feel you know about global warming? A lot, a moderate amount, a little or nothing?”

Importance. “How important is the issue of global warming to you personally? Extremely important, very important, somewhat important, not too important, or not at all important?”

Certainty. “Overall, how sure are you of your opinions about global warming? Extremely sure, very sure, somewhat sure, slightly sure, or not sure at all?”

Ameliorative effort and policies

Ameliorative effort. “Now, I’d like to ask you who you feel is responsible for doing something to deal with global warming. There are a number of possible groups of people who could do something, including the U.S. government, governments in other countries around the world, businesses, and average people. I’m going to ask you questions about how much each of these groups should do about global warming. First, how much do you think the U.S. government should do about global warming? A great deal, quite a bit, some, a little, or nothing?” Similar questions were asked about the governments of other countries, businesses, and average people.

“How much do you think the U.S. government is doing now to deal with global warming? A great deal, quite a bit, some, a little, or nothing?” Similar questions were again asked about the governments of other countries, businesses, and average people.

Effectiveness of reducing air pollution. “Do you think that reducing air pollution will reduce future global warming, or do you think reducing air pollution will not reduce future global warming?”

Support for policies to reduce air pollution. “Some people believe that the United States government should limit the amount of air pollution that U.S. businesses can produce. Other people believe that the government should not limit air pollution from U.S. businesses. What about you? Do you think the government should or should not limit air pollution from U.S. businesses?”

“Some people think that in order for the U.S. to give money to help another country, that country should be required to reduce the air pollution it produces. Other people feel that the U.S. should not require air pollution reductions from countries it gives money to. Do you think the U.S. should or should not require countries it gives money to reduce air pollution?”

“Electric companies, gas companies, and oil companies cause air pollution when they produce electricity and fuel for people to use. If these companies change the methods they use so that they produce less air pollution, it will cost them more money, and this will cause the price of electricity, gas, and oil to go up. The more prices go up, the more air pollution could be prevented. Would you be willing to pay any more money each month for electricity, gas, and oil in order to reduce the amount of air pollution that these companies produce?”

Activism

“Since June 1st, about four months ago, have you written a letter to a public official expressing your views about global warming or air pollution issues?”

“Since June 1st, have you given money to an organization that is concerned with global warming or air pollution?”

“Since June 1st, have you attended a group meeting to discuss global warming or air pollution?”

Consequences of global warming “Now I’d like to ask you to assume that the world’s average temperature will definitely be about five degrees Fahrenheit higher in 75 years than it is now. I’d like to ask you about some specific possible changes that this may or may not bring about in the world. Even though you might not have technical knowledge about the world’s climate, we’re interested in your opinions.

“This first set of questions is about possible changes in land and water. First, what about the level of the oceans in the world? In the next 100 years, do you think global warming would cause the level of the oceans in the world to go up, to go down, or would global warming have no effect on the sea level?” Similar questions were asked about each possible effect of global warming.

Education

“What is the highest level of education you have completed?”

Age

“In what year were you born?”

Gender

Interviewers recorded respondent gender, which was coded 0 for females and 1 for males.

Party identification

“Generally speaking, do you usually think of yourself as a Republican, a Democrat, an independent, or what? [IF REPUBLICAN:] Would you call yourself a strong Republican or a not very strong Republican? [IF DEMOCRAT:] Would you call yourself a strong Democrat or a not very strong Democrat? [IF INDEPENDENT OR OTHER:] Do you think of yourself as closer to the Republican party or to the Democratic party?”

Race

“What is your race?”

Income

"Which of the following best describes your family's total family income before taxes? Just stop me when we get to the correct category: less than 10,000, 10,001 to 20,000, 20,001 to 30,000, 30,001 to 40,000, 40,001 to 50,000, 50,001 to 60,000, 60,001 to 70,000, 70,001 to 80,000, 80,001 to 90,000, 90,001 and up."

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