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'Time to Wake Up': Climate change advocacy in a polarized Congress, 1996-2015

Deborah Lynn Guber[a], Jeremiah Bohr[b] and Riley E. Dunlap[c]

[a]Department of Political Science, The University of Vermont, Burlington, USA; [b]Department of Sociology, University of Wisconsin Oshkosh, USA; [c]Department of Sociology, Oklahoma State University, Stillwater, USA

ABSTRACT

Scholars who study the failure of climate change policy in the United States tend to focus on the mechanics of denial and the coordinated efforts of political operatives, conservative think tanks, and partisan news outlets to cast doubt on what has become overwhelming scientific consensus. In contrast, we address a factor that has been understudied until now – the role of climate change advocacy in the U.S. Congress. Using quantitative text analysis on a corpus of floor speeches published in the *Congressional Record* between 1996 and 2015, we find notable differences in the language partisans use. Democrats communicate in ways that are message-based, emphasizing the weight of scientific evidence, while Republicans tend towards a softer, cue-based narrative based on anecdotes and storytelling. We end with a discussion of what climate change advocates can hope to accomplish through the 'politics of talk,' especially in an age of heightened polarization.

KEYWORDS Climate change; political polarization; U.S. Congress; text-as-data

Introduction

Near the end of a mild winter in 2018, and in one of the warmest Marches on record, Sheldon Whitehouse walked to the podium of the U.S. Senate in Washington, D.C. to deliver a speech. He was accompanied, as usual, by a worn, bright green poster, on which was printed a view of the earth from space and the words 'Time to Wake Up' in bold, white type. It was a familiar routine for the junior senator from Rhode Island. By the time he began to read his remarks, televised to a small C-SPAN audience, he had already spoken for more than 500 hours on the subject of climate change – an accumulation of words uttered every week of every Senate session for nearly 6 years. In the days leading up to what would be his 200th address, he talked with journalists about the 'hollow feeling' that came with pushing an issue of

CONTACT Deborah Lynn Guber deborah.guber@uvm.edu

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vital importance in front of a nearly empty chamber (Dillon 2018). That night, however, he was joined by a score of Democratic Party colleagues who stood, in turn, to admire the 'dogged persistence' with which he had worked, time and again, 'to educate, to cajole, and to inspire' Congress to finally take action (Cardin 2018).

By Whitehouse's own assessment, his arduous efforts and those of fellow advocates have done little to change the debate on climate change, where there is a 'whopping disconnect' between the federal government and the scientific community that has only gotten worse in the age of Trump (Cooney 2010, Davenport and Landler 2019). In the days leading up the Senator's speech on 13 March 2018, studies were published linking warmer Arctic air to heavy snowfall in the northeastern United States (Cohen *et al.* 2018), and rising sea levels to coastal flooding in vulnerable areas such as San Francisco Bay (Shirzaei and Roland 2018). Yet for Whitehouse that night, it was not the likely and ever more dire effects of climate change that struck him most, nor the overwhelming consensus of experts in the field. After all, he said, 'we are long past any question as to the reality of climate change.' Instead, he used the pulpit he was given to condemn Congress – and the Republican majority, in particular – for its 'embarrassing' and 'persistent failure' to take up the issue at all (Whitehouse 2018). For Whitehouse, to understand the impasse on climate change is to recognize the corrosive role of money in politics, and the sway of the fossil fuel industry over the highest levers of power. In his view, the government's failure to act is 'simple political hydraulics' (Whitehouse 2017a).

Scholars who study the failure of climate change policy in the United States tend to focus on the mechanics of denial and the coordinated efforts of partisan news outlets, corporate lobbyists, and conservative philanthropists, foundations and think tanks, to cast doubt on what has become overwhelming scientific evidence (McCright and Dunlap 2000, 2010, Oreskes and Conway 2010, Dunlap and Jacques 2013, Brulle 2014, Dunlap and McCright 2015, Farrell 2015, 2016, Boussalis and Coan 2016). In contrast, we address the understudied role of climate change advocacy in the U.S. Congress, epitomized by Whitehouse and his weekly 'Time to Wake Up' addresses. Since the willpower to act on climate change in the U.S. is constrained by 'the elite partisan battle over the issue,' we argue that what party leaders *say* in their capacity as elected representatives is of critical importance (Brulle *et al.* 2012, 185, Druckman and McGrath 2019, Carmichael and Brulle 2017, Tesler 2018).

Using quantitative text analysis on a corpus of floor speeches published in the *Congressional Record* between 1996 and 2015, we look first at the frequency of speech by party over time, and at the inflection points that determine the varying attention given to the subject. Then, we use an unsupervised topic model to identify and compare meaningful clusters of

words used by Democratic and Republican Party members. Our results demonstrate that the legislative agenda on climate change adapts to news stories and external events, both for better and for worse, and there are notable themes that emerge in the language partisans use. Democrats tend to communicate in ways that are message-based, emphasizing the weight of evidence and the importance of scientific consensus, the way climate change contributes to anomalous weather events, and the opportunities promised by a new 'green' economy. Meanwhile, Republican speech is focused more narrowly on specific policy proposals such as cap-and-trade and the Keystone XL Pipeline, as well as on more general resistance to the issue itself that has evolved gradually over time from an outright denial of science into a softer, cue-based narrative based on anecdotes and storytelling (Iyengar and Valentino 2000). We end with a discussion of what Democrats can hope to accomplish by speaking in Congress, especially in an age of heightened polarization – a largely symbolic act that some have termed the 'politics of talk' (Maltzman and Sigelman 1996, Morris 2001).

