Climate Change Denial & Skepticism: A Review of the Literature – Version 1.0

September 15, 2022

Abstract

Political actors and individuals who deny the reality of human-caused climate change are a minority with an outsized ability to shape domestic climate science, policy, and communications. This literature review traces the development of climate change denial from its beginnings in conservative organizations and the energy industry in the mid-20th century, and shows how the initial denialists' work has been refined by contemporary actors to spread climate dis- and misinformation online. The essay examines the scholarly literature on the alignment of climate change denial with identity, showing how climate change denial has become woven into certain cultural, political, racial, and religious identities. It further traces the tactics for spreading climate change denial, like social media targeting and conspiracy theories designed to cast doubt on scientific findings. Finally, the essay explores scholars' work examining ways to disrupt climate change denial, build support for scientific institutions, and bolster acceptance of knowledge about climate change.

Introduction

As the effects of climate change on our weather, economies, and societies continue to worsen, a related phenomenon of climate denialism threatens a healthy people and planet. "Climate denial," a catch-all term to describe activities and opinions that run counter to the existing scientific consensus on anthropogenic climate change, is an obstacle to action on climate change (Collomb 2014; Farmer & Cook 2012; Schafer 2015; Walter et al. 2017; Whitmarsh 2011). As wildfires, droughts, and flooding across the U.S. becomes a new normal, why do some politicians, business leaders, and everyday Americans insist climate change does not exist?

We must address climate change denialism because the dangers posed by climate change are quite real. Comprehensive reports from the United Nations Intergovernmental Panel on Climate Change (IPCC) reveal that the predicted consequences of unchecked climate

change are extremely likely to be dire physically, economically, and socio-culturally to humans and the planet (IPCC 2021; IPCC 2014). Action is necessary to prevent a runaway global environmental crisis, but dysfunctional information dynamics, sticky anti-climate narratives, and coordinated tactics by disinformation producers erode public support for pro-environmental policies (Cook et al. 2016; Tesler 2017).

While climate change denialism is a broad term, there's significant nuance that many scholars have developed over time. Typically, denialism exists on a spectrum from rigid rejection to confusion and disinterest. The Yale Global Warming's Six Americas report (2021) defines six U.S. groups ranging from belief to disbelief, with categories like "dismissive" and "doubtful" falling within a denialist spectrum. Coan, Boussalis, Cook, and Nanko (2021) classify denialism in groupings such as "it's not real," our focus in this paper, and "it's not bad" or "the experts are unreliable."

Research has shown that climate denialists are a large minority with an outsized impact. Less than 30% of the US population does not believe in climate change; which as of 2022, is roughly 90 million people (Leiserowitz et al. 2020). This minority has a powerful voice. False claims about climate change in the US has spilled over into action, instigating events ranging from violent threats like armed citizens taking to Oregon streets over wildfire conspiracies to click-bait style stunts like a U.S. senator bringing a snowball into the Capitol in a facetious attempt to demonstrate that the Earth is not warming. While climate mis- and disinformation has existed prior to social media, the rise of these platforms has enabled climate deniers to network with one another and amplify false claims, dangerous hoaxes, misleading climate studies, and create echo chambers of denialist feedback loops (see: Bloomfield & Tillery 2019; Koteyko et al. 2013; Lewandowsky et al. 2019; Lutzke et al. 2019; Pearce et al. 2018; Samantray & Pin 2019).

Polling and research has identified common demographic characteristics of people who do not believe in climate change; the most consistent characteristic is conservative political identity (McCright 2011; Björnberg et al. 2017; Treen et al. 2020a; Treen et al. 2020b). Yet being a part of an identifiable minority of the population has not prevented this group from significantly shaping domestic climate science, policy, and communications (Leiserowitz et al. 2020). Knowing who is most likely to deny climate change does not answer all of the questions surrounding climate change denial: including the history of the movement, why it persists, and what efforts can be taken to change minds about climate change and the possibility of limiting its effects.

In this literature review we look at the history of the producers of climate denialism in the Republican party, conservative organizations, and the energy industry, and how their work has been refined by contemporary actors to spread climate dis- and misinformation online.

We will also consider climate denialists' identity through the lens of demographic variables like politics, geography, race, and religious affiliation. Finally, we explore the pervasiveness of these climate denial narratives, and where we stand on disrupting them. Understanding the nuances of climate change denialism in the US is pressing; our days to secure the political will for robust conservationist policies—and thus warding off the worst effects of climate change— are numbered.

