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Riley E. Dunlap, Aaron M. McCright & Jerrod H. Yarosh

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The Political Divide on Climate Change:

PARTISAN POLARIZATION WIDENS IN THE U.S.

by Riley E. Dunlap, Aaron M. McCright, and Jerrod H. Yarosh

The November 2008 election of Barack Obama as 44th President of the United States created great optimism among supporters of many progressive causes, including environmental protection and action on climate change. Obama's victory marked the end of the George W. Bush Administration, widely viewed as the most anti-environmental administration in our nation's history,¹ based in part on its record of denying the significance of human-caused climate change and blocking federal action to deal with it.² It also coincided with growing societal attention to climate change.

Al Gore's movie *An Inconvenient Truth*, released in 2006 and published in book form the following year, received considerable attention, and its message was buttressed by the Intergovernmental Panel on Climate Change's (IPCC) 2007 *Fourth Assessment Report* proclaiming that the evidence for global warming was "unequivocal" and that it is "very likely" due to human activities. The impact of both was heightened in 2007 when *An*



Inconvenient Truth won the Academy Award for Best Documentary Film, and Gore and the IPCC shared the Nobel Peace Prize. By the following year public concern about global warming rose to levels not seen since the late 1990s—prior to 9/11 and the Bush Administration’s “war on terror.”³

Political scientists Deborah Lynn Guber and Christopher J. Bosso capture the situation when stating, “The year 2007—with its unlikely fusion of science, politics and old-fashioned Hollywood glamour—had seemed to mark a long-awaited tipping point for climate change,” a window of opportunity reinforced by growing corporate acceptance of the necessity of limiting greenhouse gas emissions and a multitude of climate actions plans passed at the regional, state, and local levels.⁴ They continue, “Thus it was, for a fleeting moment that American environmentalism stood at a crossroads, burning with the momentum needed to enact change in U.S. energy and climate policies. And, yet,

two short years later, the pendulum had swung back with stunning speed and brutal force.”⁵ Similarly, after also noting the optimism prompted by Obama’s election, another political scientist, the late Judith Layzer, noted, “Almost immediately after Obama’s election ... the prospects for climate change legislation began to deteriorate.”⁶

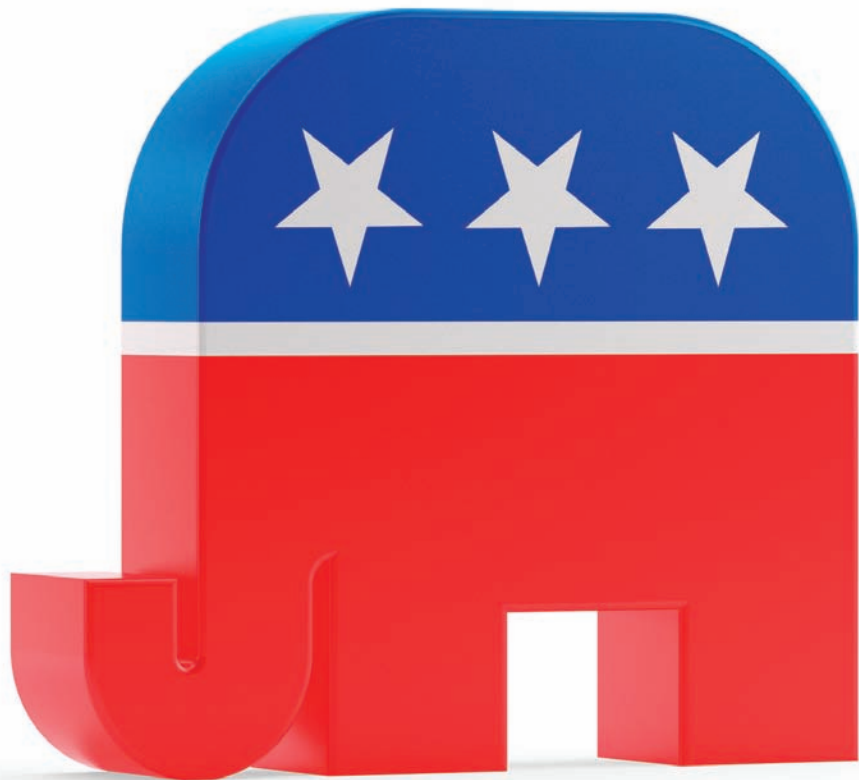
Many autopsies of the death of federal legislation aimed at limiting greenhouse gas emissions have been written, highlighting the Obama Administration’s initial failure to prioritize it, national environmental organizations’ reliance on partnering with corporate leaders rather than building grass-roots support, an upsurge in organized climate change denial, and of course the declining salience of climate change and most other issues in the face of our nation’s severe economic recession.⁷ But another critical factor was the growing degree of partisan polarization in the United States, a phenomenon that escalated significantly in response to Obama’s election.⁸

Indeed, we now know that during the evening of Obama’s inauguration, Republican leaders were strategizing over dinner about how best to undermine his administration, in retrospect making his early overtures for bipartisanship both futile and naive.⁹

The Escalation of Partisan Polarization in the United States

Partisan polarization had been building in recent decades, leading Christopher Hare and Keith T. Poole to argue, “Even the most casual observer of American politics cannot help but notice that partisan conflict has grown sharper, unrelenting, and more ideological over recent decades.”¹⁰ This has resulted from both political elites and—to a lesser but noticeable degree—much of the public viewing a growing number of issues along a single liberal-conservative continuum, and from this ideological axis becoming increasingly aligned with partisan identification.¹¹ While political scholars are debating the degree to which this is a top-down process, in which elites provide cues that party followers adopt, or a bottom-up process, in which party activists and primary voters push candidates and elected officials to adopt more extreme views, the result has clearly been increased “party sorting” in which voters are falling into ever-more-distinct partisan camps.¹²

Lilliana Mason recently suggested that partisan polarization has been strengthened by the growing tendency of individual Americans to treat party identification as a “social identity,” whereby being Republican or Democrat is increasingly important in how they see themselves.¹³ As partisan and ideological identities become aligned (producing conservative Republicans and liberal Democrats), the effect of political identity becomes stronger. “Partisans ... do not need to hold wildly extreme issue positions in order to be biased against and angry with their opponents,” notes Mason, “They simply need to hold aligned partisan identities.”¹⁴ This line



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of argument is complemented by the notion of “negative partisanship” put forth by Alan I. Abramowitz and Steven Webster, who argue that “supporters of each party have come to perceive supporters of the opposing party as very different from themselves in terms of their social characteristics, political beliefs and values and to view opposing partisans with growing suspicion and hostility.”¹⁵ The result is that “the greatest concern of party supporters is preventing the opposing party from gaining power.”¹⁶

The political scientists just described and other analysts indicate that the Republican (GOP) shift to the right has exceeded the Democratic shift leftward, and thus contributed disproportionately to this polarization.¹⁷ This tendency became especially apparent as the Tea Party-led anti-Obama backlash, funded by conservative elites such as Charles and David Koch, helped push Republicans further rightward.¹⁸ Indeed, Theda Skocpol and Alexander Hertel-Fernandez document how a network of conservative mega-donors (led by the Koch brothers) has created a shadow GOP, reducing the influence of the Republican National Committee by funding a wide array of organizations (including Americans for Prosperity, a major force behind the Tea Party) that both support Republican candidates and push them to endorse extremely conservative views.¹⁹

Regardless of the specific mechanisms responsible, it is clear that the Republican Party has moved significantly to the right, and its recent electoral victories in Congress and state legislatures have enabled successful opposition to the fleeting Democratic command of

The growing partisan polarization has been especially evident on environmental protection, an issue that historically enjoyed a fair degree of bipartisan support.

Congress in 2009 and most Obama Administration policies since then. In the process the GOP has quashed the optimism that backers of progressive causes held at the end of 2008, including the hope for federal action to reduce greenhouse gas emissions.

Escalating Polarization on Environmental Protection and Climate Change

The growing partisan polarization has been especially evident on environmental protection, an issue that historically enjoyed a fair degree of bipartisan support.²⁰ As the Republican Party has moved rightward, especially in terms of opposing governmental regulations in principle, environmental protection measures and the U.S. Environmental Protection Agency in particular have come under increasing attack by Republicans.²¹ The result has been a dramatic increase in partisan polarization among both political elites, such as members of Congress, and the general public.²² The former is evident in Figure 1, which shows the environmental voting scores compiled by the League of Conservation Voters (where 100 represents a perfect record of pro-environmental votes on legislation) for members of the two parties in both the U.S. Senate and the U.S. House of Representatives from 1970 through last year.²³ What was once a modest tendency for Congressional Republicans to be less pro-environmental than their Democratic counterparts has become a chasm—with Republicans taking near-unanimous anti-environmental stances on relevant legislation in recent years, especially 2015.

