

# Validating Conspiracy Beliefs and Effectively Communicating Scientific Consensus

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## ABSTRACT

A central challenge to effectively communicating scientific consensus is that people often reject information counter to their prior beliefs. People who believe that human-induced climate change is a hoax, for instance, may dismiss scientific consensus messages that human activity is a primary cause of climate change. We argue that such people can be persuaded, however. We hypothesize that validating an individual's belief about the existence of conspiracies makes him or her more likely to accept contrary scientific consensus information. We present experimental evidence that such validation leads individuals who previously believed human-induced climate change is a hoax to become more believing in human-induced climate change following exposure to scientific consensus information.

## 1. Introduction

Scientists nearly universally agree that human activity is a primary cause of climate change (Cook et al. 2016; IPCC 2013). Yet, the American public remains divided. While much of this division tracks partisanship or ideology (Bolsen and Druckman 2018), it also stems, in part, from a subset of individuals who believe climate change is a conspiratorial hoax (Lewandowsky et al. 2013). Polling suggests that somewhere between 20% and 40% of the U.S. public believe that climate change is a deception concocted by scientists as a way to secure taxpayer dollars to fund their research and promote a political agenda (Uscinski et al. 2017, p. 3).<sup>1</sup>

Is there a communication strategy that can persuade climate conspiracy endorsers to shift their views? We address this question by suggesting a possible approach. Specifically, we study the effect of validating general conspiracy beliefs of individuals who report thinking climate

change is a “hoax.” We hypothesize that such validation makes them more accepting of scientific consensus messages that human activity is a primary cause of climate change. We test our predictions with a survey experiment, finding that indeed validation can make conspiracy theorists more open to scientific consensus statements. We conclude with a brief discussion of the pros and cons of this approach and the areas in need of future research.

## 2. Conspiracy beliefs and information processing

The first question is what exactly is meant by “conspiracy theory” when it comes to climate change. Generally, a conspiracy theory is “an effort to explain some event or practice by reference to the machinations of powerful people, who attempt to conceal their role” (Sunstein and Vermeule 2009, p. 205; also see Uscinski and Parent 2014; van der Linden 2015, p. 171; Uscinski et al. 2017). Conspiracy ideation comes in many guises—for example, believing that the HIV virus was created as part of a plot to kill black or gay people, that NASA faked the moon landing, or that the government suppressed evidence that vaccines cause autism. Many conspiracy theories involve allegations that government, the military, or large corporations are misusing science for nefarious purposes. When it comes to climate change, conspiracy theorists most typically suggest that it is a “hoax” (i.e., a mischievous

<sup>1</sup> On the issue of climate change, there is a clear relationship between partisanship/ideology and conspiracy theory such that Republicans/conservatives are more likely to subscribe to a conspiracy belief (Uscinski et al. 2017, 20–21).

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deception) perpetuated largely by scientists for ideological or financial reasons (Goertzel 2010, p. 497; Lewandowsky et al. 2013, p. 630). Hoax claims might refer to the very existence of climate change and/or the scientific consensus view of human activity being a primary cause. The strong link between climate conspiracy and hoax claims is evidenced by the fact that scholars interested in climate conspiracy theories often use survey questions that ask about hoax beliefs (Lewandowsky et al. 2013, p. 626; Miller et al. 2016, p. 839; van der Linden 2015, p. 172).

To understand how hoax believers might process climate change information, consider motivated reasoning theory (Kunda 1990). In this theory, individuals pursue varied informational processing goals in different situations. One such goal is an “accuracy goal” where individuals aim to arrive at the “best” outcome given the evidence at hand (Druckman 2012). Another goal is a directional goal such that people process information in ways that protect, or defend, their prior beliefs, identities, and/or worldviews (Bolsen et al. 2014; Hart and Nisbet 2012; Lavine et al. 2012). In this case, if information contradicts one’s prior belief that human-induced climate change is a hoax, the individual rejects it, regardless of its veracity or authenticity. People do this because it helps them to protect existing beliefs as well as “their status within their identify-defining groups. . . [it] protects their identities as members of these groups” (Kahan 2015, p. 33). This is often referred to as (dis)confirmation bias (Taber and Lodge 2006; Leeper and Slothuus 2014): confirming one’s existing beliefs, or protecting one’s existing worldview, is more important than “getting it right” (i.e., inconsistent information is disconfirmed or rejected).