Producers and Motivations

Current manifestations of climate denialism are over fifty years in the making. Its rise coincided with the advent of climate change in the public consciousness in the early 1960s (Oreskes & Conway 2010; Dunlap & McCright 2011; Dunlap & McCright 2012). Concerned about the effects of an adequate response to prevent climate change—notably the fear of economic regulation, reduction in consumer spending, and challenges to free market capitalism—actors from the fossil fuel industry, corporate America, and conservative foundations, such as the Koch Foundation, founded a group of conservative think tanks (CTTs), like the Competitive Enterprise Institute, that came to function as the de facto mouthpieces of the climate denial movement (Oreskes & Conway 2010; Dunlap & McCright 2011; Dunlap & McCright 2012). As the movement gained traction, more CTTs joined the scene creating a "scientific Potemkin Village" as Oreskes and Conway described the strategy. Some members included the Heartland Institute, the CATO Institute, and the Marshall Institute (Oreskes & Conway 2010).

Conservative think tanks have impressive support and output, positioning their climate denialism as a central feature of the American conservative agenda. The financial backing of large corporate entities and foundations, as well as the intellectual backing of numerous skeptical scientists and politicians, successfully instigated a massive campaign to manufacture climate change denial. This campaign cast doubt over well-established scientific consensus and slowly cemented opposition to climate change reform in the conservative mind (Oreskes & Conway 2010; Grasso 2019; Cook 2019).

The most developed body of research concerning climate denial focuses on the conservative foundations and carbon-intensive industry actors involved in its production. For example, the Information Council for the Environment (ICE) was created by the National Coal Association, the Western Fuels Association, and Edison Electrical Institute. In the 1990s ICE's campaign goal was to "reposition global warming as theory (not fact)," a goal which continues today (Oreskes 2012). To be clear, the energy sector knew about the climate-warming effects of burning fossil fuels (a scientific fact established in the late nineteenth century). The coal industry knew since the 1960s that their emissions were warming, and

Exxon in 1982 accurately predicted the climate-warming conditions we see now from burning fossil fuels (Mann 2021, p.24). These actors have been part of a coalition that has fostered the wide-spread, popular rejection of climate science; and in so doing they have warded off any economic and policy changes that would accompany climate science's public acceptance.

One of the methods used by conservative think tanks to promote the public's skepticism of climate science was to attack specific scientists who raised alarms about climate change. For example, energy industries took an aggressive stance against Rachel Carson, the scientist who wrote *Silent Spring* in 1962. Industry representatives at the time described her as "radical" and "hysterical," and she remained a target for decades: for example, in 2012 fellows from the Competitive Enterprise Institute published an article entitled "Rachel Carson's Deadly Fantasies" in which they repeatedly criticized her science (Mann 2021, p12). Further attacks have been levied against contemporary scientists and environmentalists such as Bill Nye, Al Gore, and Michael Mann (Bloomfield & Tillery 2019). Some of these attacks also fall within the "corrupted scientist archetype," a term popularized by Doug Cloud (2020) to describe when challengers of anthropogenic climate change argue that scientists are tainted by financial and political ties–meaning their science is inaccurate and not impartial.

Conservative think tanks promoted anti-climate change propaganda through a variety of other mechanisms, the most significant of which were books and conservative media (Jaques et al. 2008; Painter and Ashe 2012; Cook 2019). Starting in the early 1970s, coalitions of contrarian scientists backed by the CTTs pushed out books and journal articles questioning the validity of their opponents' findings. Additionally, as Painter and Ashe point out, the organizations and their associated actors have relied upon journalists upholding the idea of "balanced media coverage" on opposing sides of a topic. This meant that climate change denialists had the same amount of news coverage as legitimate climate scientists, and ultimately made it appear as though the two sides should be weighed equally in a viewer's mind (Boykoff & Boykoff 2004; Painter & Ashe 2012). There is a broad scholarly consensus that these tactics, along with a variety of other strategies, allowed conservative actors and corporations to mount a highly successful disinformation campaign that effectively manufactured the contemporary American climate denial movement (Collomb 2014).

The Who, Where and Why of Climate Denial

Using survey research and studies of demographics, scholars have investigated the motivations of the sectors of public that deny anthropogenic climate change. These insights signal a key finding: conservative political identity is potentially the strongest link

between people who share this disbelief. The findings align with political scientists' understanding of the centrality of group identifications—like racial, religious, and cultural identities—to democratic processes; in this view, partisanship is a meta-identity that can contain a number of different social affiliations.

People vote to align with their group identity more often than according to their policy preferences (Mason, 2018). Understanding the motivations of popular climate denialism can help change hearts and minds; while climate denialists are the minority in the US, they present an outsize roadblock to deploying climate-saving policies at scale. For example, many Republican representatives in Congress block environmental policies that the majority of Americans, including some conservatives, might want to see become law.