Not surprisingly, given its backing from the Koch Brothers and others promoting an intense anti-regulatory ideology, the Tea Party readily incorporated anti-environmentalism and climate change denial into its agenda.²⁴ In fact, studies show that those who identify with the Tea Party hold substantially more skeptical views of climate change than do typical Republicans in the general public.²⁵ Perhaps more important

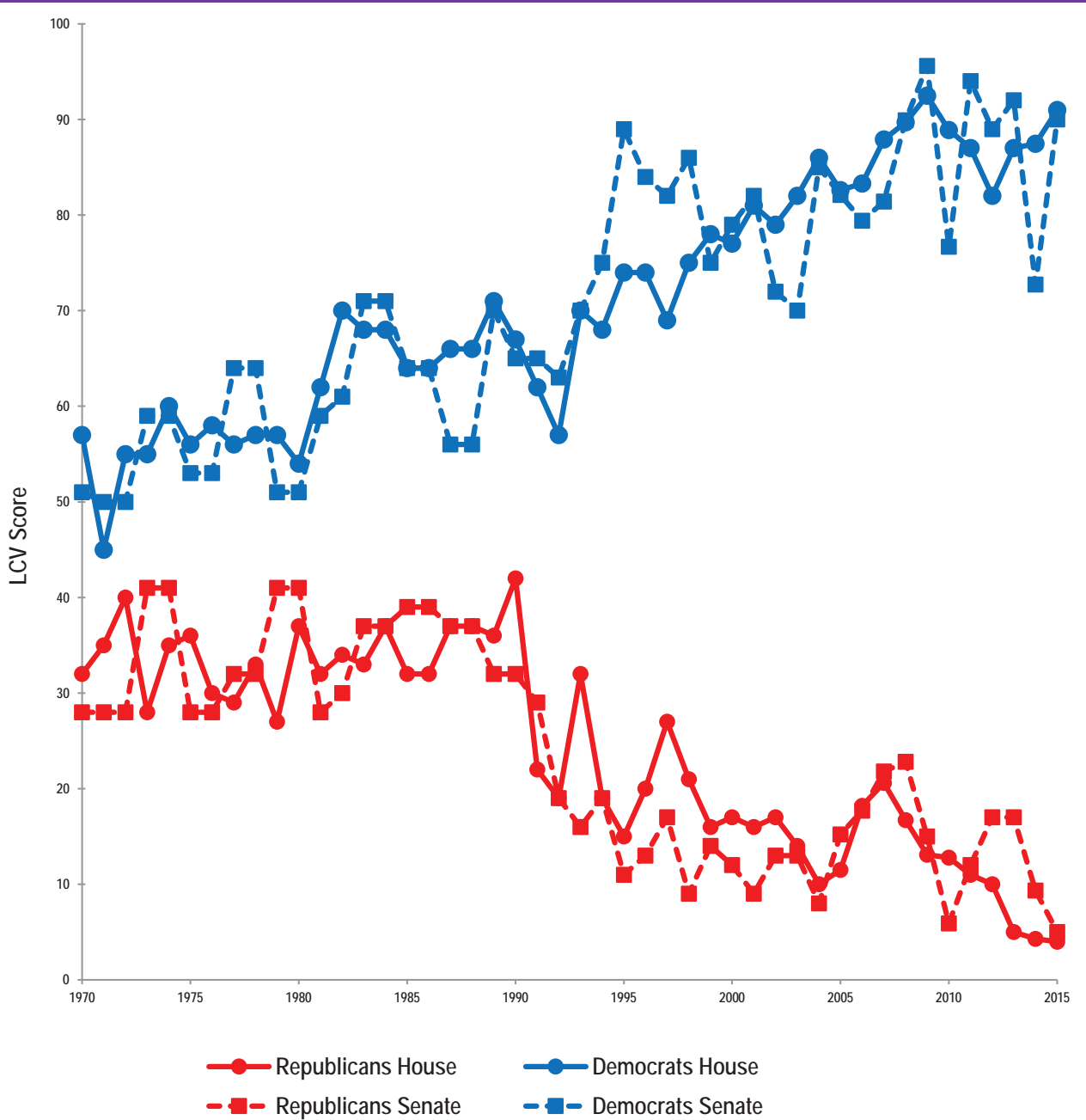
are the astroturf campaigns (named for their pseudo-grass-roots nature) against climate legislation mounted by Tea Party groups. As Jane Mayer puts it, “As protesters erupted in generalized rage in the spring and summer of 2009, Americans for Prosperity, FreedomWorks, and the other secretly funded Tea Party groups succeeded to a remarkable extent in channeling the populist anger into the climate fight.”²⁶

The Tea Party thereby joined an already active “denial countermovement”—consisting of fossil fuel corporations and business allies like the U.S. Chamber of Commerce, conservative think tanks and their funders, conservative media, and a large supporting cast of front groups, bloggers, and contrarian scientists—energized by Obama’s election and fearful that his leadership combined with the (temporary) Democratic majority in both houses of Congress would result in national legislation and U.S. agreement to international treaties to reduce greenhouse gas emissions.²⁷ Their successful efforts not only helped to block national legislation and to limit Obama’s ability to commit the U.S. to international agreements, but they led to skepticism and even denial of human-caused climate change becoming normative among Republican elites and activists. This has produced a Republican Congress that provides a sturdy legislative wall against Obama Administration climate change initiatives, and in general does its best to undermine growing evidence of the seriousness of climate change.²⁸

Contemporary Polarization on Climate Change in the American Public: The Current Study

To what degree has this intense partisan polarization on climate change been mirrored within the general public? In a 2008 article in this journal we demonstrated a growing level of partisan polarization among the general public from 1997 through that year,²⁹ and

Figure 1. League of Conservation Voters' environmental voting scores U.S. Congress – by chamber and party



Source: League of Conservation Voters

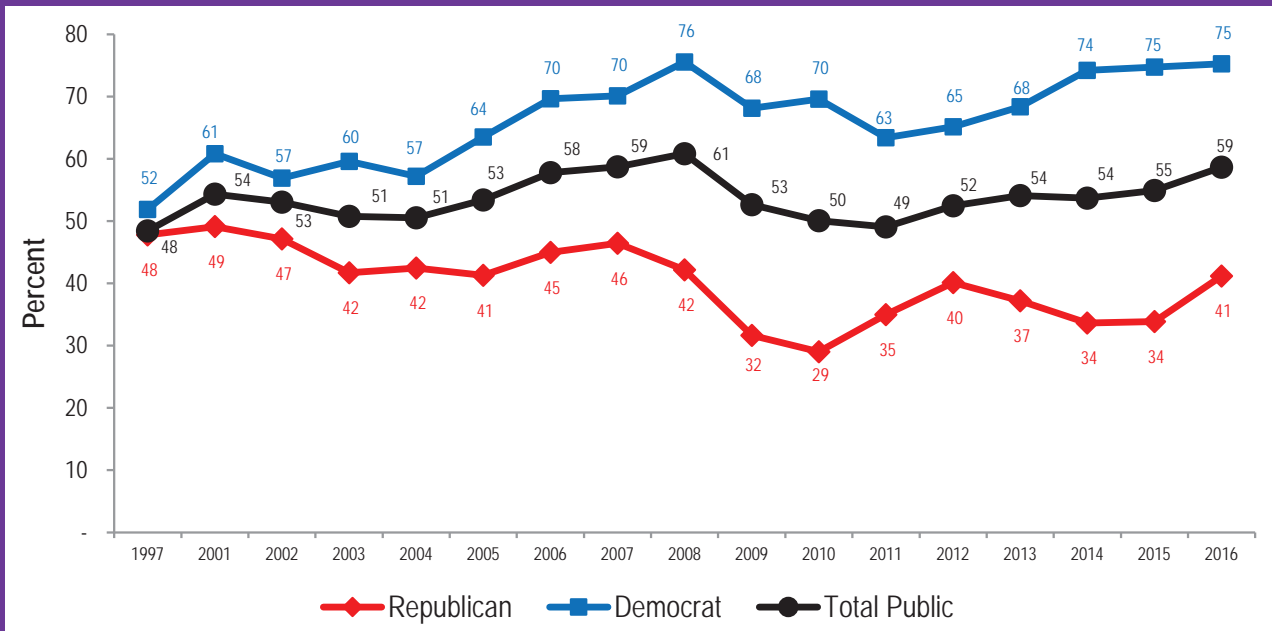
subsequent studies suggest the possibility of further growth in polarization.³⁰ As we near the end of the Obama era, it is time for an update that provides an in-depth examination of what has happened over the last eight years, a time of heightened political polarization in

general and a period in which public concern for climate change has fluctuated considerably due to the economic downturn,³¹ an upsurge in organized denial in response to proposed national legislation and international treaties,³² and varying levels of media attention

generated by political elites, Pope Francis's encyclical on climate change, and abnormal weather conditions.³³

The Gallup Organization has been using several items on "global warming" on an increasingly regular basis since 2001 in their annual environment poll,

Figure 2. Respondents saying that the effects of global warming have already begun, by party



Source: The Gallup Organization

... many Americans do not yet accept the reality of global warming ...

although they included some in 1997 in response to the attention generated by the Kyoto Protocol.³⁴ The environment poll is conducted each March on nationally representative samples of 1,000 to 1,060 adults, and the regular inclusion of global warming items yields the most extensive body of trend data on Americans' views of climate change available.³⁵ By examining partisan differences in views of global warming since 1997, we can not only compare patterns during the Obama Administration with earlier eras, but provide an unprecedented analysis of partisan polarization on climate change within the American public over the past two decades. We compare the responses of self-identified Republicans and Democrats with those of the total public, the latter to demonstrate

the long-term fluctuations in climate change views within the American public at large.³⁶