While there is ongoing debate among scholars about whether partisans engage in directional motivated reasoning when processing consensus scientific information about climate change (cf. Kahan 2017; van der Linden et al. 2017), we suspect that those who believe in conspiratorial hoaxes will do so. This is the case because conspiratorial thinking is a strong and stable part of one’s identity that often spans across multiple issues (Oliver and Wood 2014, pp. 954 and 958; Lewandowsky et al. 2013, p. 630; Uscinski and Parent 2014). Moreover, with respect to climate change, the conspiratorial belief is directly about scientists’ creating the conspiracy to advance their own interests. Thus, there will likely be an even more pronounced tendency among such individuals to engage in directional motivated reasoning and reject scientific

consensus information (Uscinski et al. 2017, p. 2).<sup>2</sup> We predict that individuals who subscribe to a climate change hoax theory will be less persuaded by a scientific consensus message about human-induced climate change, relative to those who do not believe in a hoax theory, all else constant (*hypothesis 1*).

Even if directional motivated reasoning is the default, it may be possible to shift the information processing goal to an accuracy motivation. This might lead those who believe in a hoax theory to become more open to otherwise contrary scientific consensus information (Bolsen et al. 2014; Cohen and Sherman 2014; Lewandowsky et al. 2012). One approach is to *validate* the authenticity of an individual’s general belief in conspiracies. This can vitiate the desire to act in a “defensive” manner when confronted with a contrary scientific consensus message. Cohen and Sherman (2014) explain, “When people are affirmed in valued domains unrelated to a dispute, they are more open to otherwise identity-threatening political information” (p. 352; also see Kruglanski et al. 2002). By validating the person’s general belief system—in this case, a belief in conspiracies—they no longer feel they need to react defensively and may be more open to scientific consensus information [for a related study of affirmation in the domain of climate change, see Sparks et al. (2010)]. For us, this would involve validating people’s general conspiracy beliefs. We predict that individuals who subscribe to a climate change hoax theory will be more persuaded by a scientific consensus message when it includes a validation of their general conspiracy beliefs (relative to when it is not accompanied by a validation), all else constant (*hypothesis 2*).

### 3. Experiment

To test our hypotheses, we implemented an experiment in the context of an online survey by recruiting participants from Amazon’s Mechanical Turk platform. While this is not a representative sample of residents in the United States, a growing social science literature demonstrates that the vast majority of survey experiments conducted on nationally representative samples replicate on Mechanical Turk (Mullinix et al. 2015). It also has been the source of data for some prior work on conspiracy attitudes and consensus messaging regarding climate change (van der Linden 2015). We implemented the study between 17 and 19 February 2017. The 484 respondents who completed the survey were paid \$1 for the task, which lasted only a few minutes.

All participants began by answering the question “To what extent do you agree with the following statement: the idea that climate change is primarily due to human

<sup>2</sup> Republicans and conservatives may react similarly on the issue of climate change for other reasons such as an aversion to government policies that regulate free markets or restrict personal freedoms (Campbell and Kay 2014; also see Bolsen et al. 2015).

activities is a hoax or a conspiracy?” on a 7-point scale ranging from strongly disagree to strongly agree (the midpoint on the scale stated “neither disagree nor agree”). We included the terms “hoax” or “conspiracy” since, as mentioned, the common portrayal of conspiracy theorists when it comes to climate change is that it is a hoax (e.g., [Inhofe 2012](#)). It is for this reason that other opinion researchers use the hoax term when studying climate change conspiracy theories ([Lewandowsky et al. 2013](#), p. 626; [Miller et al. 2016](#), p. 839; [van der Linden 2015](#), p. 172).<sup>3</sup> Respondents also reported their party identification on a 7-point scale ranging from strong Democrat to strong Republican. We additionally measured gender and age (on a 6-point categorical scale with the highest category being “over 65”).