Data and methods

In recent years, scholars have begun to gravitate towards the *Congressional Record* as a source of information on the use and dissemination of political language (Quinn *et al.* 2010, Diermeier *et al.* 2012, Grimmer and Stewart 2013, Grimmer 2013). In the past, it was difficult to study congressional speech quantitatively given the sheer scale of the enterprise. To give some perspective, *The Congressional Record* contains over four billion words and produces another half million per day (Quinn *et al.* 2010, p. 212). To put it mildly, there were 'simply too many statements from legislators to analyze' (Grimmer 2013, p. 2). That methodological obstacle can now be overcome with automated methods of digitizing text and with advanced statistical models capable of discerning patterns that might be overlooked by human eyes alone (Grimmer and Stewart 2013, Gentzkow *et al.* 2019).

The insights that can be gained by treating political speech as data are powerful. Floor speeches have been used to predict political ideology and to better understand the pace of partisan polarization (Jensen *et al.* 2012, Diermeier *et al.* 2012, Lauderdale and Herzog 2016). Studies of the *Congressional Record* also show that members are more likely to speak when their party is in the minority, when their views place them on the ideologically extremes, or when they are otherwise 'institutionally disadvantaged' in influencing policy outcomes (Rocca 2007, p. 489, Maltzman and Sigelman 1996). Finally, while a member's issue positions can be observed through roll call votes, researchers argue that the intensity of those preferences is better captured by the time and effort they devote to legislative debate on a given subject (Hall 1998), an activity that holds tangible rewards

(Westwood n.d.). Members of Congress use floor speeches as a means to communicate issue positions (Mayhew 1974) and cultivate constituent support (Hill and Hurley 2002, Grimmer 2013, Grimmer *et al.* 2014), to coordinate party messaging (Mulvihill 1997), and to attract campaign contributions from like-minded interest groups (Rocca and Gordon 2010). The media, in turn, report upon what members of Congress say on the floor, which drives mass opinion – indirectly, at least – and aids in the formation of the public agenda (Maltzman and Sigelman 1996). In short, to understand the dynamics of climate change policy in the United States, it is essential to observe the political arena in which that discourse takes place.

We acquired our data through the Sunlight Foundation's *Congressional Record* parser, which extracted text from the Government Printing Office's HTML files.[1] The corpus includes all speeches delivered on the floor of the U.S. House of Representatives and the U.S. Senate that contained the words 'climate change,' 'global warming,' or 'greenhouse gas,' from 1996 through the cessation of the project in 2015. Consistent with the practice of other scholars, we excluded all Extensions of Remarks, which represent statements and supplemental materials submitted for the record, yet not spoken by members during actual proceedings (Gentzkow *et al.* 2019), after which 5,707 speeches remained. A qualitative review of a random sample of those speeches revealed that many contained a single, passing reference to one keyword, with content irrelevant to the subject at hand. In the end, we opted to include only those that contained at least two mentions of any of our keywords, resulting in a final corpus of 2,727 speeches.

Before proceeding, we conducted standard data preprocessing – reducing words to word stems, removing punctuation, numbers, and common stop words – as well as bigram (two-word phrase) identification using the quanteda package in R (Benoit *et al.* 2018). Words that occurred in less than 1%, or more than 90%, of documents were also removed before generating models. Along with the full text and date of each speech, the metadata provided included the speaker's name, state, chamber, and party affiliation, which we used to prepare the figures on frequency of speech that we present below.

In our exploration of congressional rhetoric on climate change, we used an unsupervised topic model that was generated using the stm package developed by Roberts *et al.* (2014). This technique makes use of latent Dirichlet allocation (LDA) to identify associations between words – referred to as 'topics' – across a given set of documents (Blei *et al.* 2003), which allows researchers to automate and statistically analyze large volumes of text that would be difficult to assess manually (Grimmer and Stewart 2013). These models represent k topics latently present across a corpus, inferring coherent clusters of words that commonly co-occur within documents. It is important to note, however, that unsupervised topic models cannot speak directly to the

preferences of members of Congress on subjects like climate change, only to their patterns of word use (Lauderdale and Herzog 2016). For example, portions of both Democratic and Republican party speeches can be classified as 'climate change denial,' not because of any individual member's belief or disbelief, but because members on both sides are discussing the same subjects using a similar cluster of words.

When estimating our structural topic model, we conditioned topic prevalence upon the speaker's party and the date of the speech. Through this generative process, the structural topic model assigns a probability to each word of belonging to a topic, and each document is represented as a probabilistic mixture of topic scores. While scholars generally agree that no 'correct' number of topics exists in finding a topic model solution, a range of tools can offer guidance on a better or worse set of topic numbers. We made use of semantic coherence (Mimno *et al.* 2011) and exclusivity scores (Roberts *et al.* 2014, Airoldi and Bischof 2016) to initially assess model quality. From here, 16-, 17-, and 18-topic models were inspected, and an 18-topic model was selected for providing a balance of coherent and exclusive topics. We then assigned labels to facilitate the interpretation of results, which were chosen after reviewing top word probabilities and reading through the 50 most representative speeches in each topic. Finally, we computed topic correlations across documents and generated graphs using the Fruchterman-Reingold algorithm available in the igraph R package (Csardi and Nepusz 2006).

Results

Frequency of speech

To begin, we present the number of speeches delivered in Congress over time that contained at least two mentions of any of our keywords – 'climate change,' 'global warming,' or 'greenhouse gas' – first summarized by year in Figure 1, then annotated by month in Figure 2. Here, despite the raw counts that appear on the Y-axis, the frequency of climate-related speeches in the U.S. Senate stands out when compared to the House of Representatives, a difference that is especially notable given the relative sizes of the chambers – just 100 members in the Senate, compared to 435 in the House.