Trends in Partisan Polarization

Gallup employs a half dozen items dealing with basic findings from climate science, perceptions of media coverage and of scientists' views of climate change, and personal concern about climate change. We begin with two dealing with fundamental aspects of global warming well established by climate science, but still frequently challenged by the organized denial campaign.³⁷

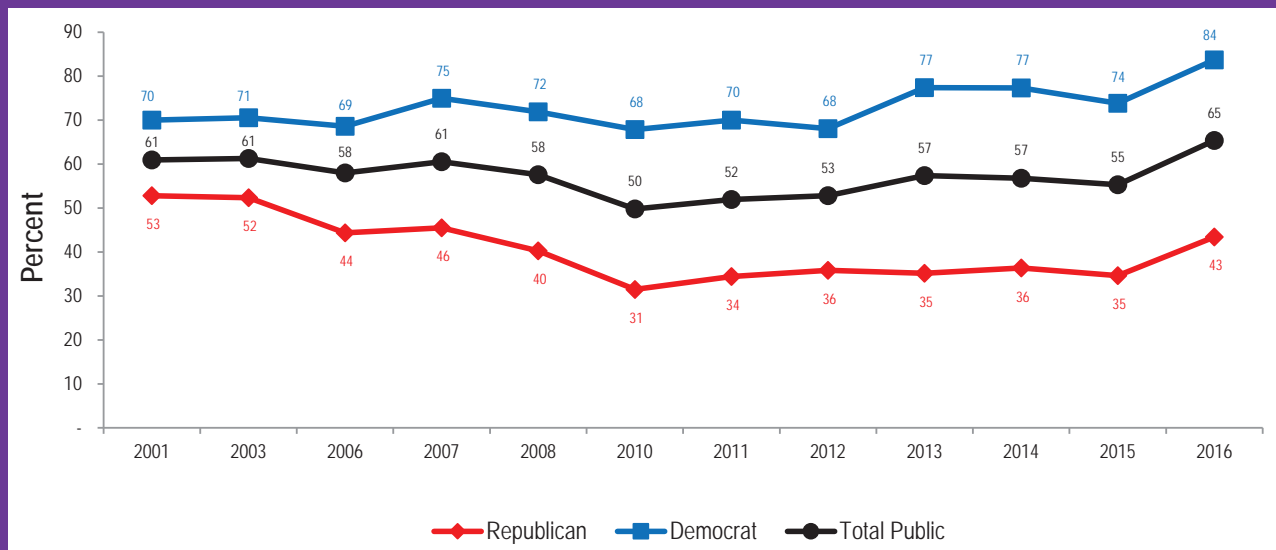
Is Global Warming Occurring?

The scientific evidence for warming of the earth's atmosphere and oceans continues to grow, leading the IPCC's *Fifth Assessment Report* to again say that global warming is "unequivocal." Nonetheless, many Americans do not yet accept the reality of global warming—apparent from the results in Figure 2.

Asked when the effects of global warming will begin, 61 percent of respondents said "they have already begun" in 2008, a figure that declined to 49 percent in 2011, and rose to 59 percent this year—back to the high levels of 2006 to 2008 prior to Obama's election.³⁸

The partisan divide in this response has been striking since 2008, when it reached a 34 percentage point difference, with 76 percent of Democrats but only 42 percent of Republicans saying global warming has already begun. The views of both Republicans and Democrats tended toward greater skepticism in 2009 and 2010, and have continued to fluctuate noticeably. While the resulting partisan gap has also fluctuated over the last eight years, reaching 41 percentage points in both 2010 and 2015, this past year it was back to 34 percentage points due to a noticeable rise in Republicans saying global warming has already begun. Clearly there is no overall trend toward reduced polarization, and the now eight-year gulf between Republicans and Democrats makes the 1997–2002 era of limited partisan differences seem like a

Figure 3. Respondents saying that the changes in the Earth's temperature over the last century are due to human activities, by party



Source: The Gallup Organization

distant memory. While approximately three-fourths of Democrats currently agree with the scientific consensus that global warming is already occurring, in recent years often barely one-third of Republicans express agreement.

Human-Caused or Natural Change?

From the early emergence of global warming as a scientific and then public issue there have been claims that while the earth may be getting warmer, it is due to natural variability rather than human activities. Although the IPCC's *Fifth Assessment Report* concludes that it is "extremely likely" that human activities are the dominant cause of observed warming since 1950, natural variability continues to be promoted by those opposed to reducing greenhouse gas emissions.³⁹ The second Gallup item, first used in 2001, deals with the issue of human causation versus natural change.⁴⁰ As shown in Figure 3, while 61 percent of the public saw global warming as being mainly due to human activities that year, by 2010 only 50 percent did so. The percentage of Americans attributing warming mainly to human activities has

slowly risen since then, until a notable 9 percent rise this year brought the figure up to a record 65 percent.

Democrats have always been more likely than Republicans to attribute global warming to human activities, starting with a relatively modest 17 percentage point difference in 2001 that grew to 32 by 2008. The partisan gap has fluctuated a fair amount since then, reaching 37 percentage points in 2010 and then 42 in 2013. A noticeable rise in Republicans endorsing human activities this year is matched by a similar increase among Democrats, with the result that the gap remains very sizable. A very large majority of Democrats (84 percent), but well under half of Republicans (43 percent), currently see global warming as largely due to human activities.

Republicans' reluctance to see global warming as having already begun (found with the first question) and to see it as primarily due to human activities indicates that a majority of the GOP is not convinced by the evidence amassed by the scientific community and summarized by the IPCC. The next

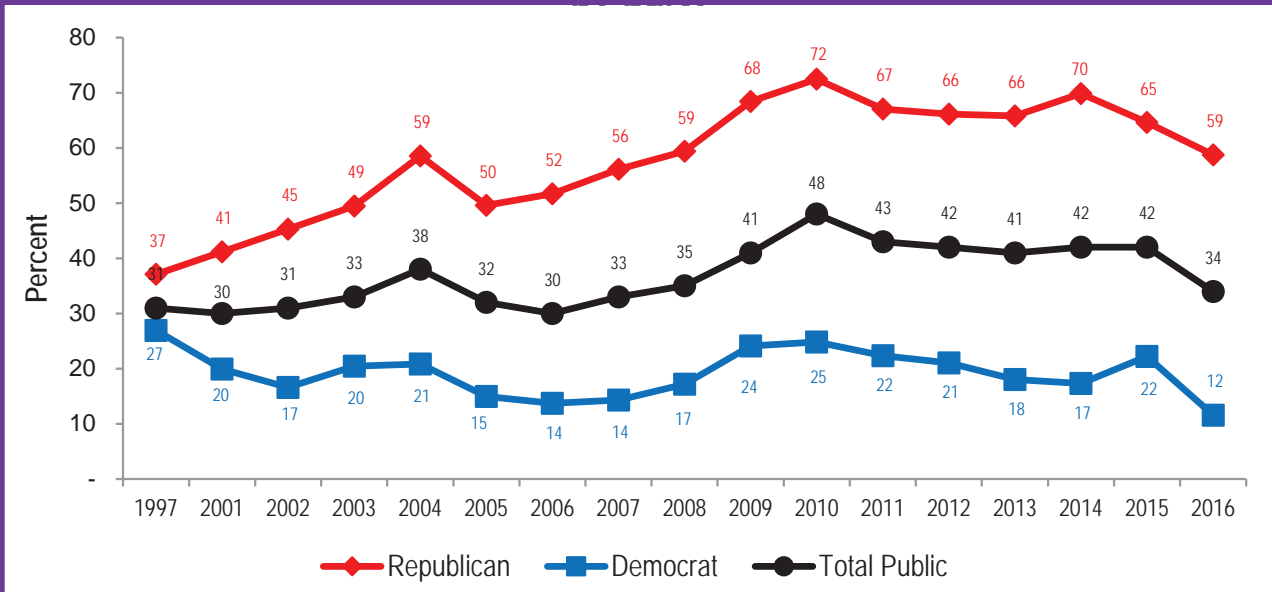
two items give some insight into why this is the case.

Is Media Coverage Exaggerated?

Most Americans obtain information on global warming from various media outlets, with online and social media making gains over newspapers and television in recent years. Even though numerous studies document that the U.S. mainstream media tend to give climate change limited attention, and often include skeptical voices in an attempt to provide "balance,"⁴¹ it is frequently alleged that the media exaggerate the threat of global warming. The third Gallup item focuses on perceptions of this issue.⁴² As shown in Figure 4, 31 percent of the public in 1997 said that the seriousness of global warming is generally exaggerated in the news. After fluctuating somewhat, this response rose to 48 percent in 2010, and then tended to level off until it dropped to 34 percent this year.

A modest partisan gap of 10 percentage points in 1997 grew to 38 in 2004, and then varied from a low of 35 in 2005 to a high of 53 in 2014—when

Figure 4. Respondents saying that the seriousness of global warming is generally exaggerated in the news, by party



Source: The Gallup Organization

70 percent of Republicans but only 17 percent of Democrats said global warming was being exaggerated. There was a noticeable rise in this response among both sets of party identifiers in 2009, when the denial campaign was in full swing during Obama’s first year. For the past several years about two-thirds of Republicans compared to less than one-fifth of Democrats have said global warming is generally exaggerated in the news. While this past year has seen a decline in this response within both camps, the partisan gap remains huge, with 59 percent of Republicans and only 12 percent of Democrats saying the media exaggerates global warming—five percentage points higher than in 2008.

