

***An End to a Means: Partisanship, Policy Preferences and Global Warming***

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***Abstract:***

Recent polls have shown significant declines in the expressed belief that global warming is occurring, particularly among conservatives and Republicans – but whether this represents a fundamental shift in the public’s understanding of climate change, or some sort of political calculation, is an open empirical question. While previous public opinion research has explored the political and social determinants of (1) expressed belief in whether global warming is occurring, and (2) policy preferences concerning global warming, the standard explanatory model has been limited to designating the former (expressed belief global warming is occurring) as a predictor of the latter (policy preferences). What has received considerably less attention in the literature is the reverse causal logic – that is, whether or not views on government action to address climate change can predict expressed belief in whether it’s occurring. In this paper we examine the bi-directionality of this relationship, what other factors are most influential in shaping it and the nature of changes over time. We explore these issues using nationally representative ABC News data as well as other contemporaneous national data within the broader context of increasing ideological polarization. The paper concludes with a discussion of the challenges of disentangling the logic of causal order in these data as well as the meaning of expressed “belief” in public opinion polls.

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A number of polls in 2009 documented counterintuitive shifts in public opinion about global warming, most notably the decline in the expressed belief that global warming is, in fact, occurring but also on other measures such as concern about the immediacy of global warming's impact. This represented a discontinuity with longer-term trend, as prior to these recent data public awareness, understanding and assessments of personal relevance about global warming tended toward consistent growth or, at least, a leveling off – not a rollback.<sup>1</sup> That such changes have occurred as scientific consensus and the urgency of warnings about the impact of global warming have increased is particularly surprising. Whether this discontinuity represents a fundamental shift in the public's understanding of climate change, or some sort of political calculation, is an open empirical question.

Explanations of these recent changes have ranged far and wide,<sup>2</sup> from “apocalypse fatigue” (suggesting “the louder and more alarmed climate advocates become... the more they polarize the issue, driving away a conservative or moderate for every liberal they recruit to the cause”)<sup>3</sup>, to the “cool-year” theory (the argument that the relatively low average world temperature in 2008 encouraged those with low trust in climate scientists to surmise that global warming was not happening)<sup>4</sup> to general economic malaise (that the recession has led to lower global warming issue-salience and a subsequent slippage in related opinions).<sup>5,6</sup> While these explanations are theoretically interesting and empirically plausible, in this paper we offer a different take on the debate – a conceptual reframing of the measurement of the perception of whether global warming is occurring, as well as an alternative, policy-oriented explanation of its recent decline.<sup>7</sup>

Our conceptual approach is to separate what's simplistically taken as a measurement of “belief” from what instead, we think, should be called “expressed belief” – a softer survey response, informed by predispositions and individual judgment rather than a recounting of objective facts. In asking about the reality of global warming, the distinction between belief and expressed belief is often overlooked – perhaps less critical when survey responses generally parallel the state of

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<sup>1</sup> Nisbet, Matthew C. and Teresa Myers. 2007. “The Polls – Trends: Twenty Years of Public Opinion About Global Warming.” *Public Opinion Quarterly* 71(3):444-470.

<sup>2</sup> Nisbet and Myers (2007) identify a decline in the early 1990s in expressed belief that “the greenhouse effect or global warming is real” using Cambridge Reports/Research International data. Analysis of climate change policy at that time suggests that the mobilization of conservative think tanks in opposition to ameliorative global warming efforts effectively challenged definitions of global warming as a significant problem. For details, see: McCright, Aaron M. and Riley E. Dunlap. 2003. “Defeating Kyoto: The Conservative Movement's Impact on U.S. Climate Change Policy.” *Social Problems* 50(3): 348-373.

<sup>3</sup> Nordhaus, Ted and Michael Shellenberger. “Apocalypse Fatigue: Losing the Public on Climate Change.” Available at: <http://www.e360.yale.edu/content/feature.msp?id=2210>. Nov. 16, 2009.

<sup>4</sup> Krosnick, Jon A. “Americans' Opinions About Climate Change.” Available at: <http://www.ametsoc.org/atmospolicy/climatebriefing/krosnick.html>. March 2010.

<sup>5</sup> Pew Research Center. “Searching For Clues in the Global Warming Puzzle.” Available at: <http://pewresearch.org/pubs/1390/why-do-fewer-americans-believe-the-earth-is-warming>. Oct. 27, 2009.

<sup>6</sup> Harshaw, Tobin. “Are Americans Cooling on Global Warming?” Available at: <http://opinionator.blogs.nytimes.com/2009/10/23/weekend-opinionator-are-americans-cooling-on-global-warming/>. Oct. 23, 2009.

<sup>7</sup> The approach we explore in this paper first was proposed in: Langer, Gary, “Conservatives, Republicans Move Away From Belief That the Earth is Warming,” available at <http://abcnews.go.com/images/PollingUnit/1096a7GlobalWarming.pdf>, Nov. 24, 2009; and was explored further in Langer, Gary, “Understanding Answers,” available at <http://blogs.abcnews.com/thenumbers/2009/12/understanding-answers.html>, Dec. 3, 2009.

scientific knowledge. When they move in opposite directions, however, it's less clear how the public comes to "unknow" something (barring a substantial revision of evidence). By considering responses about the reality of global warming as expressed belief, we allow for other factors to come into play in explaining its decline.