We randomly assigned participants either to a baseline condition, which included a scientific consensus statement only ( $N = 279$ ), or to a treatment (belief affirmation) condition that added a conspiracy belief validation statement along with the consensus statement ( $N = 205$ ).<sup>4</sup> Participants in both conditions read the following scientific consensus statement:

Climate change refers to a long-term change in Earth’s climate due to an increase in the average atmospheric temperature. A recent report, *Climate Change Impacts in the United States*, produced by 300 expert scientists and reviewed by the National Academy of Sciences as well as agencies with representatives from oil companies, puts much of the uncertainty to rest by stating that climate change “is primarily due to human activities.”

Participants in the belief validation condition were also told: “A majority of people acknowledge that on many topics, powerful people work to mislead citizens for bad purposes. Yet human induced climate change is not one of those topics.”<sup>5</sup> The point of the treatment is to affirm general conspiracy beliefs while making clear that the science regarding human-caused climate change is not a hoax. By so doing, as explained, these individuals should feel less motivated to defend their prior belief or worldview and be more open to consensus scientific information.

<sup>3</sup> We differ from others insofar as we include both the words “hoax” and “conspiracy.” We do this to signal an understanding of the common conspiracy theory, and because the intent of our treatment is to validate general conspiracy beliefs.

<sup>4</sup> The  $N$ s vary by condition because we randomly launched the links on Mechanical Turk at different times and this resulted in a greater response rate, by chance, in the baseline condition.

<sup>5</sup> It is worth noting that this is not a deceptive statement given that more than 50% of Americans believe in at least one conspiracy ([Oliver and Wood 2014](#)).

Our main outcome measure is about belief in human-caused climate change: we asked respondents, “To what extent do you think climate change is *human-induced* as opposed to a result of Earth’s natural changes,” on a 7-point fully labeled scale ranging from entirely due to Earth’s natural changes to entirely human-induced. We also measured information seeking behavior: we asked participants, “How interested are you in receiving more information about *human-induced* climate change,” on a 7-point fully labeled scale ranging from extremely uninterested to extremely interested.<sup>6</sup> We suspect that the accuracy motivation stimulated by affirmation might lead hoax believers to be more interested in further information so as to better inform their beliefs.

#### 4. Results

The average “hoax” score in our sample is 2.35 (std. dev. = 1.84;  $N = 483$ ), with 52% of the sample offering a response of 1 (strongly disagree) and another 15% responding with a 2 (e.g., mostly disagree). Thus, the median and modal respondent does not believe that human-induced climate change is a hoax. However, there is enough variation on this measure in our sample to test for a *belief validation effect*; indeed, 16% of our sample recorded a score *above* the midpoint score of 4, where a 4 is “neither disagree nor agree” that climate change is a hoax.<sup>7</sup> Otherwise, our sample slightly leans Democratic with an average score of 3.53 (1.80; 484) on our measure of party identification. Not surprisingly, there is a notable correlation between an individual identifying as Republican and a belief that climate change is a hoax ( $r = 0.56, p < 0.01$ ).<sup>8</sup>

When it comes to our outcome variables, we find a mean value for the belief in human actions being the primary cause of climate change of 5.01 (1.35; 482) and a

<sup>6</sup> Even though this question only gauges “interest” in receiving more information (rather than any promise of actually receiving information), we nonetheless debriefed respondents at the end of the study that no information would be provided. Sending information would not have been possible given the anonymous nature of the survey.

<sup>7</sup> The 16% is smaller than the aforementioned figures that suggest 20%–40% of the population holds a hoax belief. We suspect this difference reflects the nature of our sample being relatively liberal compared to the larger population. The full distribution of responses on our hoax measure is 52% scored a 1, 15% scored a 2, 10% scored a 3, 7% scored a 4, 5.5% scored a 5, 5.5% scored a 6, and 5% scored a 7.