Do Scientists Agree on Global Warming?

Although the scientific consensus on the basics of global warming, as reflected in IPCC reports, grows ever stronger, a major thrust of the denial campaign has been to promote the notion that there is considerable disagreement within the scientific community.

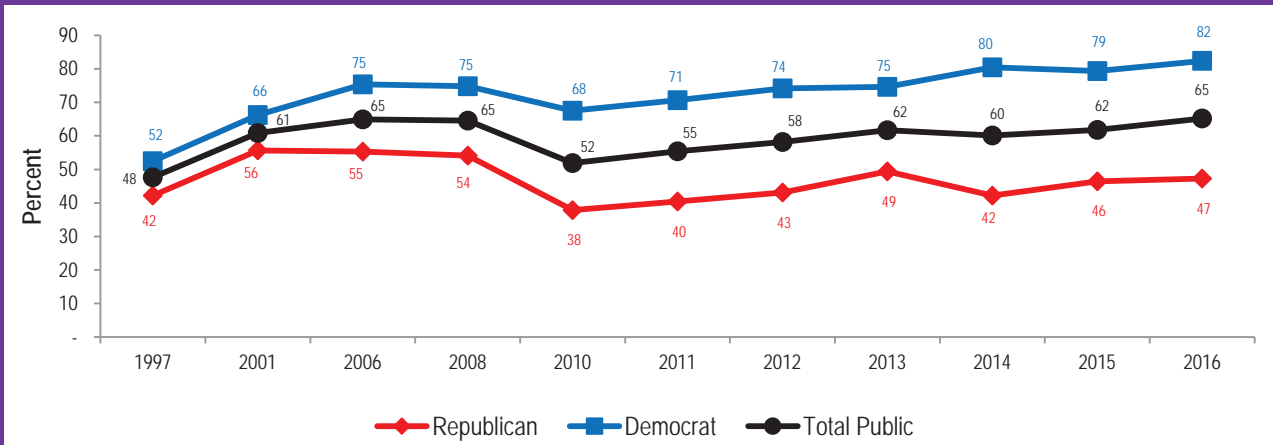
They do so by using a small number of “contrarian” scientists to attack climate science, a tactic aided by mainstream media’s commitment to the “balancing norm” emphasizing the need to present both sides of an issue.⁴³ This tactic has had some success, creating the appearance of a scientific controversy in the eyes of some policymakers and at least a significant sector of the public.⁴⁴ Gallup began asking Americans whether most scientists believe global warming is occurring in 1997, when 48 percent said they do⁴⁵ (Figure 5). The figure rose to 65 percent in 2006 and 2008, but declined to 52 percent in 2010—once again reflecting an overall growth in skeptical views of climate change early in the Obama Administration. The belief that most scientists think global warming is occurring has slowly increased since then, and this year once again reached 65 percent. Nonetheless, it is striking that only about two-thirds of Americans perceive that “most” scientists believe global warming is occurring when the actual figure—especially among those in fields relevant to climate change—is much larger.⁴⁶

Once again, a modest partisan gap of 10 percentage points in 1997 grew to 21 in 2008, then to 30 in 2010, mainly due to a large decline in Republicans saying that most scientists agree global warming is occurring—down to 38 percent compared to 68 percent of Democrats giving this response that year. While there has been a gradual increase in perception of a scientific consensus among both sets of partisan identifiers since 2010, the gap has grown somewhat overall. This year 82 percent of Democrats, but only 47 percent of Republicans, say most scientists are in agreement—another indication that polarization has not declined over the last eight years. In fact, over the past two decades Democratic belief in a scientific consensus has risen 30 percentage points (52 to 82 percent) while among Republicans it has only risen five percentage points (42 to 47 percent).

Is Global Warming a Threat?

A key problem for those promoting action to reduce greenhouse gas

Figure 5. Respondents saying that most scientists believe global warming is occurring, by party



Source: The Gallup Organization

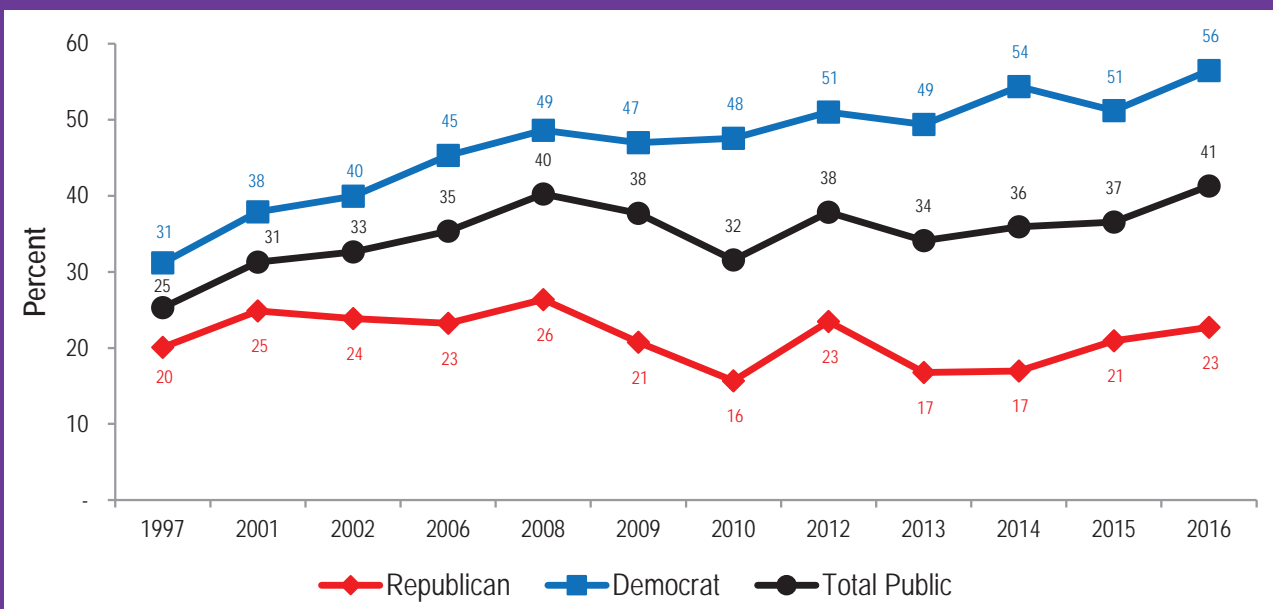
emissions is that global warming seems to be a distant problem, not a personal threat, for many Americans. The next Gallup item focuses on this issue by asking respondents whether they think global warming will pose a serious threat to them or their way of life in their

lifetime (Figure 6).⁴⁷ The percentage of Americans responding affirmatively grew from 25 to 40 from 1997 to 2008, and then declined for the next two years and has only come up to 41 percent this year. Despite the accumulation of a wealth of evidence on the threats posed

by global warming over the past two decades, still well under half of Americans believe it poses a serious threat to them personally.

The percentage of Democrats saying that global warming will pose a serious threat rose steadily from 1997 through

Figure 6. Respondents saying that global warming will pose a serious threat to them or their way of life in their lifetimes, by party



Source: The Gallup Organization



February 17, 2013: 35,000 people journey to the nation's capital to participate in the largest rally on global warming in U.S. history.

2008, reaching 49 that year, dipped a tad for the next two years, and since then has slowly if irregularly risen, reaching 56 percent this year. The percentage of Republicans seeing global warming as a threat peaked at 26 in 2008, then

declined to 16 by 2010, and now stands at 23—essentially staying flat over the past two decades. The result is that the partisan gap that grew from 11 to 23 percentage points from 1997 to 2008 now stands at 33 percentage points,

with more than half of Democrats but less than a quarter of Republicans seeing global warming as a threat to their way of life. Once again, we see evidence of continuing polarization on a crucial view of climate change.