Informed by this conceptual view, our analytic strategy offers an alternative to traditional public opinion research on global warming. Most of the literature focuses on determining the key political and social predictors of (1) expressed belief in whether global warming is occurring, and (2) related global warming attitudes (e.g., human responsibility, seriousness, threat) and policy preferences concerning global warming, with ensuing explanatory models typically designating the former as a predictor of the latter.<sup>8</sup> What has received considerably less attention is the reverse causal logic – that is, whether or not views on government action to address climate change can predict expressed belief in whether it's occurring. In our analysis, we examine the bi-directionality of the relationship, what other factors are most influential in shaping it and the nature of changes over time.

Further, we present a policy lens to focus the analysis, allowing for views on proposed governmental action to impact expressed belief whether global warming is indeed occurring. This approach more clearly places the recent decline in expressed belief in global warming into the context of the change in power in Washington, with the subsequent shift in global warming policy from "off-the-table" to fully on it, producing increased political polarization generally and heightened concern among opponents of climate change legislation.

### ***The Decline in Expressed Belief***

Our measure of expressed belief in global warming was most recently asked as part of a nationally representative ABC News/Washington Post poll, conducted by phone Nov. 12-15, 2009, among a random sample of 1,001 adults (including both landline and cell-phone-only respondents). The question asks: "On another subject, 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 has not been happening?"

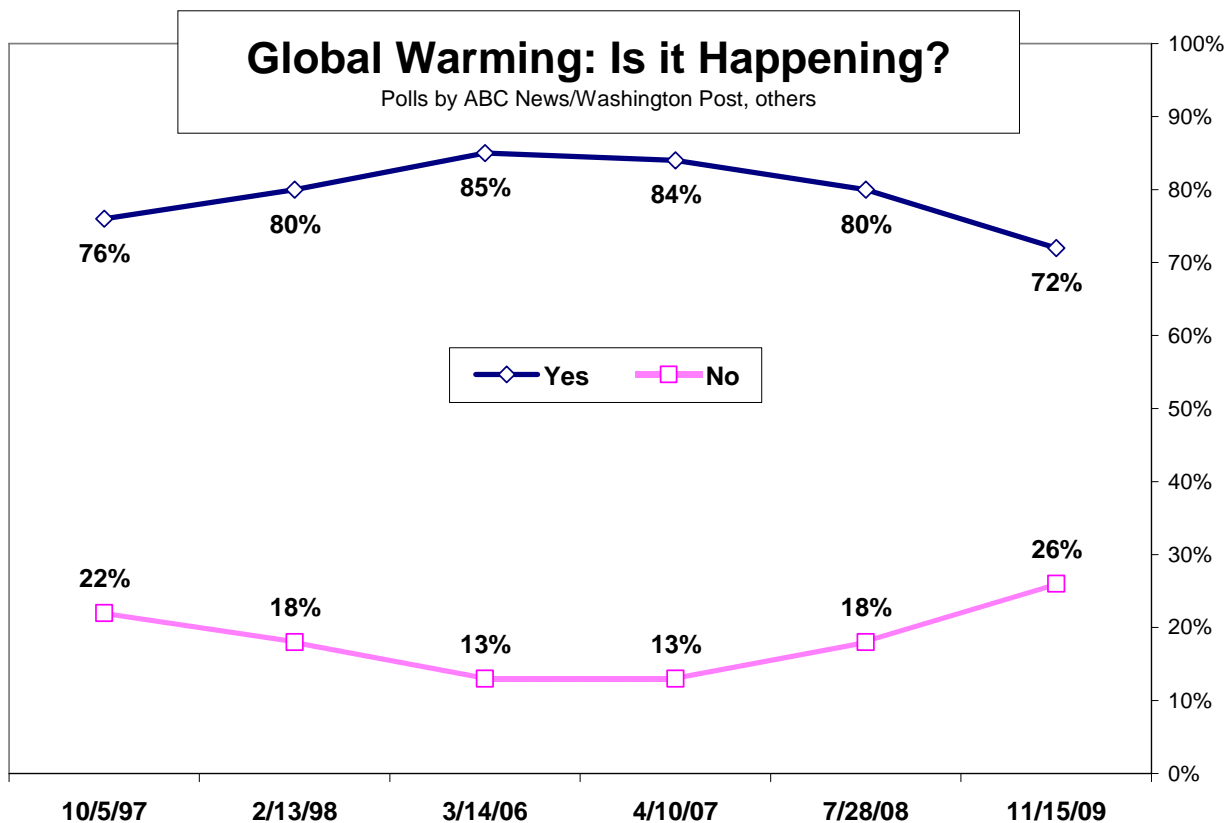
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<sup>8</sup> For an excellent example of modeling global warming opinions and preferences, see: Krosnick, Jon A., Allyson L. Holbrook, Laura Lowe and Penny S. Visser. 2006. "The Origins and Consequences of Democratic Citizens' Policy Agendas: A Study of Popular Concern About Global Warming." *Climate Change* 77: 7-43. Available at: <http://communication.stanford.edu/faculty/krosnick/docs/GW%20National%20Seriousness.pdf>

The trend on this question, prior to the November 2009 poll, showed that more than three-quarters of Americans in each of five surveys believed the world’s temperatures have been going up slowly over the past century: no fewer than 76 percent of Americans answered in the affirmative, that in 1997, peaking at 85 percent in 2006 (see Figure 1).<sup>9</sup>

The November poll, however, showed a significant change. The number of Americans who expressed belief global warming was occurring dipped to 72 percent, still high – note that those who say it’s occurring outnumber those who think not by nearly 3-1 – but the lowest since 1997, certainly a counterintuitive result.

