

The conditional effect of conspiracy thinking on attitudes toward climate change

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Abstract

Even though climate scientists are nearly unanimous that climate change is real and manmade, about 40% of Americans reject the scientific consensus. Why? The largest contributing factor is partisanship; however, recent studies argue that underlying conspiracy thinking exerts a positive, linear effect on climate change denial. In this article, we reexamine the effect of conspiracy thinking on climate change attitudes by accounting for the various pathways that conspiracy thinking could drive denialism in a politically polarized environment. We find the effects of conspiracy thinking on climate change denial are not only larger than previously suggested, but also non-monotonic and conditional on individuals' party identification. Moreover, we find evidence suggesting conspiracy thinking affects independents' positions, and even their partisan leanings. These findings further explain why people reject the scientific consensus on climate change, and suggest that climate change denial is not merely the product of partisan polarization.

Keywords

Conspiracy theory, conspiracist ideation, climate change, partisanship, independents

Many Americans deny anthropogenic climate change. Why? Social scientists have identified many factors that explain denialism (Kahan, 2013; Leiserowitz, 2006; Whitmarsh, 2011); however, partisanship may be the most consistent predictor. In general, Democrats accept the scientific consensus and Republicans reject it (Dunlap et al., 2016; McCright et al., 2014). Party elites are largely responsible for this polarization (Bolsen et al., 2015; Carmichael and Brulle, 2017; Hetherington and Weiler, 2015). While there is *some* within-party heterogeneity, independents are largely divided.

Beyond partisanship, conspiracy theories claiming that climate change is a hoax, communist ploy, or precursor to totalitarianism are entangled in the debate. For example, in 2016 a Fairleigh Dickinson poll revealed that 41% of Americans thought it true or possibly true that “global warming is a myth concocted by scientists.” Researchers find that just exposure to climate change conspiracy theories can have a harmful effect on climate opinions and behaviors (Jolley and Douglas, 2014; van der Linden, 2015). Their ubiquity has led scholars to examine if conspiracy thinking drives climate change denial. The prevailing finding is that underlying conspiracy thinking exerts a

significant, though modest, positive effect on denialism (Lewandowsky et al., 2013a, 2013b, 2015). However, this finding is in conflict with most other research on conspiracy thinking, which suggests that the effect of conspiracy thinking on politicized issues is contingent on partisan identity.

To address this contradiction in the literature, we account for the various ways conspiracy thinking could interact with partisanship in a polarized environment to affect attitudes toward climate change. Our findings show that conspiracy thinking is a more important predictor of climate change denial than previously thought, but that these effects are highly contingent on partisan identity. Our findings advance our understanding of both climate change denial and conspiracy thinking, suggesting further avenues for research.

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Conspiracy thinking and climate denial

Conspiracy thinking (also called *conspiracist ideation*) is a worldview that leads a person to view events and circumstances as the product of conspiracies, powerful actors as conspirators, and authoritative accounts as fabricated (Brotherton et al., 2013; Bruder et al., 2013; Lantian et al., 2016). This way of thinking should be thought of as a spectrum: the more a person is predisposed toward conspiracy thinking, the more likely he/she is to believe in specific conspiracy theories (Uscinski et al., 2016).

Previous analyses find a positive and linear relationship between conspiratorial thinking and climate denial (Lewandowsky et al., 2013a), meaning that the more a person engages in conspiracy thinking, the more likely they are to reject the scientific consensus. This finding meshes with extant literature showing that a stronger disposition toward conspiracy thinking leads people to reject official accounts (Wood et al., 2012). In this case, people regardless of their party affiliation will reject the scientific consensus—simply because it is the official consensus—as they increase in levels of conspiracy thinking.

With this said, the findings of Lewandowsky et al. (2013a) diverge from a long line of literature suggesting that the effect of conspiracy thinking is conditioned by party attachment (McClosky and Chong, 1985). Social scientists show that people selectively apply their conspiracy thinking based upon their partisan identity (Miller et al., 2016; Oliver and Wood, 2014), and this is evident with the conspiracy theories surrounding climate change (Douglas and Sutton, 2015). Specifically, Republicans are more likely to believe that climate change is a hoax while Democrats are more likely to believe that oil companies are hiding solutions to climate change (Cassino, 2016; Furnham, 2013). Therefore, and given that different parties offer different official accounts on climate change, there is reason to doubt Lewandowsky et al.'s (2013a) finding that conspiracy thinking exerts a positive linear effect on climate change denial, irrespective of party identification.