<sup>8</sup> Average scores for the hoax measure and party identification are statistically identical across conditions. We report one-tailed tests for statistical significance throughout given our directional expectations ([Blalock 1979](#); [Cho and Abe 2013](#)).

mean value of wanting more information of 4.20 (1.70; 483). There are no statistically significant differences across conditions on either the human-induced climate change measure or the information seeking measure. Specifically, for belief in human-induced climate change, the baseline group registers a score of 4.99 (1.38; 278) while the validation treatment group has a mean of 5.04 (1.31; 204) ( $t_{480} = 0.43, p \leq 0.35$ ). For wanting more information the respective means are 4.21 (1.68; 278) and 4.18 (1.72; 205) ( $t_{481} = 0.20, p \leq 0.60$ ). We did not expect to find differences across the entire sample, however, as our focus is on those who subscribe to the conspiracy theory.

Recall that hypothesis 1 suggests that we should find differences in the belief in human-induced climate change based on one's score on the hoax measure. We expect this regardless of experimental condition since in both respondents received the consensus scientific information. To test the hypothesis, we compare the 16% of the sample who gave a score above the midpoint score of 4 on the scale against those who scored 4 or below. Consistent with hypothesis 1, we find dramatic differences such that those who scored above the hoax scale's midpoint have a mean human-induced climate change score of 3.42 (1.52; 76) compared to a score of 5.31 (1.08; 405) for those at 4 or below ( $t_{479} = 13.05, p \leq 0.01$ ).<sup>9</sup> We also find that the hoax belief significantly reduces interest in receiving more information about human-induced climate change with respective means scores of 4.38 (1.61; 405) and 3.27 (1.83; 77) ( $t_{480} = 5.40, p \leq 0.01$ ). This is sensible insofar as people who are sure they do not believe in a phenomenon have little reason to seek out more information.

To test hypothesis 2, we focus on the validation manipulation's impact on respondents who believe climate change is a hoax. The belief validation manipulation was designed to affect those whose believe human-induced climate change is a hoax concocted by scientists: we expected the validation manipulation might open such individuals to the contrary consensus information. In line with the hypothesis, we focus strictly on those who scored above a 4 on the hoax question. We find, on the belief in human-induced climate change measure, that those individuals in the consensus only baseline condition report a significantly lower mean score of 3.00 (1.66; 36) than those randomly assigned to the belief validation condition of 3.80 (1.29; 40) ( $t_{74} = 2.37, p \leq 0.01$ ). This supports hypothesis 2. We also find, in line with what we anticipated, that participants who believe climate change is a hoax are more likely to request additional

information about climate change in the belief validation condition. The respective mean scores for the information-seeking measure, for the baseline and belief validation conditions, are 2.81 (1.93; 37) and 3.70 (1.65; 40) ( $t_{75} = 2.18, p \leq 0.05$ ).

We offer a further test in Table 1 where we regress each outcome variable on the continuous version of our hoax measure (rather than the split we used above), partisanship, age, gender, the experimental condition, and an interaction between the hoax measure and the experimental condition variable. There are two key findings. First, the belief that human-induced climate change is a hoax has a substantial effect, again confirming hypothesis 1. In fact, it has a notably larger effect than partisanship such that a one-point shift on the hoax scale decreases belief in human-induced climate change by 0.46 units on the 7-point response scale. This compares with an analogous movement of just 0.09 units on the party identification response scale as people move one unit toward being more Republican.

Second, the regression results again confirm hypothesis 2 regarding the impact of the belief validation manipulation. The significant interaction shows that the belief validation manipulation significantly reduces directional motivated reasoning among individuals most likely to disbelieve in human-induced climate change—that is, those who previously believed it to be a hoax. The belief validation manipulation does not eliminate the impact of conspiratorial beliefs on human-induced climate change; nonetheless, it causes people who previously report believing climate change is a hoax to be more open to contrary scientific consensus information. The second column in Table 1 shows, consistent with the aforementioned mean scores, that the validation treatment also leads the conspiracy subgroup to be more interested in acquiring further information about the issue.