Figure 1: Expressed belief that global warming has been happening, 1997-2009.



The ABC/Post poll results weren’t alone in documenting declines in expressed belief in global warming, with results differing in degree given the different questions posed. Among others:

- A Pew Research Center report in October 2009 noted a “sharp decline,” from 71 percent in April 2008 to 57 percent, in people saying there’s “solid evidence” average temperatures

<sup>9</sup> The earlier polls in the trend were also asked of national samples, with different partners: 2008 with Planet Green and Stanford University; 2007 with the Washington Post and Stanford University; 2006 with Time and Stanford University. The data from 1997 and 1998 are from Ohio State University polls.

have been rising the past few decades. Pew also reported a 9-point drop over the same period in the percentage of all Americans viewing global warming as a “very” serious problem.<sup>10</sup>

- Earlier in 2009, a March Gallup poll found an 8-point decline in the past year, from 61 percent to 53 percent, in belief that the effects of global warming “have already begun to happen” and a “record high” of 16 percent reporting that the effects will never occur; the previous high on the latter figure was 11 percent. Additionally, Gallup reported a modest 6-point decline, to 60 percent, in personal worry about the greenhouse effect/global warming and a 6-point gain, to 41 percent, in the belief its seriousness is “generally exaggerated” in the news (a view Gallup called “somewhat volatile” in polls since 2001).<sup>11</sup>
- A Fox News poll in May 2009 found 69 percent of registered voters said they “believe global warming exists,” down from 82 percent in January 2007 and 77 percent in October 2005.<sup>12</sup>
- In a related question, a CBS News/New York Times poll in December 2009 found 37 percent of Americans saying global warming was a “very serious problem and should be one of the highest priorities for government leaders,” a 15-point drop from April 2007.<sup>13</sup>

There is substantial variation in the results, as may be expected given the marked differences in what they ask. As noted, the ABC/Post item (originated by Jon Krosnick, then of Ohio State University) asks if people think temperatures probably have or probably have not been rising over the past century, a measure of personal belief about global warming.

Pew, by contrast, asks, “From what you’ve read and heard, is there solid evidence that the average temperature on earth has been getting warmer over the past few decades, or not?” This is more an assessment of the state of climate science, based on what an individual has “read and heard”<sup>14</sup> rather than a measure of personal belief. Further, the Pew item sets a higher bar than the ABC/Post question in asking about “solid evidence,” and offers a different time frame (“past few decades” vs. “past century”).

The Gallup question asks not about whether global warming is happening, but for personal views on when the effects of global warming will happen, if at all: “Which of the following statements reflects your view of when the effects of global warming will begin to happen? They have already begun to happen. They will start happening within a few years. They will start happening within your lifetime. They will not happen within your lifetime, but they will affect future

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<sup>10</sup> Pew Research Center. “Fewer Americans See Solid Evidence of Global Warming.” Available at: <http://people-press.org/report/556/global-warming>. Oct. 22, 2009.

<sup>11</sup> Saad, Lydia. “Increased Number Think Global Warming Is ‘Exaggerated’.” Available at: <http://www.gallup.com/poll/116590/increased-number-think-global-warming-exaggerated.aspx>. March 11, 2009.

<sup>12</sup> Blanton, Dana. “Fox News Poll: Where Americans Stand on the Issues.” Available at: [http://www.foxnews.com/printer\\_friendly\\_story/0,3566,520559,00.html](http://www.foxnews.com/printer_friendly_story/0,3566,520559,00.html). May 18, 2009.

<sup>13</sup> CBS News/New York Times. “Global Warming.” Available at: <http://www.cbsnews.com/htdocs/pdf/Dec09aglobalwarming.pdf?tag=contentMain;contentBody>. Dec. 14, 2009.

<sup>14</sup> For a discussion of the influences of information on views on climate change, see: Malka, Ariel, Jon A. Krosnick and Gary Langer. 2009. “The Association of Knowledge with Concern About Global Warming.” *Risk Analysis* 29(5): 633-647. Available at: <http://woods.stanford.edu/docs/surveys/Global-Warming-Knowledge-and-Concern.pdf>.

generations. Or, they will never happen.” Unlike the ABC/Post and Pew questions, the Gallup item does not offer a definition or description of global warming.

The CBS/Times question, for its part, measures both perceived severity and priority (in double-barreled fashion).<sup>15</sup> Fox News asks simply: “Do you believe global warming exists?” While this does address belief, this item offers no definition of the phenomenon; it also lacks balance, providing no alternative to the posited argument.

While these items are not directly comparable given their wording variation, the fact that their results all move in the same direction is suggestive of a broader phenomenon, one that reinforces our argument that what’s measured, and what’s recently moved, isn’t simply a “belief.”

***Partisan and Ideological Shifts***

In the ABC News polls, the change in expressed belief in global warming was almost exclusively partisan and ideological in nature – perhaps unsurprising given the importance of these predispositions in shaping views on global warming more broadly (see Table 1).