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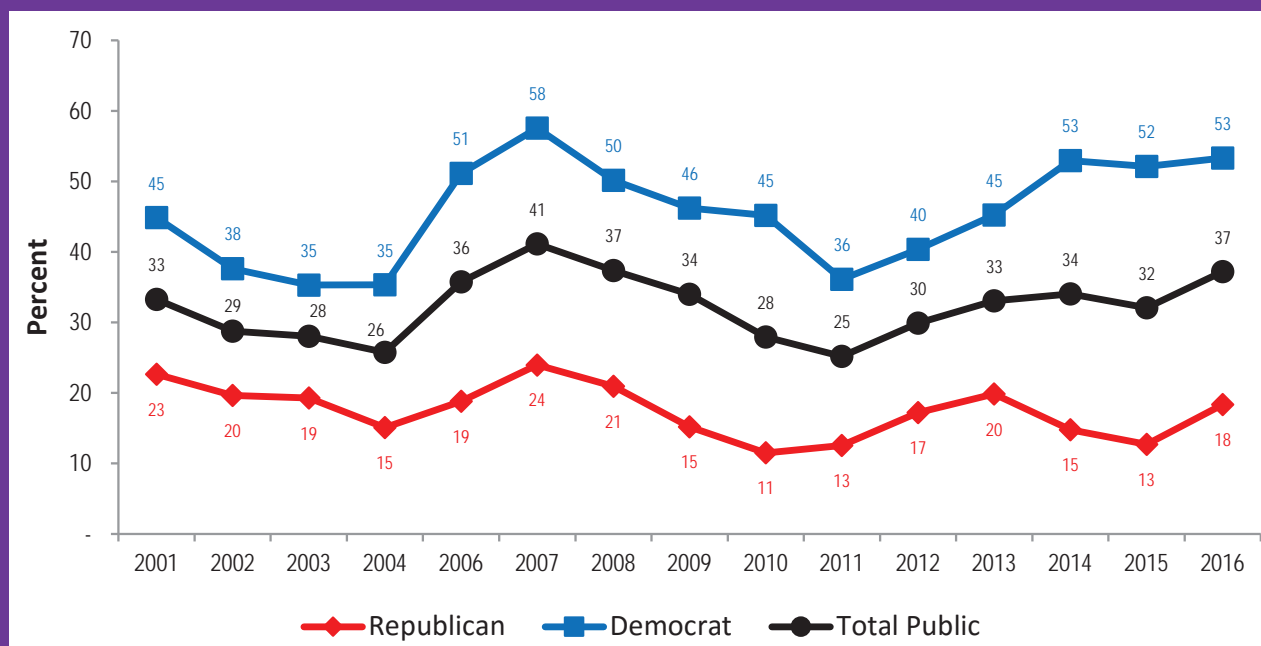
Personally Worry About Global Warming?

The last Gallup item on global warming, first used in 2001 and always appearing earlier in the interview than

the ones already discussed, comes from a question asking respondents to indicate how much they personally worry (from “not at all” to “a great deal”) about a list of environmental problems. Global warming typically comes in at or

near the bottom of the list, well below items dealing with air and water pollution. Here we focus on respondents who indicate they worry a great deal about global warming.⁴⁸ Americans’ level of personal worry about global warming

Figure 7. Respondents saying that they personally worry a great deal about global warming, by party



Source: The Gallup Organization

has fluctuated considerably over the years: one-third worrying a great deal in 2001, followed by a decline, a rise to 41 percent in 2007 (coinciding with the attention given *An Inconvenient Truth*), and then a fall to 25 percent in 2011 (likely reflecting the predominance of economic worries), before reaching 37 percent this year (Figure 7). The modest proportion of the public worrying a great deal is consistent with that seeing global warming as a threat.

The partisan gap in personal worry was sizable in 2001 (22 percentage points), and then grew substantially in 2006 and 2007, as the percentage of Democrats expressing a great deal of worry rose rapidly. Despite a decline in worry among both Republicans and Democrats since that year, a large partisan gap has persisted—with some lessening from 2011 to 2013—and now stands at 35 percentage points, compared to 29 in 2008. Once again, there is no evidence of decreased polarization as we reach the end of the Obama era.

Overall Trends in Polarization

To help clarify the overall pattern of long-term trends in partisan polarization, as well as the trend over the eight years of the Obama era, Table 1 shows the percentage difference in Democratic and Republican responses to the six items for 2001 (the first year all six were used, and the beginning of the George W. Bush Administration), 2008 (eight months before Obama's election), and this year (Obama's last in office), as well as the bivariate correlation coefficients between partisan identification and the full range of responses to each global warming item.⁴⁹

Partisan polarization is apparent for all items from 2001 to 2008, as in every case the partisan gap in responses indicating belief in and concern about global warming increased substantially, as did the correlations between party identification and these responses. From 2008 to this year the partisan gap, despite being substantial at the outset, continued to increase for every item except one.

There was sufficient Republican increase in belief that global warming is already occurring in 2016 that the gap (after having widened for a number of years) was back to 34 percentage points. For the other five items we see an increase in the partisan gap of anywhere from five percentage points (seeing global warming as exaggerated in the news) to 14 percentage points (saying most scientists agree global warming is occurring) during the Obama era. Similarly, we see increases in the correlation coefficients for all items other than the first one during the Obama presidency, with the largest increase of 0.12 for believing that most scientists agree that global warming is occurring.⁵⁰

In short, the results indicate that the substantial partisan polarization that had rapidly built up in the first eight years of the new millennium has not abated, but has actually grown, since 2008. The increased level of political polarization in the Obama era is apparent in the area of climate change, with already large partisan gaps in views of

Table 1. Partisan Gap in Global Warming Views Over Time

	Percent Differences			Correlations*		
	2001	2008	2016	2001	2008	2016
Effects of global warming have already begun	12	34	34	0.17	0.39	0.40
Global warming due more to human activities	17	32	41	0.20	0.34	0.45
Global warming exaggerated in the news	21	42	47	0.26	0.43	0.49
Most scientists believe global warming is occurring	10	21	35	0.11	0.28	0.40
Global warming poses serious threat in lifetime	13	23	33	0.15	0.26	0.36
Personally worry a great deal about global warming	22	29	35	0.30	0.44	0.49

*All correlations significant at $p < .001$.

global warming growing still larger over the past eight years. While the gulf between self-identified Republicans and Democrats in the general public may not match the chasm between elites in the two parties (elected officials, candidates, and activists), it is clearly substantial and shows no signs of diminishing.

Ideological Alignment and Partisan Polarization

As noted earlier, political analysts attribute growing partisan polarization among both political elites and the general public to the increasing alignment between party identification and political ideology, with Republicans becoming increasingly conservative and Democrats increasingly liberal.⁵¹ In fact, many studies find that political ideology (typically measured with a single item) is a strong predictor of climate change views of the American public, rivaling

party identification.⁵² In both cases, the shared commitment to an anti-regulatory view of government, or what has been called “market fundamentalism,” is assumed to be the crucial motivator of opposition to recognizing the significance of human-caused climate change and thus the necessity of developing policies to lower greenhouse gas emissions.⁵³

In fact, we and others have argued that the conservative movement, fearful of the regulatory implications of climate change, and seeking to defend the current economic system built on fossil fuel use, has been the driving force behind organized climate change denial.⁵⁴ Further, to accomplish their goal, conservative activists have managed to elevate “climate change to the status of a litmus test of cultural politics in the U.S., up there with abortion, guns, god, gays, immigration and taxes.”⁵⁵ Their success is confirmed by Gary C. Jacobson’s finding that climate change (and environmental

protection) are components of a general liberal-conservative dimension differentiating American voters into Republicans and Democrats.⁵⁶ It is therefore not surprising that an increasingly conservative Republican Party has embraced denial, at the levels of both elites and—as we have shown in this article—the general public.

We can see the effects of partisan and ideological alignment by comparing the global warming views of Republicans who identify as conservatives and Democrats who identify as liberals with the 2016 Gallup data, a comparison that is presented in Table 2.⁵⁷ In all cases we see a substantial rise in the percentage difference between these two ideologically aligned partisan groups compared to that between all Republicans and Democrats shown in Table 1.⁵⁸ Indeed, the differences are extremely large, ranging from a low of 49 percentage points for seeing global warming as posing a serious threat in one’s lifetime to a high

Table 2. Global Warming Views of Conservative Republicans and Liberal Democrats in 2016 (Percent)

	Conservative Republicans ($n = 243$)	Liberal Democrats ($n = 224$)	Percent Difference
Effects of global warming have already begun	30	89	59
Global warming due more to human activities	29	90	61
Global warming exaggerated in the news	72	7	65
Most scientists believe global warming is occurring	40	90	50
Global warming poses a serious threat in lifetime	17	66	49
Personally worry a great deal about global warming	14	67	53

of 65 for seeing global warming as exaggerated in the news. The differences on the two items tapping belief in basic climate science are notable: Nine out of ten liberal Democrats but only three out of ten conservative Republicans believe global warming has already begun and is due more to human activities than to natural variation.

The chasm in views of climate change between these two politically aligned sectors of the public is especially important, because research indicates that members of these sectors are more likely to vote and be politically active, helping create bottom-up pressure for partisan polarization that complements the effects of elite cues and other top-down pressures.⁵⁹ In an era of growing ideological differentiation between the two political parties, contributing to ever-more-effective party sorting, the result is likely to be increased pressure for Republican candidates to toe the party line on climate change, which currently involves skepticism of climate science and denial of the need to reduce greenhouse gas emissions.

Can Partisan Polarization on Climate Change Be Reduced Soon?

Can this partisan divide on climate change be reduced in the near future, especially in view of the strong underlying trends toward political polarization more generally? It has long been

In short, the results indicate that the substantial partisan polarization that had rapidly built up in the first eight years of the new millennium has not abated, but has actually grown, since 2008.

hoped that more factual information about human-caused climate change will increase public belief in its reality. However, two decades of news coverage and educational campaigns since 1997 have produced only modest increases in Americans' belief in the reality and human cause of climate change, with gains among Democrats often offset by declines among Republicans (seen in Figures 2, 3, and 5). This raises the question: What might strengthen Americans'—especially Republicans'—belief in the reality and human cause of climate change? Two possibilities that many see as promising include more persuasive messaging about climate change, and personal experience with extreme weather events or increasing temperatures.