Geographically, there are differences in climate beliefs at the national and local levels (Zhang et al. 2018). Broadly, rural parts of the United States—notably in Appalachia, the Midwest, and the South—that historically have large conservative populations remain the most skeptical of anthropogenic climate change, even in the face of first-hand experience of climate-related events, such as extreme drought (Metcalfe 2015; Olson-Hazboun & Howe 2018; Lachapelle & Albrecht 2018). In urban areas with higher concentrations of political liberals, the opposite is true (Lachapelle & Albrecht 2018). Rural states with ties to the energy industry, like Wyoming, West Virginia, and North Dakota, are particular strongholds of climate denialism; these are locations where over 50% of the population did not believe in anthropogenic climate change. This dynamic of "urban belief" versus "rural reluctance" can partially be tracked to local industry: counties with high-polluting energy industries, like coal, have higher rates of disbelief (Howe, P., Mildenberger, M., Marlon, J., & Leiserowitz, A. 2015). Yet leaving these states aside, the difference in popular opinion between urban and rural locales is overall a modest one: 73% of the US population overall believes in climate change, while 64% of rural populations believe in climate change (Olson-Hazboun & Howe 2018). More robust research into location-based public opinion of climate change is required to unpack the community effects and spread of climate mis- and disinformation.

Demographic research on age and education level may help explain the urban-rural divide as well, but findings on these variables have been inconsistent, highlighting how political leanings are probably the best determinant (Hamilton et al. 2015; Lachapelle & Albrecht 2018). For example, conservative white males who vary in education and age are the most likely to share or believe in climate misinformation (McCright 2011; Björnberg et al. 2017; Treen et al. 2020a; Treen et al. 2020b). Overall, geographic analysis across the country underscores how climate denialism is often tied to ideologically conservative communities.

Further rooting climate disbelief in conservative political identity are the Republican Party's policies and messaging. The party's political leaders have been using conspiracy theories on

anthropogenic climate change as a framing technique to serve their political agenda. In the early 2000s, a staffer to then- President George W. Bush sent strategy memos to Republican members of Congress instructing them to use the term “climate change” over “global warming” because “climate change” sounded like a natural process and, therefore, could be used to avoid a public push for new regulations that are contrary to conservative values (Saunders 2017). This groundwork helped establish a belief among Republicans that “global warming” was a hoax; a belief perpetuated today by former President Donald Trump on Twitter. This plan worked: conservatives are documented to be more likely to believe global warming is a hoax over adherents to other political ideologies (Van Der Linden 2015).

Conservative ideology and faith are also deeply tied for US white, evangelical Protestants, and this group have lower levels of climate change belief than other racial or religious groups, including those who identify as religiously unaffiliated. According to a Pew Research Center study, only 41% of US white, mainline Protestants believe that the Earth is warming due to human behavior. White evangelicals have an even higher rate of disbelief and is the highest out of any racial and religious group in the US of climate change denialism (Heimlich 2011; Bardon 2020). They also have a strong correlation with politically conservative ideology, highlighting again the link between politics and climate change beliefs. In comparison, non-white Christians largely believe in climate change, and many of these groups are also on the political left. Black protestants in the US are mostly concerned about climate change, and mostly left leaning (Bardon 2019). Latinx Catholics have the highest rate of anthropogenic climate change belief among religious ethnic groups.

There are multiple theories to explain why climate change denialism is so pervasive in the white, Evangelical community—some that draw conclusions from their continually intertwining religious and political beliefs and some that eschew this religious-political relationship. Research has found that evangelicals rank their scriptural duties above secular concerns, such as global warming (Zaleha & Szasz 2015; Veldman 2019). There are also fringe Christian groups that believe in an approaching end-time apocalypse and view it as justification for climate skepticism (Barker & Bearce 2013; Zaleha & Szasz 2015).

However, scholarly consensus holds that influence from politics and business interests has had a bigger influence on white, evangelicals’ climate-change skepticism than scriptural or eschatological concerns. Veldman (2019), for example, argues that the Reagan administration in the 1980s was the source of the notion that Christians did not need to believe in climate change because the apocalypse would come soon; most Christians who are climate skeptics feel that climate change belief stems from hubris about the knowability of the world, or is a form of Marxism. Other research suggests that there is not a natural fit between Evangelical Christianity and anti-environmentalism, given that US Evangelicals have held a close spiritual relationship to nature since the early nineteenth century

(Grainger 2019). Altogether, Evangelical Christianity plays a role in climate denialism, but probably more as a marker of group identity tied with other political or social beliefs (Veldman 2019; Berry 2020; Kahan et al. 2011; Barker & Bearce 2013).