*Table 1: Differences in expressed belief in global warming by partisan and ideological groups.*

	<b>2009</b>	<b>2008</b>	<b><i>Difference</i></b>
<b>All</b>	72	80	-8
<b>Democrats</b>	86	87	-1
<b>Independents</b>	71	79	-8
<b>Republicans</b>	54	74	-20
<b>Leaned Dems</b>	86	87	-1
<b>Leaned Reps</b>	55	72	-17
<b>Liberals</b>	85	88	-3
<b>Moderates</b>	81	83	-2
<b>Conservatives</b>	56	69	-13
<b>Liberal Dems</b>	88	89	-1
<b>Conservative Reps</b>	45	65	-20

Differences significant at the .05 level are highlighted.

The overall decline in expressed belief global warming is occurring was 8 points from July 2008 to November 2009. Specifically, it fell by 20 points among Republicans and 8 points among independents while essentially steady among Democrats. If we look at “leaned” partisan identity grouping Republicans with independents who lean toward the Republican Party, it dropped by 17 points, compared with essentially no change among Democrats and Democratic-leaning independents.

<sup>15</sup> The CBS/Times question asks: “Which comes closer to your view? 1. Global warming is a very serious problem and should be one of the highest priorities for government leaders. 2. Global warming is serious but does not need to be a high priority. 3. Global warming is not serious and can be addressed years from now.”

Similarly, since summer 2008 expressed belief that warming is occurring fell by 13 points among conservatives while holding essentially steady among liberals and moderates.

Combining these partisan and ideological groups, we see a similar storyline – that is, among conservative Republicans, fewer than a majority now says global warming is occurring, a 20-point drop, the only group in which less than half says so. And we see no change among liberal Democrats, holding steady at nearly nine in 10 expressing belief that global warming is occurring.<sup>16</sup>

Changes in other contemporaneous polls are less emphatically partisan and ideological, perhaps given their different questions, but nonetheless support the notion of a significant partisan and ideological element to the trends they show.<sup>17,18,19,20</sup>

### ***Preferences on Cap-and-Trade Policy and Government Action***

To gauge the relationship between expressed belief in global warming and proposed government policy, we used two items asked in the ABC/Post November 2009 poll: support for a cap-and-trade system to help limit greenhouse gases, and the circumstances under which the U.S. should take action on global warming, if at all.

The cap-and-trade item asks: “There’s a proposed system called ‘cap and trade.’ The government would issue permits limiting the amount of greenhouse gases companies can put out. Companies that did not use all their permits could sell them to other companies. The idea is that many companies would find ways to put out less greenhouse gases, because that would be cheaper than buying permits. Would you support or oppose this system?” On this specific proposal, 53 percent supported cap and trade in November 2009 – down from 59 percent in the summer of 2008.

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<sup>16</sup> Looking back another year, to spring 2007, shows changes that also occurred disproportionately among conservatives and Republicans. In this comparison, expressed belief that global warming is occurring has dropped by 21 points among conservatives vs. 7 points and 5 points, respectively, among liberals and moderates; and by 18 points among leaned Republicans vs. 7 points among leaned Democrats.

<sup>17</sup> Pew’s “sharp decline” in people saying there’s “solid evidence” was primarily among political independents, 22 points, followed by Republicans, 14 points, but less so among Democrats, 8 points. The drop Pew found in viewing global warming as a “very” serious problem was primarily among independents, down 13 points from the prior year, while both Democrats and Republicans by 8 points each.

<sup>18</sup> In the Gallup data, views that the effects of global warming have begun fell by 16 points among conservatives, compared with 6 points among moderates and an insignificant 1-point gain among liberals. Additionally, Gallup reported sharp partisan differences in the number of people saying the news of global warming is exaggerated – 66 percent of Republicans, up 7 points in the year; 44 percent of independents, up 11 points; and 22 percent of Democrats, up a modest 4 points from the 2008 mark.

<sup>19</sup> The 13-point overall decline from 2007 to 2009 in the Fox News data on belief “global warming exists” was primarily among Republicans, down 24 points from 72 to 48 percent, and independents, down 17 points from 84 to 67 percent – while Democrats remained relatively steady, a scant 4 points off from 91 to 87 percent.

<sup>20</sup> While the other polls reflect partisan and ideological shifts as found in the ABC News data, CBS/Times is an exception. The decline in their December 2009 poll (since April 2007) in Americans saying global warming’s a “very serious problem and should be one of the highest priorities for government leaders” crossed partisan lines with Democrats showing the largest absolute decline (19 points, vs. 13 points for independents and 8 points for Republicans). However, the relative drops were about equal with each group falling about 25 percent from their earlier mark. Essentially, Democrats fell further, but from a much higher base (71 percent) than either independents (48 percent) or, especially, Republicans (30 percent).

Like expressed belief in global warming, shifts in support for cap and trade are strongly influenced by partisanship and ideology, more so than by other factors (see Table 2). Support slipped among Republicans, by 13 points, and independents, by 11 points, while holding steady among Democrats. Republicans and Republican-leaning independents dipped by 12 points, but just a modest 4 points among leaned Democrats. Ideology matters as well: Support among conservatives declined by more than it did among either liberals or moderates; among conservative Republicans support was down by 17 points while among liberal Democrats it remained steady.

Expressed belief that global warming is occurring, expectedly, influences support for cap and trade: Those who say global warming is happening are more apt to support the proposed cap-and-trade policy. But the strength of the relationship changed from 2008 to 2009, becoming sharper in the more recent poll, with the decline in support for cap and trade occurring almost entirely among those who say global warming is not happening.