## 5. Conclusions

A central challenge to effective scientific communication is that people have a tendency to reject information, even consensus information, if it contradicts their prior beliefs or worldviews. As Kahan (2015) explains “this style of reasoning is collectively disastrous: the more proficiently it is exercised by the citizens of a culturally diverse democratic society, the less likely they are to converge on scientific evidence essential to protecting them from harm” (p. 14). This style of reasoning is particularly likely when the information contradicts basic worldviews such as a belief in conspiracies. Moreover, when conspiracy theories underlie such biased reasoning, there are “serious consequences: misguided public health policies, [and] resistance to energy conservation and

<sup>9</sup> We find significant differences between these two groups even if we look within each experimental condition separately.

TABLE 1. Validation moderates the impact of hoax belief. Standard errors in parentheses.

	Column (1)	Column (2)
	Human-induced climate change	Interest in more information
Hoax belief	−0.46** (0.04)	−0.26*** (0.06)
Party (Republican)	−0.09** (0.03)	−0.11** (0.05)
Age	−0.05 (0.05)	−0.05 (0.09)
Female	0.13* (0.10)	0.38*** (0.15)
Belief validation condition	−0.04 (0.15)	−0.25 (0.24)
Hoax × belief val. condition	0.07* (0.05)	0.11* (0.08)
Constant	6.35** (0.24)	4.84*** (0.39)
Observations	478	479
R <sup>2</sup>	0.44	0.11

\*\*\*  $p \leq 0.01$ ,

\*\*  $p \leq 0.05$ ,

\*  $p \leq 0.10$  for a one-tailed test.

alternative energy” (Goertzel 2010, p. 493). In this paper, we tested a strategy for partially overcoming this hurdle: validating an individual’s conspiracy beliefs while simultaneously offering scientific consensus information about human-induced climate change. This does not completely eliminate what might be seen as deleterious (antiscience) beliefs but it does temper the impact of these beliefs.

To be clear, our findings should be taken with caution given that we drew a small sample at one point in time, which happened to be soon after a presidential election where conspiracy theories were widely discussed. We also focused on one of several possible mechanisms that lead to skepticism about climate change (i.e., many may be unsure about climate change but not believe there is a conspiracy), and we did not explore the durability of our belief validation effect. That said, our results lead to a complicated picture when it comes to communication strategies to effectively communicate climate science. Consider that Oliver and Wood (2018) estimate that 100 million Americans (40% of the adult population) are what they call Intuitionists who often form opinions and make decisions based on “magical thinking” that is distinct from deduction and systematic observation. They explain that these thinkers believe most strongly in conspiracy theories. With that in mind, if one hopes to impart scientifically based evidence to such thinkers, it requires engagement.

Identity validation is one such approach but it brings with it an ethical dilemma of sorts. On the one hand, a concern is that validating conspiracy theories embolden such individuals to believe even more strongly in such theories in other domains not related to climate change. This could be quite problematic, leading to negative societal outcomes including not receiving vaccinations, being intolerant of particular social groups, or having extreme distrust in the government. If this were the case, one would have to assess the tradeoffs between changing a single

belief—concerning climate change—compared to the effects in other areas. On the other hand, our information seeking results could mean validation generates engagement with the potential for persuasion across varying conspiracy beliefs. How validation plays out in terms of other beliefs and openness to other information is the critical question for future work. We do not claim to be in a position to adjudicate, given what we know, between these ethical pros and cons.

It may be that alternative strategies to addressing conspiratorial beliefs are more efficacious and come with fewer potential downsides. Other strategies include the use of issue counterarguments and engaging in inoculation techniques aimed to pre-empt conspiracy arguments before they take hold (Uscinski et al. 2017, p. 25). Future work is needed; it is time for social scientists and practitioners to understand and unravel alternative belief systems, some of which involve conspiracy beliefs.

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