The conditional effect of conspiracy thinking

Given prior results connecting conspiracy thinking to partisan identity, and given that elite cues are polarized on the issue of climate change, conspiracy thinking can be expected to push partisans' attitudes in different directions depending on partisan affiliation. Thus, conspiracy thinking could drive partisans to "double-down" on their opposing positions, pushing Republicans to be more skeptical of climate change and Democrats to be more convinced. Alternatively, conspiracy thinking could also drive partisans to accept positions *opposite* of their party elites, in this case interrupting the signals coming from those party elites. To account for these possibilities, our analyses interact partisanship and conspiracy thinking.

This latter possibility suggests that, in order to correctly account for the conditioning effect of partisanship, we need to control for the possibility that partisans direct their conspiratorial thinking to elites in their own party. Thus, partisanship, conspiratorial thinking, and the direction in which the conspiracy thinking is aimed could interact to produce different expectations about elite cues. Although partisans are generally suspicious of the opposing party (McClosky and Chong, 1985), polls show that some partisans—a minority—believe that their co-partisans are conspiring against them (Uscinski and Parent, 2014). This skepticism of their party possibly leads them to discount the cues coming from their party's leaders and instead take positions closer to that of the opposition. A historical example is the conservative John Birch Society whose conspiracy thinking led them to believe Republican President Dwight Eisenhower was a communist agent (Hofstadter, 1964). Just the same, a belief that the opposition is conspiring may drive partisans to take extremely polarized positions because they will fully discount cues coming from the other party and be even more accepting of cues coming from their own. To account for these possibilities, we include three-way interactions in our analyses between partisanship, conspiratorial thinking, and the groups that individuals believe are conspiring.

As for independents, the literature has paid less attention and does not provide firm footing for expectations. Conspiracy thinking may drive them to reject the existence of climate change since it represents an official consensus (Wood et al., 2012). On the other hand, conspiracy thinking could drive independents to accept climate change because, absent of the exposure to and acceptance of cues from partisan elites, the broader information environment (i.e., science, popular culture) accepts climate change and tends to accuse carbon-emitting industries and denialist politicians of malfeasance (Sakellari, 2014).

From the available literature, we present one hypothesis and one null. The null reflects the current state of the literature (Lewandowsky et al., 2013a).

H₀: Conspiracy thinking has a positive and linear effect on climate change denial.

H₁: The effect of conspiracy thinking on climate denial is non-monotonic, and depends on party affiliation.

In turn, we will explore the effects of conspiracy thinking on independents to provide new evidence of how conspiracy thinking affects independents, an important set of voters.

Data and methods

Using data from the 2012 Cooperative Congressional Election Study (CCES) survey (Ansolabehere, 2013), we investigate the impact of conspiracy thinking and partisanship on attitudes toward climate change while controlling