*Table 2: Differences in support for proposed cap-and-trade system by partisan, ideological and expressed belief in global warming groups.*

	<u>2009</u>	<u>2008</u>	<u>Difference</u>
<b>All</b>	<b>53</b>	<b>59</b>	<b>-6</b>
<b>Democrats</b>	66	66	<b>0</b>
<b>Independents</b>	49	60	<b>-11</b>
<b>Republicans</b>	39	52	<b>-13</b>
<b>Leaned Dems</b>	63	67	<b>-4</b>
<b>Leaned Reps</b>	41	53	<b>-12</b>
<b>Liberals</b>	65	69	<b>-4</b>
<b>Moderates</b>	61	63	<b>-2</b>
<b>Conservatives</b>	40	49	<b>-9</b>
<b>Liberal Dems</b>	73	73	<b>0</b>
<b>Conservative Reps</b>	30	47	<b>-17</b>
<b>GW Happening</b>	61	62	<b>-1</b>
<b>GW Not happening</b>	33	49	<b>-16</b>

Differences significant at the .05 level are highlighted.

The other question about government action asks: “Do you think the United States should take action on global warming only if other major industrial countries such as China and India agree to do equally effective things, that the United States should take action even if these other countries do less, or that the United States should not take action on this at all?” The following analysis will consider those who prefer unilateral action in comparison with those who prefer either action in conjunction with other countries or no action at all. Fifty-five percent supported the United States taking action unilaterally in November 2009, down 13 points from July 2008.



Support for unilateral action, though, has fallen more generally across groups than either expressed belief global warming is happening or support for a cap-and-trade system; it's down by 15 points among leaned Democrats as well as by 13 points among leaned Republicans, and by 11 points among both liberal Democrats and conservative Republicans (see Table 3).

Expressed belief global warming is occurring again matters: Those who say it's happening are more apt to support unilateral action, by 31 points in 2008 and 43 points in 2009. While the drop in support for unilateral action is not *exclusively* among those who say global warming is not happening, it is disproportionately among them.

*Table 3: Differences in support for unilateral U.S. action on global warming by partisan, ideological and expressed belief in global warming groups.*

	<u>2009</u>	<u>2008</u>	<u>Difference</u>
<b>All</b>	55	68	<b>-13</b>
<b>Democrats</b>	66	82	<b>-16</b>
<b>Independents</b>	52	66	<b>-14</b>
<b>Republicans</b>	43	52	<b>-9</b>
<b>Leaned Dems</b>	67	82	<b>-15</b>
<b>Leaned Reps</b>	41	54	<b>-13</b>
<b>Liberals</b>	72	82	<b>-10</b>
<b>Moderates</b>	67	73	<b>-6</b>
<b>Conservatives</b>	34	51	<b>-17</b>
<b>Liberal Dems</b>	74	85	<b>-11</b>
<b>Conservative Reps</b>	33	44	<b>-11</b>
<b>GW Happening</b>	67	74	<b>-7</b>
<b>GW Not happening</b>	24	43	<b>-19</b>

Differences significant at the .05 level are highlighted.

***Causal Ordering and Reordering***

As expected, global warming predicts support for measures to deal with it: In 2009, those who express belief global warming is happening are 28 points more apt than those who don't think it's occurring to support cap and trade, and 43 points more likely to prefer unilateral action.

But the reverse is also quite possible; policy preferences could hold a clue as to why there's been a decline in expressed belief global warming is occurring. While cross-sectional data are not ideal to disentangle this relationship, and bi-directionality is likely at play, it's our hypothesis that policy preferences can indeed influence expressed belief in global warming – that is, to some extent the causal arrow points in the opposite direction than conventional wisdom suggests.

Looked at this alternative way (see Table 4), in 2009 those who support cap and trade are 24 points more likely than those who oppose it to say global warming is happening (83 percent vs. 59 percent), in comparison with a 12-point difference in 2008 (84 percent vs. 72 percent). Furthermore, the expressed belief that global warming is occurring has fallen almost entirely among those who oppose cap and trade, from 72 percent in 2008 to 59 percent in 2009. Among those who support cap and trade, expressed belief has held steady (84 percent vs. 83 percent).

Similarly, expressed belief global warming is happening is 36 points higher among those who support unilateral action in 2009; the difference was a smaller 22 points in 2008. And the decline in expressed belief occurs almost completely among those who oppose government action: A 13-point drop in expressed belief in global warming among those who oppose unilateral action (65 percent to 52 percent), but essentially no change among those who support unilateral action (87 percent to 88 percent).

*Table 4: Expressed belief in global warming by support for a cap-and-trade system and unilateral U.S. action on global warming, 2009 vs. 2008.*

		<b>Cap and trade?</b>		<b>Unilateral action?</b>	
		<i>Support</i>	<i>Oppose</i>	<i>Support</i>	<i>Oppose</i>
<b>2009</b>	Yes	83%	59%	88%	52%
	No	16%	39%	11%	45%
<b>GW happening?</b>					
<b>2008</b>	Yes	84%	72%	87%	65%
	No	15%	26%	12%	33%

Further evidence of the relationship between expressed belief in global warming and government intervention is found in the bivariate correlation coefficients between these variables. Overall, the correlations with expressed belief in global warming are stronger in 2009 than in 2008 – especially with cap-and-trade support, about twice the magnitude (see Table 5).