That the Senate dominates debate on climate change policy is, perhaps, an unsurprising result. Since the chamber has adopted behavioral norms that are 'far more egalitarian and individualistic than the hierarchical and institutionally driven House,' senators have greater leeway to speak, even when their party falls into minority status (Volden and Wiseman 2018, p. 731, 2014). Whitehouse provides one such example, leading the charge against climate change with the highest individual number of speeches at 139. His

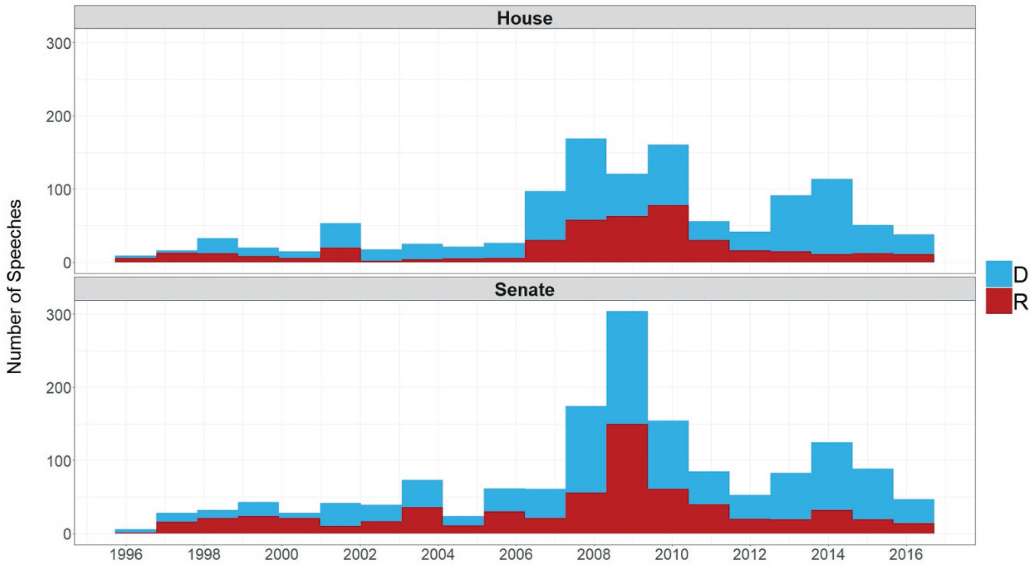


Figure 1. Number of climate change speeches in Congress by year, 1996–2015.

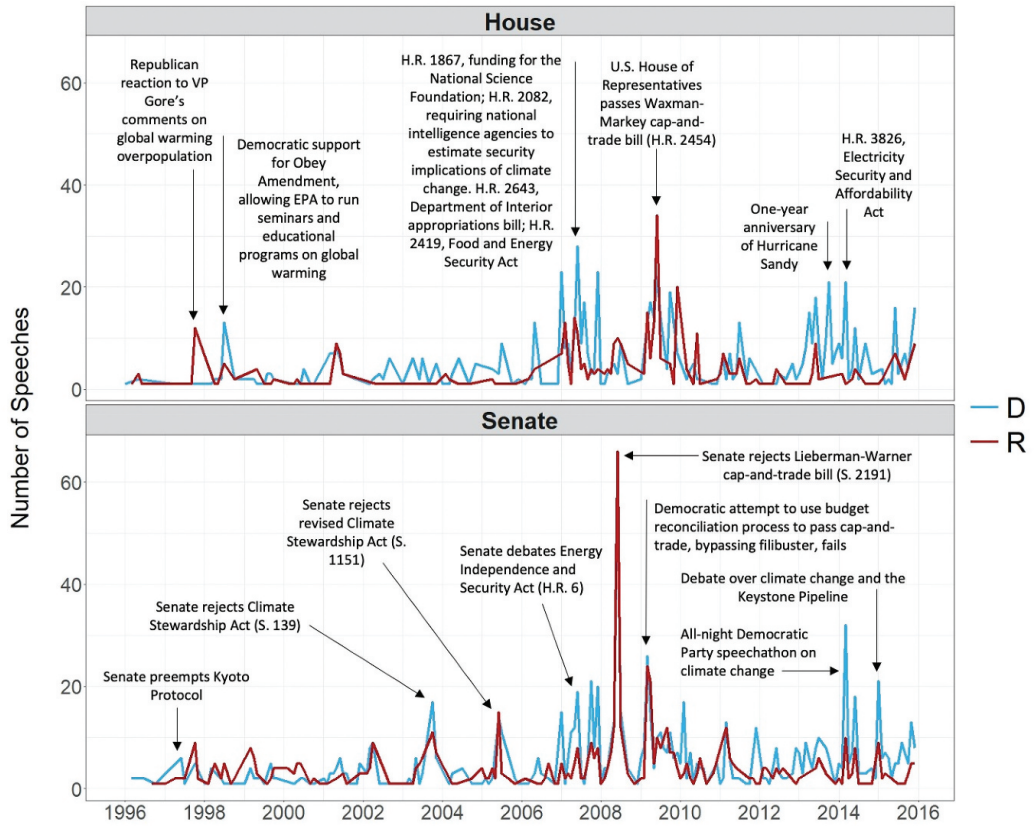


Figure 2. Number of climate change speeches in Congress by month, 1996–2015.

efforts alone represent 5% of the entire corpus and 12% of all Democratic speeches in the U.S. Senate since he began his career in 2007. That proportion swells to 32% in the time since he began his 'Time to Wake Up' addresses in April 2012.