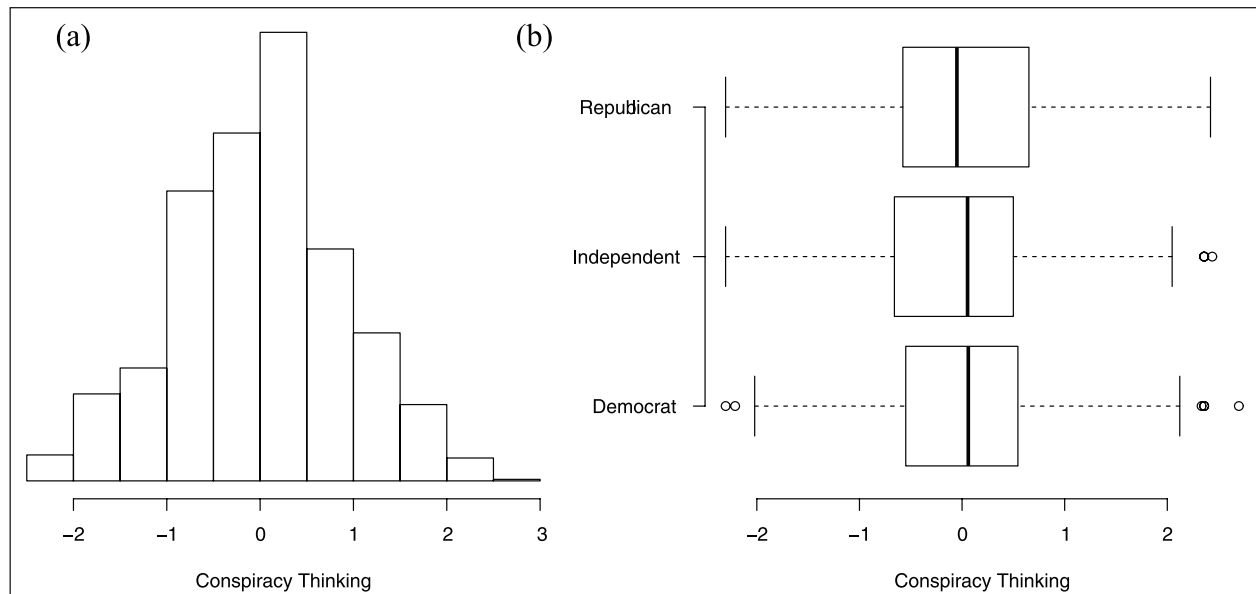


Figure 1. Estimated conspiracy thinking: distribution of estimated conspiracy thinking scores across all observations (a) and by party affiliation (b).

for a series of demographic, social, economic, and environmental factors. YouGov administered the survey online to a nationally representative sample of 1230 respondents in October 2012.

Dependent variable

Our dependent variable is each respondents' level of agreement with the scientific consensus on climate change. When prompted to express their opinion, respondents could choose from five alternatives ranging from complete agreement (*Global climate change has been established as a serious problem, and immediate action is necessary*) to complete denial (*Global climate change is not occurring; this is not a real issue*). These options touch on both the existence of climate change and the necessity of action; they are ideal because they match the positions taken by party elites. These alternatives were numbered 1–5.

Explanatory variables

Conspiracy thinking. To estimate the degree to which survey respondents engage in conspiracy thinking, four statements were loosely adapted from McClosky and Chong (1985) and provided to respondents: “Events like wars, the current recession, and the outcomes of elections are controlled by small groups of people who are working in secret against the rest of us”; “Much of our lives are being controlled by plots hatched in secret places”; “Even though we live in a democracy, a few people will always run things anyway”; “The people who really ‘run’ the country, are not known to the voters.” Agreement with each statement was measured

on a five-point Likert scale running from 1= “strongly agree” to 5 = “strongly disagree.”

Since the above-mentioned survey items are all Likert-type questions, we use a graded-response (GRM) item response theory (IRT) model to obtain measures of latent conspiracy thinking (Samejima, 2016). The GRM IRT essentially estimates an ordinal regression model of all Likert-type survey responses as a function of a single, latent predictor (viz. a measure of conspiracy thinking), and two question-specific parameters (viz. difficulty and discrimination parameters)—much in the same way IDEAL and NOMINATE estimate ideology measures based on a binomial (rather than ordinal) IRT model of “yay” and “nay” legislative votes. The distribution of our estimated measure of conspiracy thinking is depicted in Figure 1(a), appearing largely symmetric with a slightly longer right-hand tail, indicating the presence of a few highly conspiracy-minded respondents.

Partisanship

Partisanship was measured using standard three-point scale. The boxplots (Figure 1(b)) depict the conditional distributions of our conspiracy thinking measure across partisanship, which we would expect to be different if members of one partisan group were more prone to engage in conspiracy thinking than others. However, partisanship appears independent of our estimated measure of conspiracy thinking.