*Table 5: Correlations of expressed belief in global warming and cap-and-trade support, 2009 vs. 2008.*

	<b>2009</b>	<b>2008</b>
<b>All</b>	0.262	0.133
<b>Democrats</b>	0.074	-0.057
<b>Independents</b>	0.313	0.184
<b>Republicans</b>	0.252	0.160
<b>Leaned Democrats</b>	0.168	-0.025
<b>Leaned Republicans</b>	0.260	0.193
<b>Liberals</b>	-0.037	0.030
<b>Moderates</b>	0.158	0.145
<b>Conservatives</b>	0.335	0.098
<b>Liberal Dems</b>	-0.191	-0.126
<b>Conservative Reps</b>	0.281	0.092

Correlations significant at the .05 level are highlighted.

The correlations between expressed belief in global warming and cap-and-trade support show variation between groups over time, echoing some of the earlier partisan and ideological findings. There are significant but stronger associations among Republicans and, in particular, conservatives in 2009 than in 2008, and no significant correlation among Democrats or liberals in either poll.

The correlations with support for unilateral action are less striking but, similarly, are stronger in 2009 than 2008 for Republicans and conservatives (see Table 6). On the other hand, the association among liberals is not statistically significant in either year, and while statistically significant among Democrats in both years, the strength of the association diminishes in 2009.<sup>21</sup>

*Table 6: Correlations of expressed belief in global warming and support for unilateral U.S. action on global warming, 2009 vs. 2008.*

	<b>2009</b>	<b>2008</b>
<b>All</b>	<b>0.390</b>	<b>0.259</b>
<b>Democrats</b>	0.191	0.289
<b>Independents</b>	0.460	0.230
<b>Republicans</b>	0.411	0.248
<b>Leaned Democrats</b>	0.242	0.165
<b>Leaned Republicans</b>	0.449	0.284
<b>Liberals</b>	0.132	0.057
<b>Moderates</b>	0.321	0.343
<b>Conservatives</b>	0.385	0.171
<b>Liberal Dems</b>	0.286	0.255
<b>Conservative Reps</b>	0.394	0.168

Correlations significant at the .05 level are highlighted.

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<sup>21</sup> Pearson correlation coefficients are shown in Table 5 and Table 6. Results are similar when using measures of ordinal association, such as Kendall's tau-b.

The bivariate association between expressed belief in global warming and either of the policy-related variables cannot be explained away by controlling for other variables. In a logistic regression model, support for cap and trade is the strongest predictor of expressed belief in global warming, followed by party identification and political ideology – controlling for age, sex, race, education, income and region of residence (see Table 7).

Support for cap and trade increases the odds of expressing belief in global warming by a factor of 2.65. There’s also evidence of partisan and ideological influences as well: Democrats, in comparison to independents, are more apt to express belief in global warming; conservatives, in comparison to moderates, are less apt to express such belief.

Moreover, these predictors are much more powerful in 2009 than 2008 (using the same set of control variables), explaining about two and one-half times the variance as in the previous year. Much of that increase has to do with policy preferences – in 2008, support for cap and trade increased the odds of expressing belief in global warming by a significant but smaller factor of 1.62, much lower than 2.65 in 2009.<sup>22,23</sup>

*Table 7: Logistic regression predicting expressed belief in global warming including support for a cap-and-trade system, 2009 vs. 2008.*

2009					2008				
Predictor	B	Wald X <sup>2</sup>	Odds Ratio	Sig	Predictor	B	Wald X <sup>2</sup>	Odds Ratio	Sig
Cap and trade	0.98	32.75	2.65	.000	Cap and trade	0.48	6.95	1.62	.008
Party ID					Party ID				
Democrats	0.80	12.68	2.23	.000	Democrats	0.52	4.91	1.68	.027
Republicans	-0.31	2.55	0.73	.110	Republicans	-0.09	0.17	0.91	.679
Ideology					Ideology				
Liberals	0.38	1.72	1.46	.190	Liberals	0.11	0.16	1.11	.686
Conservatives	-0.75	16.88	0.47	.000	Conservatives	-0.66	10.22	0.52	.001
Region					Region				
Midwest	-0.64	5.17	0.53	.023	Midwest	-0.55	3.28	0.58	.070
South	-0.56	4.65	0.57	.031	South	-0.43	2.31	0.65	.128
West	-0.44	2.23	0.65	.135	West	-0.31	0.99	0.73	.321
Sex	0.32	3.53	1.38	.060	Sex	0.03	0.02	1.03	.879
Education					Education				
Some college	0.07	0.12	1.07	.734	Some college	0.46	3.43	1.58	.064
Graduate	0.47	3.56	1.61	.059	Graduate	0.39	2.34	1.47	.126
Post-grad	0.25	0.51	1.28	.475	Post-grad	0.59	2.49	1.81	.114
Race	-0.22	1.02	0.80	.313	Race	0.31	1.84	1.36	.175
Age					Age				
30-64 years	-0.15	0.45	0.86	.500	30-64 years	0.19	0.68	1.21	.410
Seniors	-0.40	2.05	0.67	.152	Seniors	-0.02	0.01	0.98	.936
Income					Income				
\$50-100K	-0.33	2.59	0.72	.108	\$50-100K	-0.33	2.14	0.72	.143
\$100K+	0.04	0.02	1.04	.884	\$100K+	-0.38	1.87	0.69	.172
Cox & Snell R <sup>2</sup>	0.161				Cox & Snell R <sup>2</sup>	0.063			

<sup>22</sup> Not including support for a cap-and-trade system in the model significantly weakens its explanatory power, by about a quarter in 2009 (0.161 vs. 0.129). And including either one of these global warming variables when predicting the other does increase the model’s explanatory power. Similar results were found using the unilateral action variable. Details available upon request.