Since the early 2000s, climate change communicators have increasingly advocated for, and often implemented, messaging strategies that attempt to frame climate change in ways expected to better resonate with the general public, and with key sectors such as conservatives.⁶⁰ Dozens of studies have examined the effectiveness of these messaging and framing techniques. While several find these efforts to have no effect on Americans' climate change views, others do find a positive influence—but typically only a modest one at best.⁶¹ Yet almost none of these studies investigates how persuasive messages and frames perform in the presence of denial messages, which more closely approximates the reality of American media. The one study that does so finds that a denial message decreases citizens' belief in climate change, while potentially positive frames (e.g., economic opportunity, national security, etc.) have no effect.⁶² Further, some studies find that persuasion attempts may produce a “boomerang effect” among Republicans—actually eroding their concern about climate change.⁶³ Does any persuasive framing strategy hold special promise for penetrating Republicans' partisan/ideological identities? The evidence so far gives little basis for optimism.

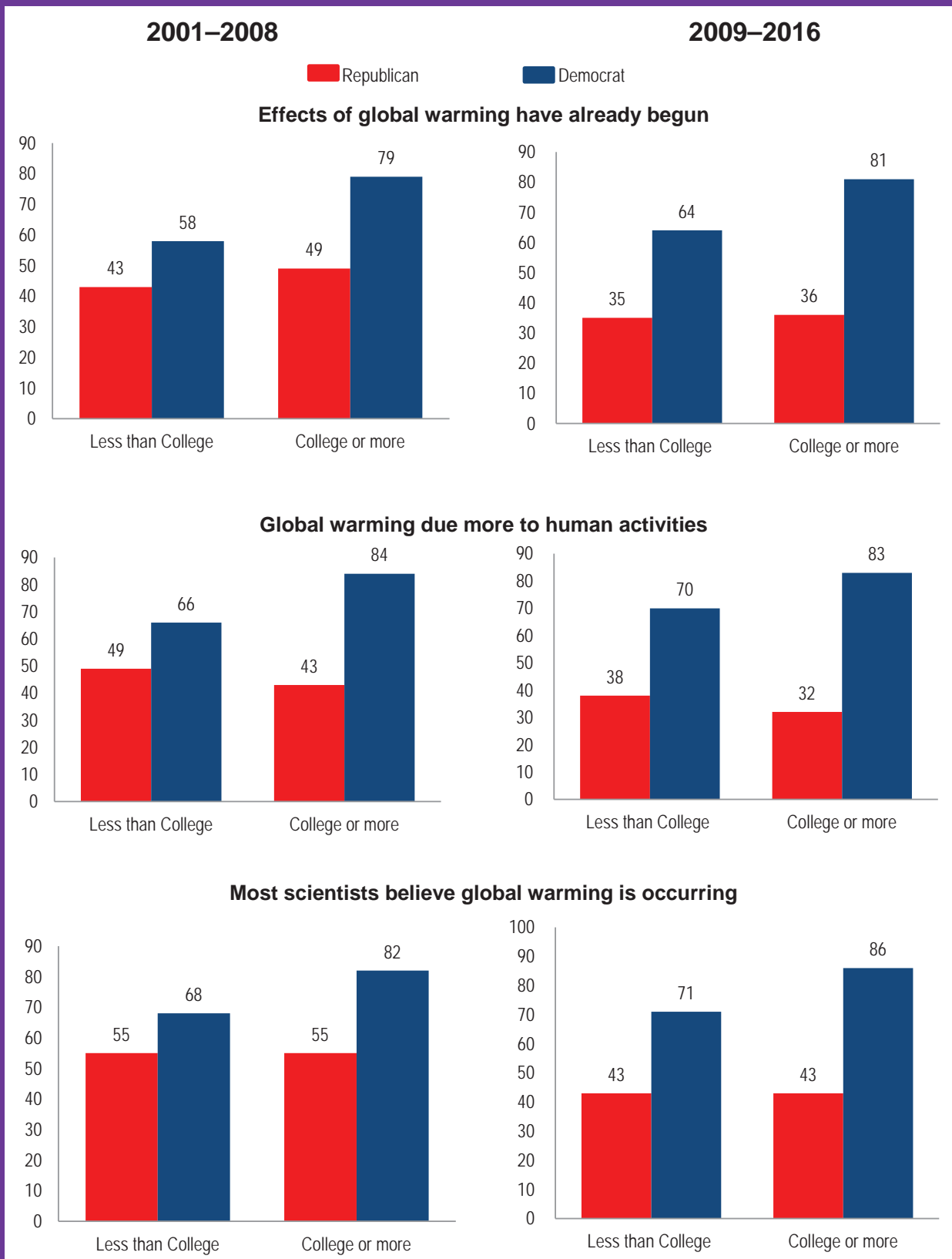
Other analysts suggest that direct personal experience with extreme

weather events or rising temperatures may increase belief in human-caused climate change, but a growing number of studies in recent years provide ambiguous results. Analyses investigating whether climate change views are influenced by exposure to climate-related physical risks (e.g., droughts, flooding, heat waves) sometimes find a small positive effect,⁶⁴ a small negative effect,⁶⁵ or no effect.⁶⁶ Analyses investigating whether climate change views are influenced by long-term changes in temperature or climate patterns also find either a small positive effect,⁶⁷ a mix of positive and negative effects,⁶⁸ or no effect.⁶⁹ Further, a few studies report that strong partisans are less swayed by local temperature increases than are their less partisan or Independent counterparts.⁷⁰ Can we therefore expect exposure to extreme weather events or climate extremes to overcome Republicans' skepticism about human-caused climate change? Again, the evidence thus far does not provide much support for optimism.

A key reason that neither persuasive messages nor experiences with climate change influence citizens' climate change views is motivated cognition, the tendency for citizens to selectively accept information that reinforces, or reject information that opposes, their political beliefs or identity.⁷¹ The result of motivated cognition is clearly visible in what scholars term the “political moderator effect,”⁷² so called because partisan identification statistically moderates the relationship between educational attainment (and self-reported understanding) and belief in climate change. Briefly, educational attainment and self-reported understanding are positively related to beliefs consistent with the scientific consensus among Democrats, but are negatively or not related to beliefs consistent with the scientific consensus among Republicans.⁷³

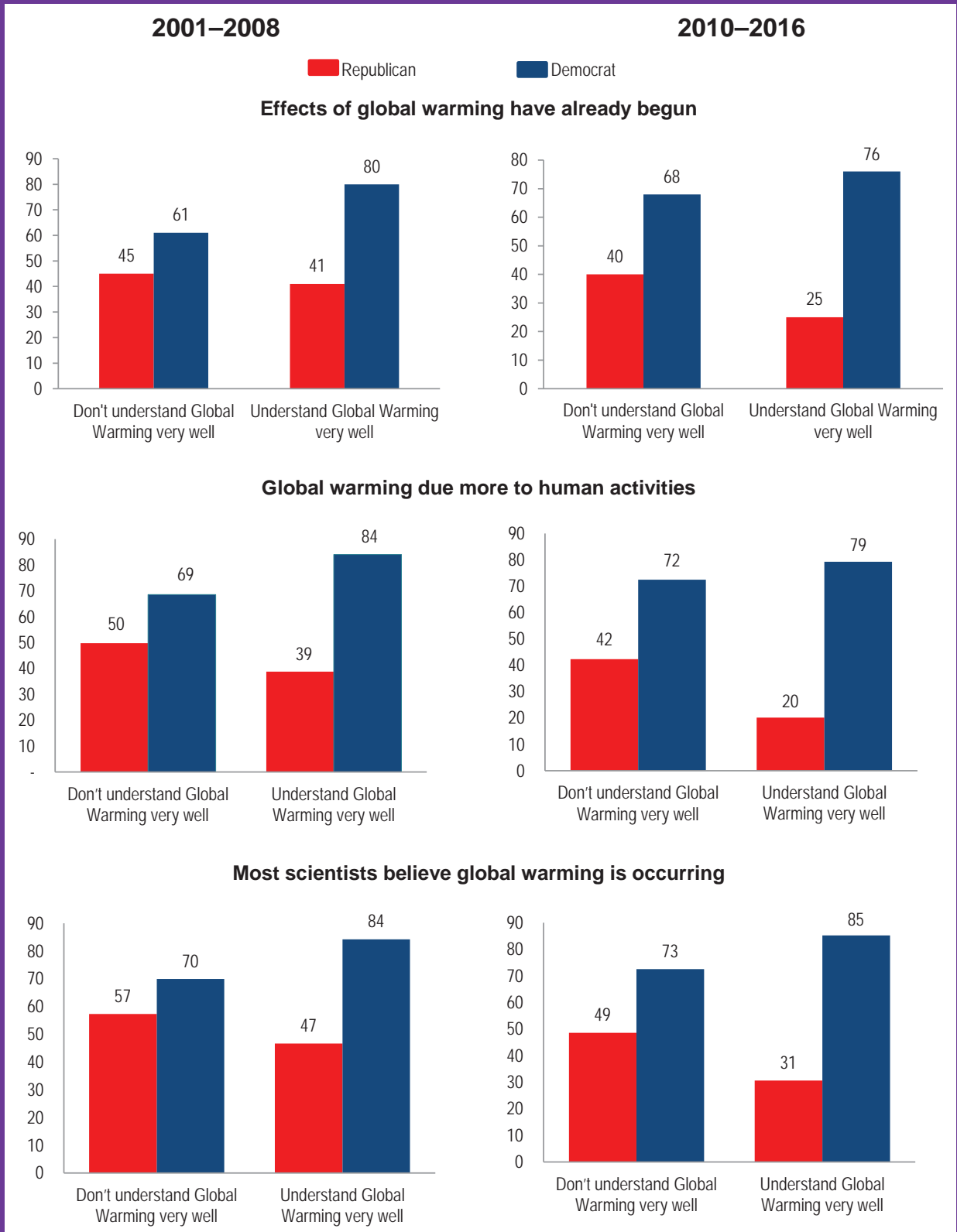
Our remaining figures illustrate this political moderator effect on the relationships between both educational attainment (Figure 8) and self-reported understanding⁷⁴ (Figure 9) and three climate science beliefs during the George