Control variables

Scholars have found that demographic factors are predictive of climate denial. Accordingly, we rely on the battery

of demographics collected by the CCES to control for family income, educational attainment, importance of religion, race, gender, and age. Scholars have also found that local weather can impact views of climate change (Egan and Mullin, 2012); therefore, we account for respondents' regional and local weather by including state fixed-effects and the difference between historical average temperatures in the respondent's zip code and the average temperature in the month prior to the survey. We also account for news attention, as news is a common forum through which elites communicate to the masses.

Finally, and to account for the fact that attitudes toward climate change can depend not only on partisanship and conspiracy thinking, but also on the *direction* of the conspiracy thinking, we allow the effects of conspiracy thinking to vary across respondents' partisanship and the partisan identity of the groups that respondents believe are conspiring. To measure the latter, we rely on a question that allows respondents to indicate whether they believe certain groups "work in secret against the rest of us." We aggregate responses to this question into four categories: No Groups, Liberals, Conservatives, Other groups. Specifically, if respondents answered that no groups work against the rest of us, we coded them as No Groups; if they answered either "Democrats or other liberal groups," "Communists and Socialists," or "Labor Unions" (and explicitly said no to the conservative groups) we coded their direction of distrust as "Liberals"; if they answered yes to either "Corporations and the rich" or "Republicans or other conservative groups" (and explicitly said no to the liberal groups), we coded their direction as "Conservatives"; otherwise, we coded their direction as "Other."

Results

Given the nature of our outcome variable, we estimate an ordered probit model. As we are interested in evaluating whether the effect of conspiracy thinking on attitudes about climate change are conditional on partisanship, our model allows the cumulative probability of believing climate change is a serious issue to be a function of an interaction between party affiliation, conspiracy thinking, and the direction of conspiracy thinking. Although the survey included 1230 respondents, we excluded 205 respondents who did not answer at least one of the items involved in the model, leaving us with 1025 cases on which the model is estimated.¹ The results of our estimation are presented in Table 1.

The model fits the data significantly better than a null (intercepts only) model, with a χ^2 test statistic equal to 494.5 on 88 degrees of freedom. While a saturated model is still discernibly better than our own (with a deviance of 2535.02 indicating there is large amount of variation across our 1025 observations yet to be accounted for), our model still correctly classifies about 43% of cases. With five response categories in our outcome variable, the classification rate is roughly twice as good as chance would have it.

As interpreting the estimated effects of variables involved in a three-way interaction is difficult to do by simply reviewing coefficients, we opt instead for obtaining predicted probabilities of answering our outcome question with the category "*Global climate change has been established as a serious problem, and immediate action is necessary*" (which we call the *focal category*) and comparing it to the probability of choosing any other alternative. To calculate predicted probabilities, we follow the "observed value" approach (Hanmer and Ozan Kalkan, 2013), which consists of taking N samples from the sampling distribution of coefficients and recording, for each sample, an average quantity of interest *across observed values*. These N averages across observed values are in turn averaged, and confidence intervals are approximated by considering empirical quantiles (e.g., 2.5 and 97.5 for a 95% confidence level). Using the "observed value" approach also averages over the potentially conditioning effects of direction that we accounted for in the three-way interaction, allowing us to focus on the conditioning relationship of interest: that of conspiracy thinking and partisanship.

The quantity of interest is thus the difference in predicted probabilities of choosing the focal category for high and low values of the conspiracy thinking variable, for each different party affiliation label. The predicted differences (i.e., the effects of a maximal change in conspiracy thinking) by party affiliation are plotted in Figure 2, with positive values on the vertical axis indicating an increase in the probability of adopting a stance on climate change that is in line with the scientific consensus. Furthermore, as we are not holding the target of conspiracy thinking constant, these effects correspond to marginal predicted differences across said targets, allowing us to focus on the different effects of conspiracy thinking across party affiliations while still accounting for their conditional nature.

As the plot shows, the effect is significant across party affiliations. Holding all else constant at their observed values, and averaging across conditional effects, conspiracy thinking makes partisans less likely to take a stance in line with scientific evidence, even if it means (in the case of Democrats) moving *away* from the cues offered by their own party. The effect is larger among Republicans than it is among Democrats. While the probability of choosing the focal category as a response is 15 percentage points lower among conspiratorial Democrats than among their non-conspiratorial co-partisans, conspiratorial Republicans are about 28 points less likely to choose the focal category than their non-conspiratorial Republican counterparts. This provides support for H_1 —that the effect of conspiracy thinking is non-monotonic and conditional upon party affiliation—and allows us to reject the null.