<sup>23</sup> Of the control variables, only region of residence reached statistical significance at the .05 level in the 2009 model; none did in the 2008 model. Residents of the Midwest and South were less apt to express belief that global warming is occurring than those in the East; residents in the West were not significantly different from those in the East. The impact of region was much weaker than the global warming policy, partisan affiliation and political ideology variables included.

Repeating this analysis using our other measure of government action shows similar results (see Table 8). Support for unilateral U.S. action on global warming is the strongest predictor of expressed belief in global warming, with partisanship and ideology also significantly contributing to the model's explanatory power – again to a lesser extent. Compared with the 2008 model, the 2009 model explains more than twice of the variance in expressed belief global warming is occurring (0.211 vs. 0.095).

*Table 8: Logistic regression predicting expressed belief in global warming including support for unilateral U.S. action on global warming, 2009 vs. 2008.*

2009					2008				
Predictor	<i>B</i>	Wald <i>X</i> <sup>2</sup>	Odds Ratio	Sig	Predictor	<i>B</i>	Wald <i>X</i> <sup>2</sup>	Odds Ratio	Sig
Unilateral action	1.73	85.36	5.63	.000	Unilateral action	1.17	38.07	3.23	.000
Party ID					Party ID				
Democrats	0.67	8.62	1.95	.003	Democrats	0.35	2.19	1.41	.139
Republicans	-0.42	4.23	0.66	.040	Republicans	0.03	0.02	1.04	.881
Ideology					Ideology				
Liberals	0.51	2.87	1.67	.090	Liberals	0.21	0.61	1.23	.434
Conservatives	-0.54	8.16	0.58	.004	Conservatives	-0.56	6.97	0.57	.008
Region					Region				
Midwest	-0.63	4.82	0.53	.028	Midwest	-0.67	4.78	0.51	.029
South	-0.48	3.42	0.62	.064	South	-0.42	2.11	0.66	.146
West	-0.61	4.19	0.54	.041	West	-0.41	1.69	0.66	.193
Sex	0.27	2.41	1.31	.120	Sex	-0.06	0.09	0.95	.766
Education					Education				
Some college	0.07	0.09	1.07	.760	Some college	0.42	2.81	1.52	.094
Graduate	0.49	3.66	1.63	.056	Graduate	0.30	1.40	1.35	.236
Post-grad	0.40	1.25	1.49	.264	Post-grad	0.58	2.23	1.79	.136
Race	-0.10	0.21	0.90	.644	Race	0.44	3.92	1.56	.048
Age					Age				
30-64 years	0.24	1.04	1.27	.308	30-64 years	0.19	0.67	1.21	.415
Seniors	0.05	0.03	1.05	.867	Seniors	0.04	0.02	1.04	.892
Income					Income				
\$50-100K	-0.46	4.75	0.63	.029	\$50-100K	-0.19	0.69	0.83	.407
\$100K+	-0.11	0.15	0.89	.697	\$100K+	-0.22	0.62	0.80	.432
Cox & Snell <i>R</i> <sup>2</sup>	0.211				Cox & Snell <i>R</i> <sup>2</sup>	0.095			

## Discussion

Our paper presents an alternative, policy-oriented model to explain the counterintuitive decline in expressed belief that global warming is occurring. The foundation of our explanation lies in our reconceptualization of survey questions that purportedly measure “belief” in the reality of global warming. While appearing as questions of objective fact or knowledge at first blush, they are not; these are opinion questions, subject to personal predispositions as well as cognitive dynamics.

One factor in explaining the decline in expressed belief that global warming is occurring is the ample uncertainty, confusion, politically and ideologically based skepticism and counterargument on the subject of climate change, more than enough to render it a less-than universally agreed upon phenomenon. Gravity, as an alternative example, is entirely experimental: a dropped apple falls. Global warming is less obvious to the naked eye, making assessments of its existence and personal relevance much more complex.

In general, as more voices – both scientific and unscientific – enter a controversy, and debate over the appropriate responses (if any) intensifies, agreement is more difficult. A coherent theme about the state of science can be muffled among contradictory messages, allowing other

considerations to come into play, such as partisan and ideological biases and a seeking-out of trusted sources of information.<sup>24</sup> “Expressed belief” – again, something softer than “belief,” and not a measure of knowledge – is elastic, able to shift in response to other considerations; it is “expressed belief” about global warming, we argue, that is measured in polls.

We suggest further that there can be a message-sending element to the way respondents answer survey questions – not always to answer the question in the way we imagine, but in the way they desire. Respondents who oppose or are skeptical about proposed policy solutions on global warming, yet who see such policies as increasingly likely given the change in administration, may be more apt to express opposition to such policies by any means available – including by withdrawing their expressed belief that global warming is occurring. They use such questions as a vehicle to express antipathy toward the solution, not to voice a firm disbelief in the existence of the problem.<sup>25</sup>

The susceptibility of expressed belief in global warming to other considerations swelled at the particular historical moment captured in our data, from the summer of 2008 to the fall of 2009, which coincided with a number of events heightening the partisan and ideological aspects of environmental policy. The 2008 presidential election certainly changed the political opportunity structure with regard to global warming; within several months of the presidential inauguration:

- the Obama administration cancelled drilling leases on public lands, reversing previous Bush administration actions,<sup>26</sup>
- the Environmental Protection Agency issued a finding that greenhouse gases pose a threat to public health and welfare,<sup>27</sup>
- the Obama administration proposed strict vehicle emissions limits and fuel-efficiency standards for cars,<sup>28</sup> and
- the House of Representatives passed a cap-and-trade bill.<sup>29</sup>

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<sup>24</sup> Malka, Ariel, Jon A. Krosnick and Gary Langer. 2009. “The Association of Knowledge with Concern About Global Warming.” *Risk Analysis* 29(5): 633-647. Available at: <http://woods.stanford.edu/docs/surveys/Global-Warming-Knowledge-and-Concern.pdf>.