Interesting patterns also emerge in the amount of attention given to climate topics over time. As the annotations provided in Figure 2 demonstrate, variations in the frequency of speech reflect, first and foremost, the daily business of Congress and the ebb and flow of legislative debate on bills and amendments. Indeed, the most striking data point on frequency of speech in the entire corpus represents but a single week in early June 2008, during which the U.S. Senate considered a cap-and-trade bill titled 'America's Climate Security Act,' also known as Lieberman-Warner (S. 2191) after its co-sponsors, Joe Lieberman (I-CT) and John Warner (R-VA).

Yet scholars have long recognized that the decision to introduce a bill at all and bring it to the floor reflects a degree of risk, as well a sober assessment of the timing of events and the creation of policy windows in which to act (Kingdon 1984, Kraft 1995, 2013). In our corpus, the frequency of speech peaks in both chambers in the years 2007 through 2009, coinciding with a flurry of news stories that pushed climate change into the mainstream of American political discourse, for better and for worse – the release of the documentary film *An Inconvenient Truth*, the Nobel Peace Prize awarded jointly to former Vice President Al Gore and the U.N. Intergovernmental Panel on Climate Change (IPCC), as well as the bitter scandal involving leaked emails from the University of East Anglia that came to be known as Climategate (Guber and Bosso 2009, 2012).

If environmental activists pushing Lieberman-Warner assumed that a 'tipping point' on climate had made cap-and-trade saleable at last (Guber and Bosso 2009), surely they were wrong. Democrats were reluctant to increase their constituents' energy bills, however marginally, at a time when gasoline approached 4 USD per gallon (Pooley 2008, Rabe and Borick 2010). They remained largely silent during the floor debate on the bill – in contrast to their Republican counterparts – and failed to follow through when similar legislation, known as Waxman-Markey (H.R. 2454), passed the House the following year. In contrast to Mayhew's description of position-taking in his classic book, *Congress: The Electoral Connection* (1974), Senate Democrats adopted a strategy of 'position avoidance' on cap-and-trade, and a final vote was never taken (Jones 2003).

But the decision not to act, or to remain quiet on issues, has consequences as well. In explaining why he began to deliver his 'Time to Wake Up' addresses on the floor of the Senate in 2012, Whitehouse referred to the years following the collapse of Waxman-Markey, as a 'particularly bleak period.' Democrats, he said, had put their careers on the line to pass cap-and-trade in the House, at last, and the Senate walked away. Things '[j]ust fell

apart,' he explained. 'You couldn't get the Obama White House to use the words climate and change in the same paragraph, and it just seemed really, really bleak' (Freedman 2018). Indeed, Democratic advocacy on climate change was relatively muted during that time, as Figure 1 illustrates. Coverage of the subject in major U.S. newspapers declined (Boykoff *et al.* 2020), as did public concern for the environment in polls (Newport 2010), suggesting that elite opinion is a vital catalyst for maintaining the attention of the news media and the public at large (Grimmer 2013). Whitehouse's plan was a simple one: '[L]et's start talking about this on a regular basis' (Freedman 2018).

Topic prevalence

To further explore the content of congressional speech, Figure 3 presents labels for the 18 topics produced by our unsupervised model, along with the top word stems associated with each topic, ranked in descending order from the most to the least prevalent in the corpus. As a whole, this list represents the varied ways in which members of Congress discuss the complex issue of climate change, and hints at the 'talking points' and other rhetorical devices they use to persuade their audience.

As the graph in Figure 4 shows, these topics are not distributed evenly between Democrats and Republicans, but instead splinter in ways that highlight key differences in partisan speech, worthy of a closer look. For instance, in our corpus, Republican members devoted far more attention than their Democratic counterparts to topics related to cap-and-trade policy, climate

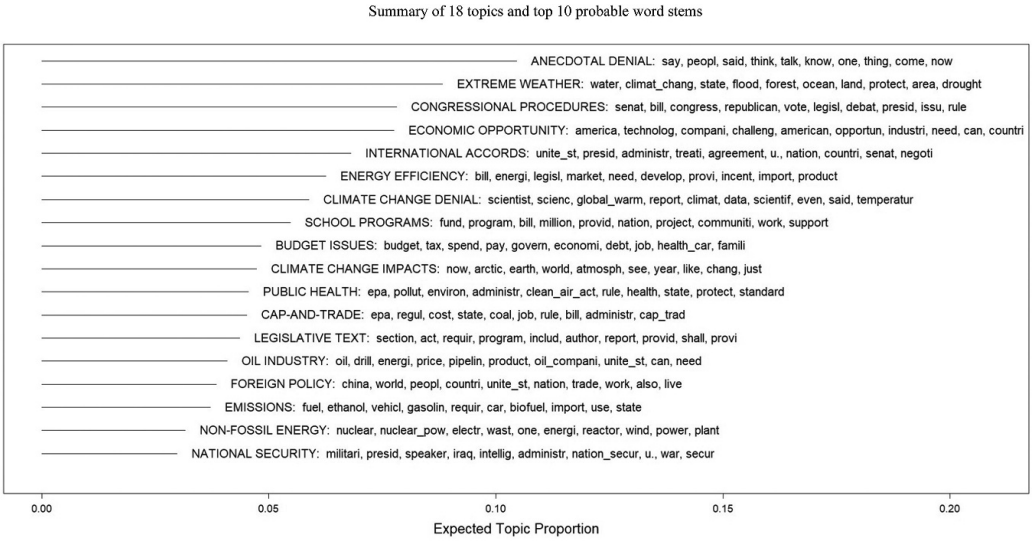


Figure 3. Labels for an 18-topic solution produced by a structural topic model of congressional speeches, 1996–2015. Summary of 18 topics and top 10 probable word stems