Understanding independents

Heterogeneity, and support for H_1 , is even more pronounced if we consider the effect among independents, where more

Table 1. Ordered probit model of level of agreement with consensus on climate change.

	Coefficient	Standard error
Party: Democrat	0.560*	(0.079)
Party: Republican	-0.591*	(0.081)
Conspiracy thinking	0.249*	(0.094)
Who conspires: no particular group	0.075*	(0.075)
Who conspires: Liberals	-0.997*	(0.074)
Who conspires: Conservatives	0.772*	(0.074)
Income >150k	0.049*	(0.057)
Income 30–60k	-0.099*	(0.078)
Income 60–150k	-0.037*	(0.078)
Religion importance: somewhat important	0.090*	(0.081)
Religion importance: not too important	-0.005	(0.099)
Religion importance: not at all important	0.455*	(0.101)
Education level: high school	-0.244*	(0.067)
Education level: some college	-0.135*	(0.065)
Education level: 2 year degree	-0.168*	(0.089)
Education level: 4 year degree	-0.189*	(0.069)
Education level: graduate degree	0.101*	(0.086)
White	0.052*	(0.080)
Female	0.074*	(0.070)
Birth year	-0.003*	(0.0002)
Difference w.r.t. normal August temperature	-0.001*	(0.006)
News interest: some of the time	-0.151*	(0.076)
News interest: only now and then	0.023*	(0.098)
News Interest: Hardly at all	-0.224*	(0.059)
News interest: don't know	0.068*	(0.022)
Democrat * Conspiracy thinking	-0.949*	(0.032)
Republican * Conspiracy thinking	-0.154*	(0.036)
Democrat * Who conspires: none	-0.178*	(0.054)
Republican * Who conspires: none	0.048*	(0.023)
Democrat * Who conspires: Liberals	0.401*	(0.025)
Republican * Who conspires: Liberals	0.390*	(0.050)
Democrat * Who conspires: Conservatives	-0.389*	(0.045)
Republican * Who conspires: Conservatives	-0.394*	(0.012)
Conspiracy thinking * Who conspires: none	-0.579*	(0.019)
Conspiracy thinking * Who conspires: Liberals	0.415*	(0.025)
Conspiracy thinking * Who conspires: Conservatives	0.507*	(0.028)
Democrat * Conspiracy thinking * Who conspires: none	2.411*	(0.007)
Republican * Conspiracy thinking * Who conspires: none	-0.595*	(0.004)
Democrat * Conspiracy thinking * Who conspires: Liberals	0.339*	(0.002)
Republican * Conspiracy thinking * Who conspires: Liberals	-0.383*	(0.017)
Democrat * Conspiracy thinking * Who conspires: Conservatives	-0.061*	(0.017)
Republican * Conspiracy thinking * Who conspires: Conservatives	-2.440*	(0.003)
State fixed-effects	Yes	
Intercept 1 2	-8.410*	(0.002)
Intercept 2 3	-7.456*	(0.071)
Intercepts 3 4	-6.663*	(0.081)
Intercepts 4 5	-5.586*	(0.090)

Observations: 1025. Akaike information criterion: 2719.023.

Note: A * indicates significance at the 0.05 level.

conspiracy thinking is associated with a higher probability of adopting the scientific consensus. Conspiracy-minded independents are on average about 18 percentage points more likely

to align their beliefs with the scientific community on climate change than their non-conspiracy-minded counterparts. This seems to be the case among both Democratic and Republican