Figure 8. Global warming views by party controlling for education and era



Source: The Gallup Organization

Figure 9. Global warming views by party controlling for self-reported understanding and era



Source: The Gallup Organization

W. Bush Administration (the left-hand column in each figure) and the Barack Obama Administration (the right-hand column in each figure).⁷⁵ Each of the 12 pairs of bar charts in the two figures clearly illustrates the political moderator effect. Moving from the left to the right in each shows that greater education (Figure 8) and greater self-reported understanding (Figure 9) are associated with substantially greater belief in the scientific consensus among Democrats but with only a slight increase, no change, or even a slight decrease in belief in the scientific consensus among Republicans. This pattern, which first appeared in the early 2000s, continues to the present. The result of this moderating effect is a much larger political divide on climate change beliefs among partisans who are highly educated or more confident in their understanding of global warming than among their lesser educated and lesser confident counterparts.

Focusing on the top two pairs of bar charts in Figure 8 helps clarify this pattern seen in both eras. Between 2001 and 2008, 58 percent of Democrats with less than a college degree believed that the effects of global warming have already begun, but only 43 percent of Republicans with less than a college degree believed the same. While substantially more college-educated Democrats (79 percent) believed that global warming is occurring, only slightly more college-educated Republicans (49 percent) believed the same. The 30-percentage-point difference between college-educated partisans doubled the 15-percentage-point difference between less educated partisans. As a result of growing partisan polarization during the Obama years, the percentage differences between less educated partisans (64 vs. 35 or 29 percent) and their college-educated counterparts (81 vs. 36 or 45 percent) are substantially larger between 2009 and 2016 than in the Bush years. Still, the moderator effect remains just as strong in the later era as it was in the earlier era. The 15-percentage-point divergence between less educated and college-educated partisans for 2001–2008

was matched by a 16-percentage-point difference between the same for 2009–2016. In the remaining five pairs of bar charts in Figures 8 and 9, the strength of the political moderator effect in the later era is also approximately the same as that in the earlier era.

Overall, then, not only has the gap between Democrats' and Republicans' climate change beliefs increased over time, but the political moderator effect appears to be holding steady and shows no signs of subsiding. This increases our sense that persuasive messaging and personal experiences with climate change are unlikely to have a significant effect on college-educated Republicans (especially those confident they understand global warming), a crucial sector that is especially likely to be politically active and vote—and thus have a disproportionate role in ensuring that skepticism and denial remain central features of GOP identity and candidates' stances.

Looking Forward: The 2016 Election and Climate Change

We concluded our 2008 article by discussing the imminent election between Senators Barack Obama and John McCain, noting that “it seems certain that regardless of who wins the upcoming election, the United States will have a significantly different form of leadership on global warming than it has had under George W. Bush.”⁷⁶ We argued that McCain was a rare Republican playing a leadership role on climate change in the U.S. Senate and that his positions on climate and energy were not all that different from Obama's. This led us to suggest that a McCain victory, and subsequent leadership, might possibly help reduce climate change skepticism among rank-and-file Republicans. We noted that with an Obama victory, in contrast, “we could see Republican trends toward increased skepticism continue for the next several years,”⁷⁷ and of course this is what has occurred, as we have documented.

Looking to this year's election, the situation is more complicated by the growth of overall partisan polarization in American politics, and the much more prominent role of the U.S. Congress as potential foe of the Presidency in climate change matters. As is obvious from our present situation, even when a President decides to prioritize action on climate change—as Obama has done over the past couple of years—the effectiveness of that President's actions can be limited by a recalcitrant Congress (especially if both the House and Senate are controlled by the opposing party). Thus, although Secretary of State John Kerry signed the Paris agreement reached at COP21 last December, commentators note that the “Paris agreement almost certainly would have been stronger if the Obama administration had not been constrained by GOP hostility to fighting man-made climate change,”⁷⁸ a key factor leading to pessimistic assessments of the likely effectiveness of the agreement.⁷⁹ Besides trying to undermine the agreement, Republicans in Congress and many states are doing their best to block implementation of the President's Clean Power Plan designed to reduce carbon emissions from U.S. power plants, a critical component of the Obama Administration's strategy for reducing greenhouse gas emissions to help meet our nation's Paris agreement commitments.⁸⁰

As a consequence, despite many important initiatives, Obama's accomplishments on climate change can be quickly eroded, and in some cases erased, should he be succeeded by a Republican opposed to dealing with

Whether, and how, individual Americans vote this November may well be the most consequential climate-related decision most of them will have ever taken.

climate change—which certainly appears to be the case for GOP candidate Donald Trump (as was true of virtually all competitors for the Republican Presidential nomination).⁸¹ In fact, Hare and Poole argue that one of the consequences of intensified political polarization is greater oscillation in policy outcomes (between left and right) when elections result in shifts in governing parties.⁸²

Yet should Hillary Clinton, who has expressed growing concern about climate change, win the Presidency, her administration's efforts will continue to be hampered by Congress unless the Democrats also win both the House and the Senate (the former seems unlikely at this point, while the latter is conceivable but uncertain). And it is in Congressional elections, as well as the Presidential election, that growing partisan polarization and resulting party loyalty will play a crucial role.⁸³

Some observers find optimism in recent polls showing that large pluralities and sometimes even small majorities of Republican voters (compared to sizable majorities of Democrats) express support for energy policies and other measures that would be helpful in reducing greenhouse gas emissions.⁸⁴ However, as Lilliana Mason and other political analysts note, individuals can hold relatively moderate positions on many issues and yet be strong partisans committed to keeping the other party out of office.⁸⁵ Thus, as long as rank-and-file Republicans vote for conservative candidates, and those candidates remain steadfast in opposition to climate change action, the former's receptivity to climate-friendly policies remains almost irrelevant—for the Congress they help elect will be highly unlikely to give such policies any consideration. Republican antipathy to governmental regulations, combined with enormous campaign contributions to the GOP from fossil fuel interests,⁸⁶ means that most Republican politicians have strong ideological as well as material reasons for opposing measures to reduce greenhouse gas emissions, in addition to pressure from party activists and voters.

The consequence is that the 2016 U.S. national election promises to be of historic importance in our nation's and the world's efforts to deal with human-caused climate change. A Democratic President, especially bolstered by a Democratic majority in the U.S. Senate, would likely strive to continue the momentum generated by President Obama's recent climate initiatives employing executive actions,⁸⁷ despite major opposition from a Republican House of Representatives and continued stalemate on legislation. Conversely, a Republican President, especially paired with a Republican-controlled Congress (and a conservative majority on the Supreme Court), might well take a huge step backward in our nation's efforts to reduce greenhouse gas emissions and also undermine international cooperation to deal with climate change. Whether, and how, individual Americans vote this November may well be the most consequential climate-related decision most of them will have ever taken.

ORCID

Aaron M. McCright  <http://orcid.org/0000-0001-6251-5251>

Riley E. Dunlap is Regents Professor of Sociology at Oklahoma State University. He chaired the American Sociological Association's Task Force on Sociology and Global Climate Change and co-edited the resulting report, *Climate Change and Society: Sociological Perspectives* (Oxford University Press, 2015). **Aaron M. McCright** is an associate professor of sociology in Lyman Briggs College, the Department of Sociology, and the Environmental Science and Policy Program at Michigan State University. **Jerrod H. Yarosh** is a Ph.D. candidate in the Department of Sociology at Oklahoma State University and specializes in environmental sociology and social psychology.

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NOTES

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35. Each survey is based on telephone interviews with nationally representative samples of adults (age 18 years or older) in the United States. As is typical in most national surveys, the Gallup Organization employs weighting procedures on the sample data to ensure that the samples are representative of the U.S. adult population. Data weights were not employed here when performing bivariate or multivariate analyses, because weighting can lead to inflated standard errors and misleading tests of significance.

36. Gallup interviewers ask respondents a range of questions to ascertain their demographic, social, and political characteristics at the end of the telephone interviews. For political party identification, interviewers ask, "In politics, as of today, do you consider yourself a Republican, a Democrat, or an Independent?" For those respondents who answer "Independent," mention another party, or do not answer the question, interviewers ask a follow-up question, "As of today, do you lean more to the Democratic Party or the Republican Party?" and only those who do not choose remain Independents. For Figures 2–7, "Republican" and "lean to Republican" responses and "Democrat" and "lean to Democratic" responses are combined, and in subsequent statistical analyses party is coded into Republican, Independent, and Democrat. It is typical to treat "leaners" in this fashion, as they have been found to be strong partisans. See J. R. Petrocik, "Measuring Party Supporters: Leaners are Not Independents," *Electoral Studies* 28 (2009): 562–72, and Abramowitz and Webster, note 15. We do not show the responses for the remaining "Independents" as they typically number less than 100 each year, and their percentages fluctuate considerably due to the small numbers of cases.