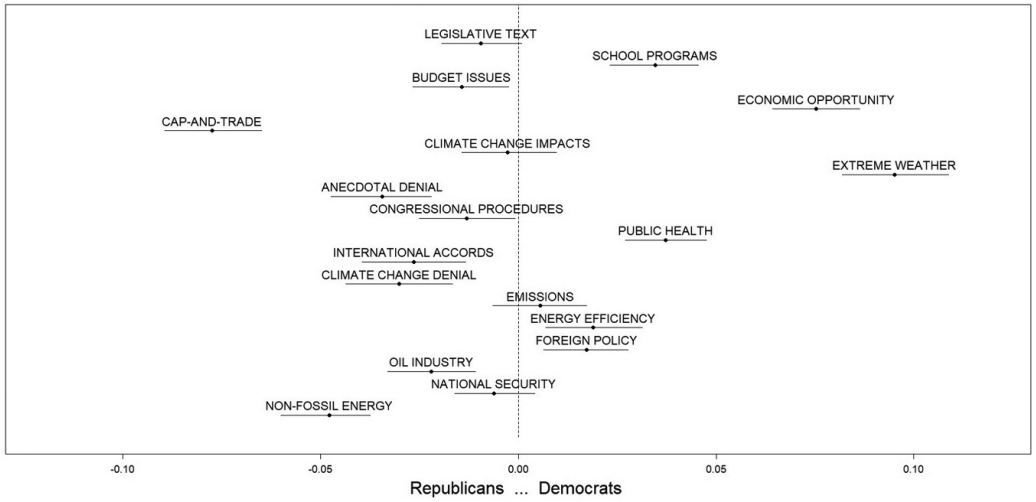


Figure 4. Partisan differences in the prevalence of 18 topics among climate-related speeches delivered in Congress, 1996–2015.

change denial, international accords, and energy production. In contrast, Democratic speeches tended to focus much more on linking climate change to extreme weather events, economic opportunities, or public health concerns.

Figure 5 displays the prevalence of a subset of topics over time, where partisan differences in attention are most apparent. Here, it becomes clear that polarization on climate change has deepened over the past 20 years.

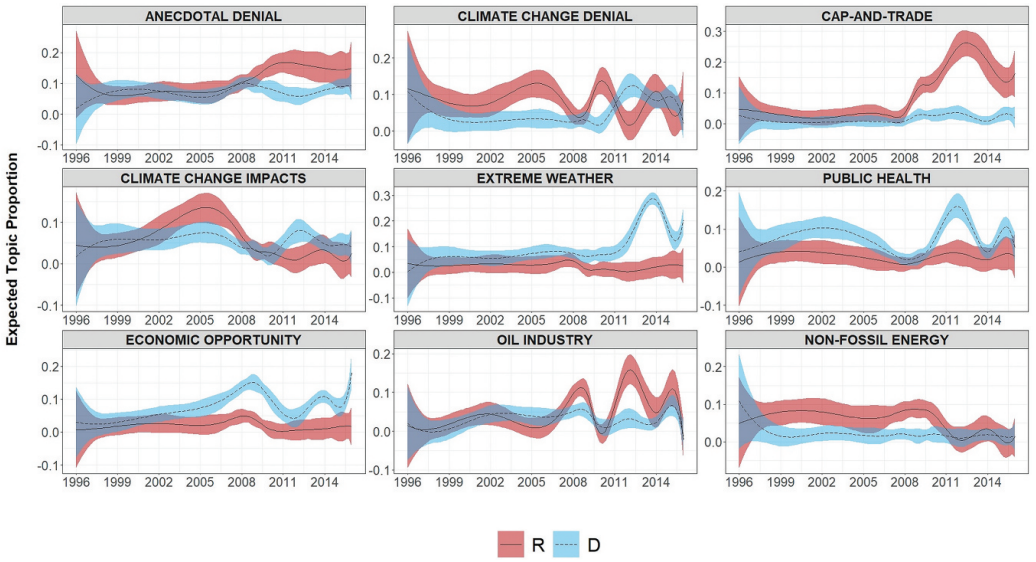


Figure 5. Topic prevalence in congressional speeches on climate change, by party, 1996–2015.

Other scholars have identified partisan differences on environmental roll call votes in Congress (Shipan and Lowry 2001, Dunlap *et al.* 2016), and our data demonstrate that those patterns extend to political discourse as well. While the 95% confidence intervals built around the LOESS curves for each topic overlap at the start of our corpus in 1996, the trajectories of Democrats and Republicans split in the years that follow, with one partial exception. In drawing attention to rising global temperatures and melting sea ice, Democrats have on occasion been joined by a small group of pro-climate change Republicans in delivering science-driven speeches, giving the topic labeled Climate Change Impacts a more bipartisan appearance than most. The two most prominent Republicans in this category – Representatives Wayne Gilchrest and Roscoe Bartlett of Maryland – represent a state acutely vulnerable to beach erosion and rising sea levels. Their positions on climate may seem strategic in light of Mayhew's (1974, p. 5) assumption that members of Congress act as 'single-minded seekers of reelection,' but it is more surprising in the context of other more recent work that stresses the role of ideology in constraining legislative behavior (Poole and Rosenthal 1991, 1996, 2007).

That aside, the bulk of our results speaks to differences in Democratic and Republican party agendas on climate change. Over time, Democrats have focused increasingly on its impact on public health, and the frequency of extreme weather events like hurricanes, blizzards, droughts, and floods. They have also emphasized the opportunities of a new 'green' economy built upon energy efficiency and renewable resources like wind and solar power and the jobs those sectors create. Meanwhile, Republican speech has leaned towards preserving fossil fuels such as oil, coal, and natural gas, a preference that Whitehouse attributes to campaign contributions and independent expenditures by interest groups that grew exponentially following *Citizens United vs. FEC* in 2010 (Whitehouse 2017b).