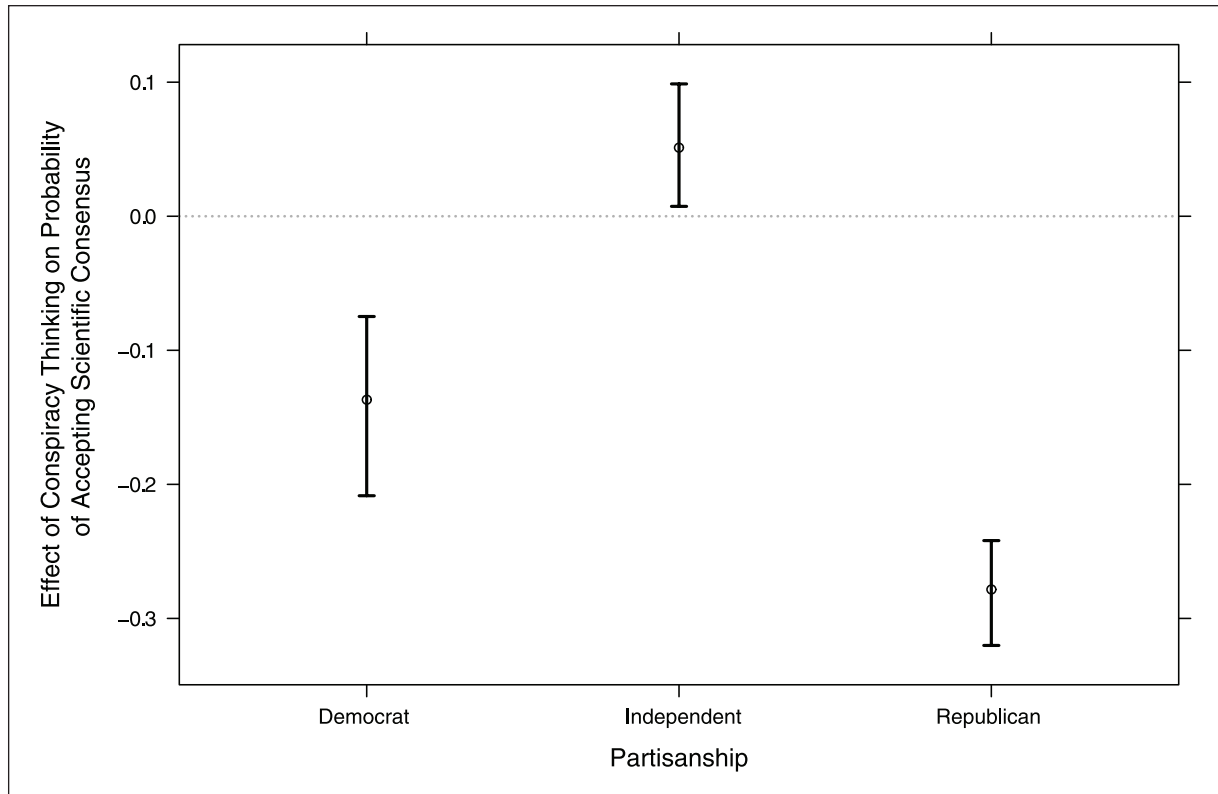


Figure 2. Effect of conspiracy thinking on acceptance of scientific consensus. Predicted change in probability of choosing the focal category when answering the question about beliefs in climate change as conspiracy thinking changes from min. to max., by partisanship.

leaning independents (though not among “true” independents), as illustrated by Figure 3, which replicates Figure 2 after grouping leaning independents with their partisan counterparts. Doing so moves the effect of conspiracy thinking among both Democrats and Republicans closer to zero (indeed rendering effects among Democrats statistically indiscernible from zero).

To further explore our findings regarding independents, we evaluated whether conspiracy thinking could predict which way independents lean when asked about their partisanship using a seven-point scale. We analyze independents, and predict their partisan leanings as a function of an interaction between their estimated conspiracy thinking and the direction of that thinking again using an ordered probit model and relevant control variables. Although we refer readers to our online appendix for specific results, Figure 4 displays the predicted probability of leaning in either direction as a function of conspiracy thinking, for each of two types of people: those whose conspiracy thoughts are targeted toward liberal groups, and those whose conspiracy thoughts are targeted toward conservative groups.