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39. Bousallis and Coan, note 37, and Farrell, note 37.

40. Gallup uses this question: "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?" In the 2016 poll, 65 percent gave the first re-

sponse and 31 percent gave the second, with 4 percent having "no opinion."

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45. Gallup uses this question, "Just your impression, which one of the following statements do you think is most accurate—most scientists believe that global warming is occurring, most scientists believe that global warming is NOT occurring, or most scientists are unsure about whether global warming is occurring or not?" In the 2016 poll 65 percent choose the first option, 7 percent the second, and 25 percent the third, while 3 percent have "no opinion."

46. In a similar vein, Leiserowitz et al. find that only 16 percent of registered voters estimate that at least 90 percent of "climate scientists think that human-caused global warming is happening," even though 90 percent is among the lower estimates from a variety of studies. See A. Leiserowitz, E. Maibach, C. Roser-Renouf, G. Feinberg, and S. Rosenthal, *Politics and Global Warming, Spring 2016* (New Haven, CT: Yale University and George Mason University, Yale Program on Climate Change Communication, 2016). Also see J. Cook et al., "Consensus on Consensus: A Synthesis of Consensus Estimates on Human-Caused Global Warming," *Environmental Research Letters* 11 (2016): 048002.

47. Gallup uses this question: "Do you think that global warming will pose a serious threat to you or your way of life in your lifetime?" In the 2016 poll, 41 percent responded "yes," 57 percent responded "no," and 2 percent had "no opinion." It should be noted that in 1997 only half of the sample was given this question.

48. Gallup uses this question: "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 or Climate Change)?" In the 2016 poll, the percentages giving these responses were 37, 27, 17, and 19, respectively. Gallup shifted from using "global warming" to "global warming or climate change" in 2015.

49. To compute Pearson correlation coefficients, party identification is treated as (1) Republican, (2) Independent, and (3) Democrat, while the responses to the six global warming items are coded from low to high, with the categories shown in the respective figures treated as the high scores except for saying global warming is generally exaggerated in the news, which is coded as low.

50. In 2008 we reported (in Table 2) the results of regression models controlling for the effects of sex, age, race, income, and education, noting that the resulting standardized regression coefficients for the effects of party on global warming views were negligibly affected. We ran similar models for 2016, which we do not report here in the interest of space, and again the effects of party on global warming views were negligibly affected by controlling for these social and demographic variables.

51. Mason, 2015, note 13; and Jacobson, 2012, note 11.

52. McCright and Dunlap, note 30; and Guber, note 30.

53. Oreskes and Conway, note 44; Layzer, note 6; and Dunlap and McCright, note 44.

54. Dunlap and McCright, note 44; McCright and Dunlap, note 30; and Oreskes and Conway, note 44.

55. D. L. Levy, "It's the Real Thing: The Power of Koch," *Climate Inc.*, September 8, 2010, at http://climateinc.org/2010/09/koch_climate/

56. Jacobson, 2012, note 11, page 1620.

57. Gallup asks respondents to describe their "political views" as "very conservative, conservative, middle of the road, liberal or very liberal." We classified Republicans (including leaners) who choose very conservative or conservative as "conservative Republicans" and Democrats (including leaners) who choose very liberal or liberal as "liberal Democrats."

58. A. Leiserowitz et al., note 45, similarly report large differences among conservative Republicans, moderate/liberal Republicans, moderate/conservative Democrats, and liberal Democrats.

59. Jacobson, 2012, note 11; and Mason, note 13.

60. S. C. Moser and L. Dilling, L., "Making Climate Hot: Communicating the Urgency and Challenge of Global Climate Change," *Environment* 46 (2004): 32–46; and M. C. Nisbet, "Communicating Climate Change: Why Frames Matter to Public Engagement," *Environment* 51 (2009): 514–18.

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72. McCright and Dunlap, note 30; and L. C. Hamilton, "Education, Politics, and Opinions About Climate Change: Evidence for Interaction Effects," *Climatic Change* 104 (2011): 231–42.

73. Dunlap and McCright, note 29; and A. M. McCright, "Political Orientation Moderates Americans' Beliefs and Concern about Climate Change," *Climatic Change* 104 (2011): 243–53.

74. Gallup uses this question: "Thinking about the issue of global warming, how well do you feel you understand this issue? Would you say very well, fairly well, not very well, or not at all?" It was not used in 2009, and thus Figure 9 compares 2001–2008 with 2010–2016. The percentages responding "very well" or "fairly well" have gradually risen from 61 percent in 1997 to 80 percent in 2008 and stayed at 79 percent in 2016. The percentages reporting "very well" or "fairly well" for Republicans increased from 67 percent in 1997 to 79 percent in 2008 and remained stable at 79 percent for 2016, while for Democrats the increase has been from 56 percent to 80 percent and then 79 percent during those years.

75. We see the same patterns with the other three climate change beliefs items. Given space limitations, however, we do not present them here.

76. Dunlap and McCright, note 29, page 33.

77. Dunlap and McCright, note 29, p. 34.

78. M. Hertsgaard, "Exxon and the Climate Fight After Paris," *The Nation* 302 (February 2016), page 19.

79. See, e.g., N. Buxton, "COP 21 Charades: Spin, Lies and Real Hope in Paris," *Globalizations*, doi:10.1080/14747731.2016.1161936; and C. L. Spash, "This Changes Nothing: The Paris Agreement to Ignore Reality," *Globalizations*, doi:10.1080/14747731.2016.1161119. For an optimistic assessment see D. King, "Biggest Opportunity of Our Age," *Science* 351 (January 8, 2011): 107; and for a cautiously optimistic one see P. Christoff, "The Promissory Note: COP 21 and the Paris Climate Agreement," *Environmental Politics* 25 (2016): 765–87.

80. S. Goldenberg, "How US Negotiators Ensured Landmark Paris Climate Agreement was Republican-Proof," *The Guardian*, December 13, 2015, at <http://www.theguardian.com/us-news/2015/dec/13/climate-change-paris-deal-cop21-obama-administration-congress-republicans-environment>.

81. See, e.g., Sargent, note 28; A. Parker and C. Davenport, "Donald Trump's Energy Plan: More Fossil Fuels and Fewer Rules," *New York Times*, May 26, 2016, at <http://www.nytimes.com/2016/05/27/us/politics/donald-trump-global-warming-energy-policy.html>; and J. Redman, "Trump's Climate Change Denial Is Already Complicating the Paris Climate Deal," *Huffington Post*, May 27, 2016, at http://www.huffingtonpost.com/janet-redman/trumps-climate-change-denial-complicating-paris-deal_b_10151148.html.

82. Hare and Poole, note 10, page 472.

83. Jacobson, 2013, note 11.

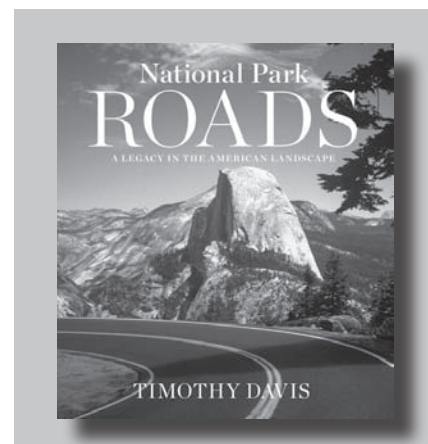
84. S. Kull, *Considering the Cost of Clean: Americans on Energy, Air Quality and Climate* (College Park, MD:

Program for Public Consultation, School of Public Policy, University of Maryland, 2016); and A. Leiserowitz et al., note 45.

85. Mason, note 13, page 141; also see Jacobson, 2013, note 11.

86. See, e.g., C. Moser and M. Lee-Ashley, "The Fossil-Fuel Industry Spent Big to Set the Anti-Environment Agenda of the Next Congress," Center for American Progress, December 22, 2014, at <https://www.americanprogress.org/issues/green/news/2014/12/22/103667/the-fossil-fuel-industry-spent-big-to-set-the-anti-environment-agenda-of-the-next-congress>; and E. Pilkington, "Republican Hopefuls Receive \$62m in Support from Donors with Fossil Fuel Ties," *The Guardian*, August 12, 2015, at <http://www.theguardian.com/us-news/2015/aug/12/republican-candidates-fossil-fuels-donors-superpacs>.

87. The Democratic National Committee's preliminary 2016 platform is only moderately strong on climate change, disappointing activists like Bill McKibben (a member of the platform committee) but vastly better than how the issue will fare in this year's Republican platform. See Eric Wolf, "Climate Hawks Wing Some, Lose Some in Dem Platform Fight," *Politico*, June 27, 2016, at <http://www.politico.com/tipsheets/morning-energy/2016/06/climate-hawks-win-some-lose-some-in-dem-platform-fight-215038>.



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