Our results also give context to the failure of Congress to pass climate mitigation legislation, despite repeated efforts. The steady trend and muted response of Democrats in the Cap-and-Trade topic suggests that many rank-and-file members were never committed enough to speak out in its defense on the floor of the House and Senate, allowing debate to be dominated by opponents instead. While emissions trading was once popular among conservatives who embraced free-market solutions to environmental problems, party polarization has since pushed Republicans to re-brand cap-and-trade as a 'cap-and-tax' scheme filled with exemptions (Broder 2010, Bohr 2016). It was a theme they continued even after the 2009 collapse of Waxman-Markey in opposing an EPA rule change that would have allowed the Obama administration to impose a 'backdoor' alternative that in the words of Senator Mitch McConnell (R-KY) would have dealt 'a devastating blow to an economy already in rough shape' (156 Cong Rec S4788).

Finally, trends on climate change denial over time are especially striking. On the one hand, it appears that Democrats began to push back more strenuously than ever against conventional Republican attacks on science after 2009, and yet a softer form of Anecdotal Denial among Republicans increased during those same years, suggesting if not a change of heart, at least a subtle change in strategy among some. Excerpts from both categories can help to illustrate the difference.

Speeches classified as Climate Change Denial are direct in their criticism of environmental activists, the IPCC, and the scientific community at large. Senator Jim Inhofe (R-OK), for example, insisted in 2007 that '[a]n abundance of new peer-reviewed studies' and the discovery of errors in data meant that 'the scientific underpinnings for alarm are "falling apart"' (153 Cong Rec S 13,473). Likewise, at the height of the Climategate scandal in late-2009, Representative Ted Poe (R-TX) complained about 'fraud and corruption in the global warming scientific community' (155 Cong Rec H13444) and claimed that 'the science behind man-made global warming is melting before our eyes' (155 Cong Rec H13613). Not long after, he joked that while the 'nation had one of the coldest winters in years, including record snowfalls in the South … the Warmers like Al Gore ignore the obvious, and still claim we are all going to perish, saying that Man is the threat to the planet. The groundhog is a better predictor of the weather than Al Gore' (156 Cong Rec H1152).

In contrast, Anecdotal Denial is less overt. At first glance, the topic seems constructed from a random collection of common word stems, such as 'thing,' 'went,' 'came,' 'happen,' 'talk,' 'someth,' 'say,' 'everybodi,' 'anyth,' and 'think' (Figure 3). However, upon a close inspection of the top 50 texts assigned to this topic, it appears far more coherent. Its speakers were not inclined to challenge the science of climate change per se. Rather, they framed the issue as a narrative, deploying analogies and storytelling to make a point. For instance, John Carter (R-TX) referenced his own experience as a young man growing up in Lubbock, Texas in the 1960 s during a House debate on the federal government's response to the Deepwater Horizon oil spill in 2010, in which he said:

> I remember specifically a day when a bunch of buddies and I went out to play a round of golf. It was 89 or 90 degrees. We were in a pair of golf shirts and Bermuda shorts, and we started out playing a round of golf. Before we got through with nine holes, a dust storm came up, and we could hardly see the ball, and we could hardly hit it. Then it began to rain, and it rained mud for about an hour through the dust storm. Then as the dust seemed to calm and go away, the temperature began to drop, and by the time we got to the club house, the temperature was 20 degrees.
>
> So we had had a climate change from 90 to 20 in a 10-hour period, including a dust storm and rain. And we know that climate change is George W. Bush's fault. Now did he do that? Because that certainly was the most spectacular

> climate change I have ever seen in my entire life. But, unfortunately, we all know in Texas, we have those climate changes all year long. Is that the Republicans' fault and the Bush administration's fault? Good Lord, where were they in 1964? (156 Cong Rec H4591).

Senator Inhofe, who famously questioned the reality of climate change by tossing a snowball on the floor of the U.S. Senate in 2015, makes frequent appearances in the Anecdotal Denial topic as well. To express his camaraderie with Senator Ted Cruz (R-TX) in opposing Obamacare in 2010, he cited a long-standing battle of his own:

> The Senator from Texas said if you don't have logic on your side or the facts on your side or the public on your side, what do you do? It is not just pounding the table. It is name-calling.
>
> I went through this, I would suggest to my friend, 12 years ago when the Kyoto treaty was up and everyone thought global warming was coming and that was going to be everyone's trip to the White House to support global warming, until we realized what the cost would be. I was the bad guy because I stood and said: No, this isn't true. First of all, it is a hoax; and secondly, even if it is not, we couldn't do it. That is when all the name-calling started. I can remember being called – in writing and by a fairly prominent person – I should be hanged for treason at that time. That is what they get, and that is what my friend is going through right now with a lot of people who don't agree with him.
>
> Twelve years later, what has happened? People realize I was right. I am not suggesting it is going to be 12 years before they realize the Senator from Texas is right on this, but it means the behavior of people today is something that has happened many times in the past.
>
> So I would just ask my friend to remember that and to realize that quite often, when a person is right on a controversial issue, they are going to be the subject of a lot of criticism, a lot of cussing, a lot of name-calling, and a lot of violence. So this isn't the first time (159 Cong Rec S6736-S6737).