<sup>25</sup> This dynamic likely extends beyond policy-related issues. For instance, some of those who say that Barack Obama wasn’t born in the United States may not be responding literally to the question but rather are taking the opportunity to voice their displeasure with him. A May 2010 ABC/Post poll provides supporting evidence: “In addition to Obama disapprovers, people who are more apt than others to say Obama was born in another country include conservatives, Republicans, supporters of the Tea Party political movement... evangelical white Protestants... and supporters of John McCain in 2008... all groups broadly critical of Obama.” For details, see: Langer, Gary. “Half of ‘Birthers’ Call it ‘Suspicion’; A Third Approve of Obama Anyway.” Available at: [http://abcnews.go.com/images/PollingUnit/Birthers\\_new.pdf](http://abcnews.go.com/images/PollingUnit/Birthers_new.pdf). May 7, 2010.

<sup>26</sup> Eilperin, Juliet. “Salazar Voids Drilling Leases on Public Lands in Utah.” Available at: <http://www.washingtonpost.com/wp-dyn/content/article/2009/02/04/AR2009020401785.html>. Feb. 5, 2009.

<sup>27</sup> United States Environmental Protection Agency. “EPA Finds Greenhouse Gases Pose Threat to Public Health, Welfare.” Available at: <http://yosemite.epa.gov/opa/admpress.nsf/0/0EF7DF675805295D8525759B00566924>. April 17, 2009.

<sup>28</sup> Broder, John M. “Obama to Toughen Rules on Emissions and Mileage.” Available at: <http://www.nytimes.com/2009/05/19/business/19emissions.html>. May 18, 2009.

<sup>29</sup> Broder, John M. “House Passes Bill to Address Threat of Climate Change.” Available at: <http://www.nytimes.com/2009/06/27/us/politics/27climate.html>. June 26, 2009.

Later last year at the United Nations, Barack Obama spoke of the danger posed by climate change – that it “cannot be denied” – and that it needed to be confronted with government action.<sup>30</sup> In December, Obama spoke at the Copenhagen Climate Council, stating that “climate change poses a grave and growing danger to our people... this danger is real. This is not fiction, this is science.”<sup>31,32</sup>

It should be noted that in an ABC/Post poll in April, 40 percent of Americans said they favor “larger government with more services” over “smaller government with fewer services,” while far more, 77 percent, said they think Obama favors “larger government with more services.”<sup>33</sup> That suggests broad room for public pushback against policies that would expand government regulation.

As our data have demonstrated, conservatives and Republicans broadly oppose proposed government measures to deal with climate change – more so now than in previous data. A heightened sense last year that such policy changes may be increasingly likely may have encouraged more people in these groups not only to oppose such policies, but to express their preferences by also voicing “disbelief” that global warming is occurring in the first place. This helps to explain the greater consistency between expressed belief in global warming and government intervention among conservatives and Republicans, but not among liberals and Democrats.

To determine the robustness of our hypothesis, further research is required on two fronts. First, more effort is required to disentangle the link between negative views on policy proposals and expressed belief about the problem or issue the policy is intended to address. It would be useful to have measurements of the perceived likelihood of a policy change taking effect, as well as the popularity of that change and views of its potential efficacy, and then measure those views against expressed belief in, or concern about, the problem itself. Second, further research is warranted into our broader concept of respondents answering questions, not literally, but rather to send a message they wish to relay. Understanding the cognitive processes behind these expressed beliefs may have implications for theories about how respondents answer questions in surveys as well as practical value to researchers to help avoid over-literal interpretations of public opinion.

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<sup>30</sup> The White House. “Remarks by the President to the United Nations General Assembly.” Available at: [http://www.whitehouse.gov/the\\_press\\_office/remarks-by-the-president-to-the-united-nations-general-assembly/](http://www.whitehouse.gov/the_press_office/remarks-by-the-president-to-the-united-nations-general-assembly/). Sept. 23, 2009.

<sup>31</sup> The White House. “Remarks by the President at the Morning Plenary Session of the United Nations Climate Change Conference.” Available at: <http://www.whitehouse.gov/the-press-office/remarks-president-morning-plenary-session-united-nations-climate-change-conference>. Dec. 18, 2009.

<sup>32</sup> The ABC/Post November 2009 poll came out of the field just a few days prior to the online posting of private emails from climate scientists at the Climatic Research Unit of Britain’s University of East Anglia. Also occurring after our polling (in January 2010) was the controversy surrounding misleading data published in a 2007 U.N. report that warned Himalayan glaciers could melt by 2035. Given the timing of these events, neither can explain the ABC/Post poll results reported here.

<sup>33</sup> Langer, Gary. “Incumbent Support its Lowest Since ’94 in a Mine-Strewn Political Environment.” Available at: <http://abcnews.go.com/images/PollingUnit/1109a22010Politics.pdf>. April 28, 2010.