As the overall increasing trend in darker shaded areas indicates, conspiracy thinking appears to be a strong predictor of partisan leaning, with more conspiracy-minded

independents (i.e., those further to the right along the *x*-axis of Figure 4) being more likely to lean Democrat—particularly so when the objects of conspiracy thinking are Conservative groups. In turn, the object of conspiracy thinking is itself an even stronger predictor of partisan leaning, with larger portions of the right-hand panel (which presents results for independents who believe conservatives conspire against them) shaded in dark gray as compared to the left-hand panel (which presents results for independents who believe liberal groups conspire against them). In general, then, our model’s results suggest a potentially relevant mechanism through which the preferences of an important—if often ignored—portion of the population are formed.

Conclusion

In politically charged domains, partisans tend to take cues from politicians (Zaller, 1992), not scientists. With this said, there is considerable heterogeneity within each party’s identifiers and our analysis shows that conspiracy thinking explains a significant portion of it. To change minds, science communicators must battle both Republican elites and conspiracy thinking. This makes changing minds

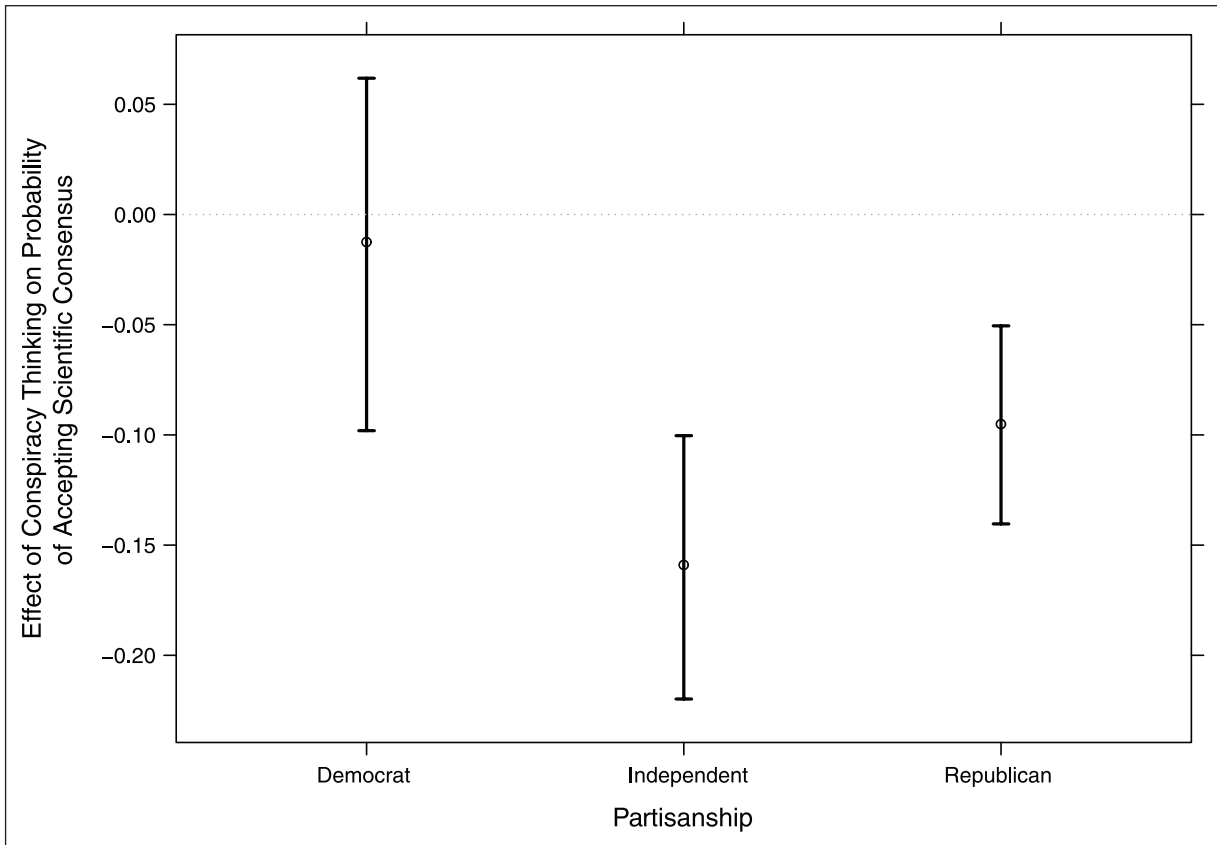


Figure 3. Effect of conspiracy thinking on acceptance of scientific consensus, after grouping leaning independents with partisan counterparts.