In our view, the two topics – Climate Change Denial and Anecdotal Denial – overlap and yet capture unique elements of Republican rhetoric on climate change. The fact that Senator Inhofe's floor speeches figure prominently in both reinforces his role as the Republican Party's most vocal critic on climate change policy. That said, the list of speakers populating these topics are distinct enough to suggest that real differences in political communication and representational style exist (Fenno 1978, Grimmer 2013). As Grimmer and Stewart (2013, p. 267) point out in discussing the promise and perils of automated text analysis, the complexity of language means that there is 'no substitute for careful thought and close reading' (Grimmer and Stewart 2013, p. 266).

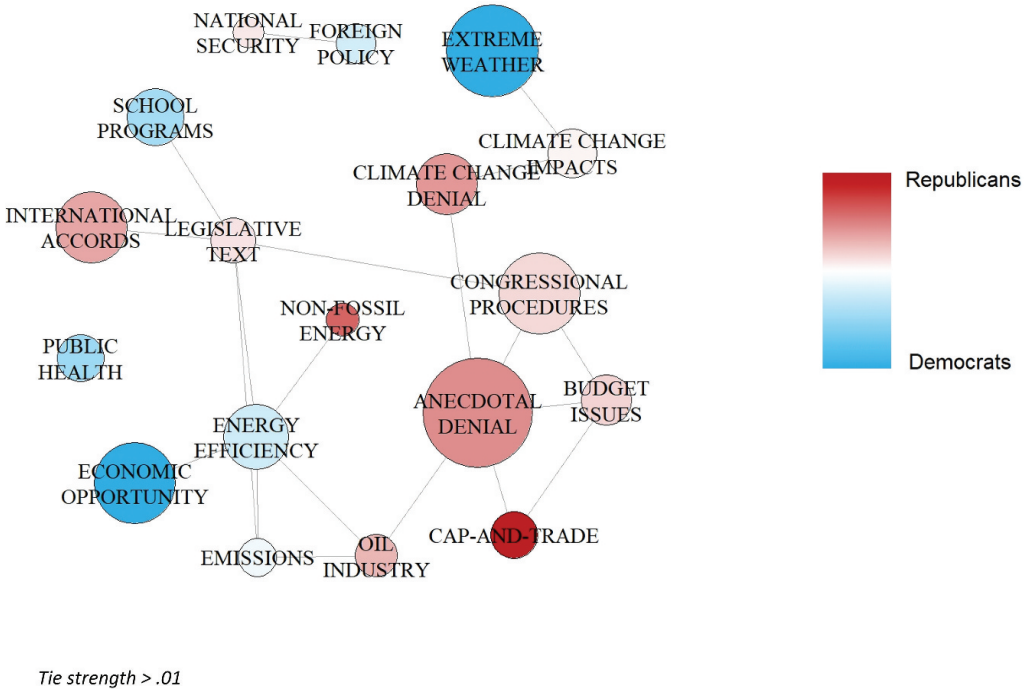
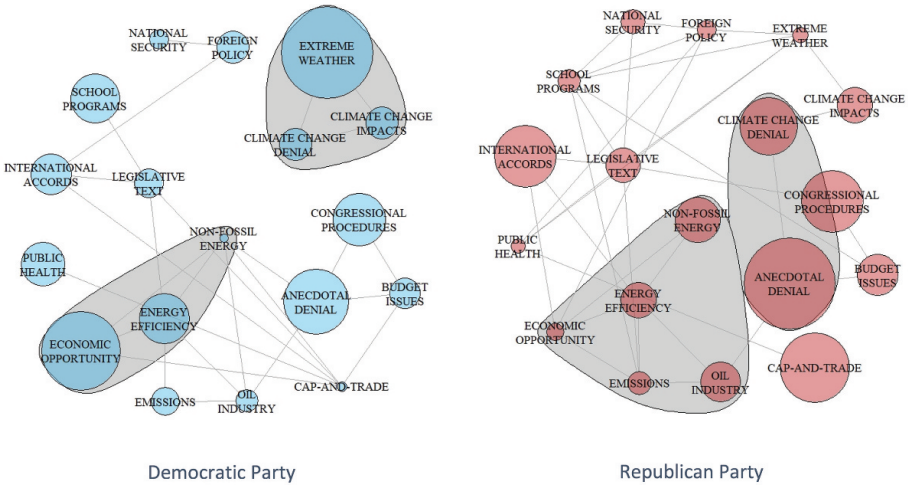


Figure 6. Topic correlations in congressional speeches on climate change, 1996–2015.

Topic correlation

Our last set of results, found in Figures 6 and 7, concern the relationship among the 18 topics in our model. Here, node size reflects corpus-level topic proportion, ties indicate a greater likelihood that topics are discussed within common documents, and color is used to highlight patterns unique to Democratic and Republican party speakers. Three observations stand out. First, Extreme Weather and Economic Opportunity are popular talking points for Democrats, while Anecdotal Denial dominates Republican speech. All are strongly asymmetric as well in that few partisans from across the aisle appear within these topics. Second, Climate Change Impacts correlates, as expected, with Extreme Weather, but has far more party balance. As noted above, these speeches include comments on glacier melt, Arctic sea ice, and rising ocean levels, which draw the attention of pro-climate change Republican who represent states especially vulnerable to coastal flooding. As Muro *et al.* (2019) point out, the geography of climate change might eventually make the politics of addressing the issue less polarizing since 'Red' states are likely to be hit hardest by its effects. Finally, it is interesting that Cap-and-Trade and the related EPA regulations that fall within that topic are largely isolated from others in the model. While the reasons for this are unclear, we might speculate that Republicans compartmentalize their opposition to climate change and find it easier to block climate policies on narrow economic grounds.



Tie strength > .01; clusters shaded for emphasis.

Figure 7. Comparing topic correlations for Democrats and Republicans.