Disinformation campaigns have led to climate skepticism in certain sectors of society, but it is worth reiterating that the majority of Americans believe in anthropogenic climate change and think that it is time to act. According to a 2020 Yale Climate Change Communications report, while 73% of Americans believe in global warming only 62% think it is caused by people's actions (Leiserowitz et al. 2020). A report by Krosnick and MacInnis (2020), found that most Americans support some green initiatives, for instance the practice of carbon pricing whereby private industry is held financially responsible for their emissions. Most Americans are interested in renewables, such as moving away from fossil fuels to water, wind, and solar for electricity generation.

Evolution of Tactics: Social Media

The "climate denial machine" funded by conservative foundations in the twentieth century has been amplified on social media platforms (Dunlap & McCright 2012; Vicario et al. 2016; Treen, Williams & O'Neill 2020). The proportion of Americans receiving their environmental news from social media has jumped in the past few years, stressing how the evolving new media landscape has contributed to the spread of climate denialism (Hansen 2018, Pew 2018). Platforms currently have limited capacities for stopping climate disinformation, although evidence suggests that they are awakening to the issue. As users engage with information about climate change online, they can spread conspiracy theories and other inflammatory content; through this process they ultimately fuel disinformation (Donovan 2020).

Before September 2020, Meta (formerly Facebook), classified anthropogenic climate change as an opinion and excused it from typical fact-checking procedures (Penney 2020, Smith 2021). The platform's limited oversight of climate science has allowed mis- and disinformation to spread. For example, CBS News reported that a 2016 analysis of popular climate Facebook posts found misinformation about climate change to be the most circulated. Another 2020 report found that 51 climate denial advertisements had been viewed at least 8 million times on Facebook that year in the US—most of them had been funded by conservative organizations (Ivanova 2020; InfluenceMap 2020). While Meta's latest policies require informational labels on climate change posts, like warning labels on misinformation, it is too soon to know if they will be effective. The company's plans for expansion into the "metaverse" raise further questions about its ability to curb disinformation online. Andrew Bosworth, Meta's new CTO, stated in 2022 that content

moderation in the metaverse “at any meaningful scale is practically impossible” (Frenkel & Browning, 2021). While Meta is changing on paper, there appears to be a gulf between policy and reality.

Meta is not a lone spreader of climate mis- and disinformation. According to a 2020 Friends of the Earth report, the number of mappable Twitter accounts—meaning the accounts where we can trace their network of interactions and engagements on the platform—active in spreading climate denial content is small, but has outsized influence. These accounts are prolific and have significantly more tweets relative to their group size and the pro-climate science mappable group of accounts. In a network map, the climate denial group was politically right-leaning (Khoo & Ryan 2020).

YouTube promotes climate denial propaganda through their “Up Next” video recommendation algorithms and monetization program. A report by Avaaz (2020) found that when watching videos YouTube’s algorithm suggested for “global warming,” the promoted “up next” videos were rife with climate disinformation— approximately 16% of the top 100 recommended.

Misinformation, up until recently, was also monetized through YouTube’s payment scheme, in which advertisers pay a fee to content creators if their ad runs on their video. This means that large companies who ran ads on climate misinformation videos, such as Samsung and Warner Bros., effectively paid the climate denial community to spread their content. YouTube announced in October 2021 it will prohibit ads on climate disinformation videos. However, content moderation on platforms has been inconsistent, and therefore it remains to be determined how well this move will be enforced, and how effective it will be (Fischer 2021).

Platform architecture could play a role in how easily climate change mis- and disinformation spreads. Newer studies are exploring Reddit communities—previously untapped yet popular online for climate communications—and found that Reddit’s unique architecture might prevent polarized echo chambers (Treen et al. 2022). On social media platforms, echo chambers can create feedback loops of similar content, ultimately reinforcing content that could be mis- or disinformation. Another large sample study on Reddit found that climate change denialism was steadfast when confronted with opposing science and views, ultimately reinforcing it (Oswald & Bright 2022). While the platform architecture could be helpful in prevention, countering these denialist communities online shows less promise.