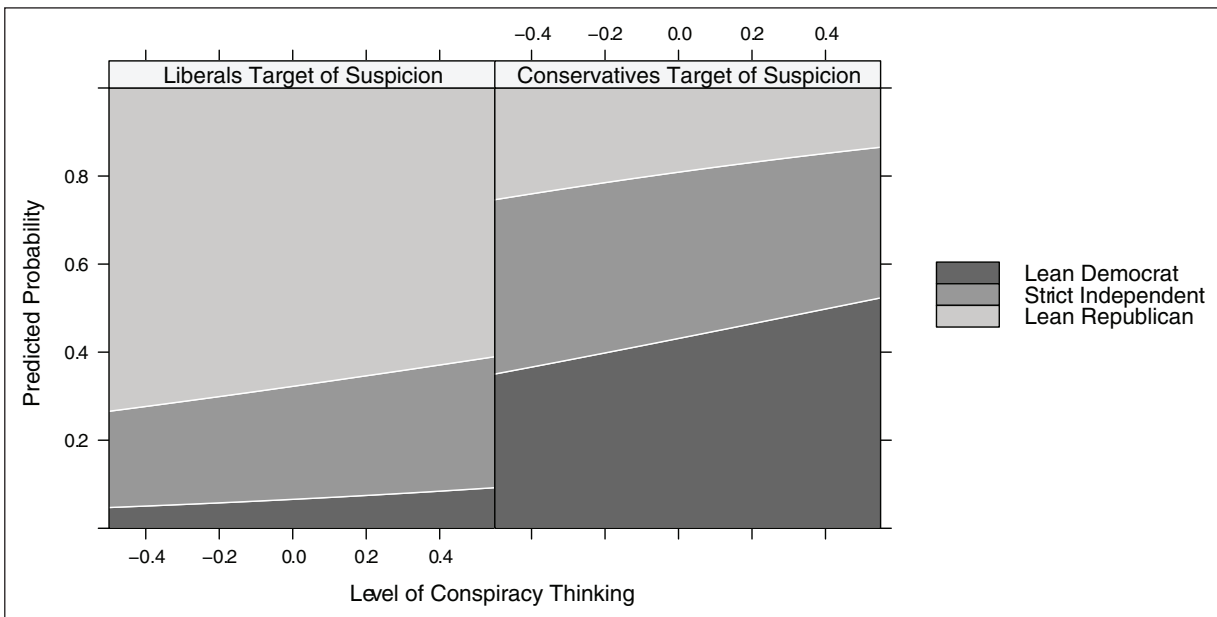


Figure 4. Predicted probability of partisan leaning as a function of conspiracy thinking, conditional on the object of conspiracy thinking.

particularly difficult: even if partisan elites uniformly came out in favor of the scientific consensus, conspiracy thinking will still be difficult to overcome.

Our findings move the literature forward by detailing the nuanced role that conspiracy thinking plays in shaping climate change opinions. Our results show that the effects of conspiracy thinking on climate change attitudes are larger than previously argued and conditional on party identification: conspiracy thinking drives Republicans and Democrats to reject the scientific consensus, but independents to accept it (depending on how one operationalizes “independents”). That conspiracy thinking drives pure independents to reject climate change suggests that partisanship is not solely to blame for denialism. Our results suggest that not all partisans accept elite cues: conspiracy-minded Democrats (excluding leaners) actively reject cues coming from their own elites. Conspiracy thinking may then constrain the influence of party elites in some instances. It is important to note that our findings varied depending on how we operationalized independents and partisans; researchers should therefore pay careful attention to their choices in operationalizing these important groups, particularly in conspiracy theory research. Our findings also shed light on how independents came to their position on climate change and suggest further avenues for research into how other worldviews drive independents in lieu of partisan attachment.

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Note

1. Although not completely random, the pattern of missing responses is likely a function of other covariates in the model, and thus can be treated as conditionally at random (or MAR).

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