Discussion

The work we have presented here, demonstrating notable differences in the language partisans use to discuss climate change policy in Congress, has important implications for climate change policy in the United States, and the opportunity for issue advocacy in Congress, in particular. First, to the extent that elites act as opinion leaders and play a key role in correcting misinformation for the mass public, the efforts of Whitehouse and others remain decidedly worthwhile (Boussalis and Coan 2016, Lewandowsky *et al.* 2017, Farrell *et al.* 2019). Likewise, if citizens accept or reject persuasive messages based on an evaluation of the source's credibility (Iyengar and Valentino 2000), it makes strategic sense for Democrats to devote time on the floor of the House and Senate to challenging the public's trust in what climate skeptics say.

Second, if media coverage has a direct impact on public concern for the environment (Brulle *et al.* 2012), then whatever advocates in Congress can do to make the news should help increase visibility for an issue that often languishes on the back-burner of American politics. In fact, some studies point to the need for 'continuous public communications efforts to maintain public support for climate change action in the face of opposing messaging campaigns' (Brulle *et al.* 2012, p. 185). If that is the case, Whitehouse's 'Time to Wake Up' addresses do not represent the failure of speech, but rather the need for far more of it.

That said, our findings also speak to the struggle that advocates face when it comes to shaping 'the frames and mental models people use to understand the phenomena' (Weber and Stern 2011, p. 315). Literature in the field of

mass communication differentiates between two distinct forms of persuasion. On the one hand, 'message-based' appeals prompt the audience to evaluate the content of the material that is presented, including relevant facts. In contrast, 'cue-based' appeals are where the audience is encouraged to attend to more easily assimilated 'signals' or associations that serve as cognitive shortcuts. Here, vivid imagery, emotional appeals, and even humor, abound (Iyengar and Valentino 2000, p. 109).

These differences are easily identified in our corpus of speeches. Democrats prefer to emphasize the weight of evidence and the value of scientific consensus, the way climate change impacts public health and contributes to anomalous weather events, and the opportunities promised by a new 'green' economy – subjects that test well in polls when presented in isolation (Leiserowitz *et al.* 2019), but grow less popular when respondents are reminded of the painful tradeoffs and economic costs involved in climate mitigation (Brulle *et al.* 2012, Egan and Mullin 2012, Lewandowsky *et al.* 2012, Brooks *et al.* 2014, Shao *et al.* 2014, Hamilton *et al.* 2015, Bernauer and McGrath 2016, Carmichael and Brulle 2017, Palm *et al.* 2017). In contrast, Republican speech tends to focus more narrowly on opposition to legislation, as well as a general resistance to climate change itself that has evolved gradually over time. By tempering outright denial of science with a softer narrative based on anecdotes and storytelling, we argue that Republicans increasingly employ a cue-based form of mass communication that – if previous research holds – is likely to be more persuasive and harder to contradict than the Democrats' factual and straightforward message-based approach (Iyengar and Valentino 2000, Bullock 2011, Brulle *et al.* 2012, Dahlstrom 2014).

Finally, it is important to emphasize that differences in partisan speech matter outside the halls of Congress. Elite cues are likely – and even designed – to activate the partisan identity of voters, much to the detriment of issues like climate change where citizens might otherwise find common ground (Hetherington 2001; Zaller, 1992). Thus, using the 'politics of talk' effectively will hinge on the ability of advocates in Congress to find words that bridge the partisan divide (Corner *et al.* 2012, Feinberg and Willer 2015). As Muro *et al.* (2019) point out: 'For decades, environmentalists have focused on the abstract opportunities of a green economy – more renewables and efficiency, for example – as the route to political change.' And yet, they say, a 'harder charging, grittier and more palpable campaign focused on climate impacts in "red" America could prove a lot more effective,' especially since those states are (and will continue to be) exposed to the most severe climate impacts (Muro *et al.* 2019). Republican members of Congress and their staff already hold 'wildly inaccurate' views of their constituents' preferences on climate change policy (Hertel-Fernandez *et al.* 2019), suggesting a vulnerability that advocates might exploit by targeting elections.

That said, it is not just elite leadership of mass opinion that matters, but rather the reciprocal relationship between the public and those they elect to represent them (Jacobs *et al.* 2013). Analysis of the *Congressional Record* holds important insights on political communication, and yet a note of caution is warranted in that overreliance on speeches in Congress could lead scholars to 'disregard key aspects of American political life and thus skew it toward finding that elites drive the conversation' in its entirety (Jensen *et al.* 2012, p. 68). It is possible, of course, for elites to act as 'polarization entrepreneurs,' a phrase coined by Sunstein (2009). Indeed, partisans might actively sow discord and cultivate groups of like-minded supporters in order to best achieve their ends. But at times they also respond and adapt to wider trends in public mood (Abramowitz 2011). If the primary goal of members of Congress is getting reelected (Mayhew 1974), after all, it stands to reason that mass attitudes shape the behavior of elites as well, by applying pressure from the bottom-up. Ultimately, the key to driving the national debate on climate change policy forward is to press equally hard on both ends and hope to meet in the middle.

Note

1. The Sunlight Foundation's *Congressional Record* parser is currently unavailable; thus data has not been updated beyond 2015. Our data were downloaded in the summer of 2016. For more, see: https://sunlightfoundation.com/2014/02/20/sample-the-new-a-la-carte-congressional-record-parser/.

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ORCID

Deborah Lynn Guber http://orcid.org/0000-0001-6287-3905
Jeremiah Bohr http://orcid.org/0000-0001-6136-3751
Riley E. Dunlap http://orcid.org/0000-0002-7047-3757

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