Ultimately, there are limitations to what can be known about climate change mis- and disinformation on social media platforms as platform companies do not always make data available to researchers. Also, as company policies and practices change so quickly, it is

difficult to evaluate what is happening in the space. However, what has been evaluated by scholars indicates that inaccurate information about climate change spreads relatively unmoderated on social media. (Bloomfield & Tillery 2019; Koteyko, Jaspal & Nerlich 2013; Lewandowsky 2019; Lutzke et al. 2019; Pearce et al. 2018; Samantray & Pin 2019). Importantly, the percentage of climate denialists in the U.S. has not risen with the tide of social media platforms. Conspiracy theories and mis- and disinformation exist without social media, and we cannot say social media is making climate denialism worse on a purely numbers level. More research is needed to determine how social media content and interactions might impact the perception of climate change and how social media might be used advantageously for climate change activists or scientists for raising public awareness. Moving forward, we should consider where social media makes tried-and-true disinformation methods worse and explore how people's awareness of climate change develops when it is mediated through social platforms.

Evolution of Tactics: Conspiracy Theories

Climate deniers' tactics have evolved since the 1970s to encompass using conspiracy theories to attack climate change science, scientists, and pro-climate activists. In 2009, a server at the Climatic Research Unit at the University of East Anglia was hacked, and thousands of climate scientists' emails were posted on the open web. The scandal, dubbed "Climategate," by climate change denialists, allowed them to portray climate change as a conspiracy built on manipulated data. The scandal was picked up by news sources, and this amplification cast doubt on an international climate change mitigation conference taking place that year. Climategate is found to have reduced trust in climate change and scientists and stands as one of the more prominent examples of conspiracy theory-driven misinformation (Leiserowitz et al. 2013; Washington 2011, p 43; Elgesem et al., 2015). Over the past decade, conspiracy theories have become a cornerstone of climate change denial. For example, the pro-climate activist Greta Thunberg has been slandered by conspiracy theories ranging from her mental ability to being a puppet for others, which began on Twitter and Reddit before circulating on the open web to conservative sites like *Daily Wire* or *PJ Media* (Dave et al. 2020, Graphika 2020).

A case study for examining how conspiracy theories work in practice is the circulation of memes, which are one of the most common ways that climate change denial spreads online. A 2020 report from *First Draft* found thousands of climate conspiracy posts on Instagram, owned by Meta, missing a label identifying them as disinformation. Memes made up 80% of the report's dataset. *First Draft* found that the top fifty most-engaged-with memes could be found on 82 other platforms, like Pinterest (Smith 2021). Image-heavy and laced with humor and irony, memes go beyond mere jokes and are strategically used in common climate

change denialists' arguments that seek to emphasize the hypocrisy of pro-climate movements and people (Boykoff & Goodman 2009; Ross & Rivers 2019). They are also excellent vehicles for conspiratorial thinking and are found to suppress productive civil discourse online (Woods & Hahner 2019; Smith 2021). Ross and Rivers (2019) found memes furthering climate denialism in repetitive templates like "Condescending Wonka"; for example, one meme of this type says, "So you believe in man-made climate change and you still drive a car, interesting" overlaying a picture of Willy Wonka smiling knowingly. Also, as they are images, memes can avoid typical AI content moderation that focuses on text, underscoring the need for research on their dissemination and reach, as well as the development of more effective content moderation (Smith 2021).

Climate conspiracies are also gaining traction in response to local events and natural disasters. For example, in response to the U.S.'s catastrophic fire season in 2020, a conspiracy campaign circulated on social media tying the fires to "Antifa" arsonists (Cameron 2020). The campaign reached such entrenchment in Oregon, for example, that Facebook deleted posts, and the Portland FBI publicly stated it was misinformation. This wildfire conspiracy was also circulated by QAnon-sympathetic accounts, indicating a growing interest by the conspiracy group in climate denialism. Leading up to 2020, QAnon accounts started sharing climate misinformation, and climate denial influencers began interacting with the QAnon social media community through hashtags or by giving credence to QAnon conspiracies online (Graphika 2020; Lasky & Korenha 2020).

Conspiracies that climate change is a hoax, communist plot, or the next step towards totalitarianism contains rhetoric that isn't exclusively Republican Party talking points, extending their sphere of influence (Uscinski & Olivella 2017). Research suggests that the climate hoaxes and conspiracies affect the mindset of individuals outside of the conservative party, notably individuals who identify as party-independents (Uscinski & Olivella 2017). U.S. Republicans, who are deeply influenced by cues from their prominent Republican politicians, are more susceptible to anti-climate change conspiracy endorsements than Democrats (Saunders 2017). Regardless of party affiliation, exposure to climate conspiracy theories—even brief encounters—has been linked to a decrease of pro-environmental behaviors and an increase in feeling uncertain on the issue (Jolley & Douglas 2014; Van Der Linden 2015).

The use of conspiracy theories by climate deniers highlights how mis- and disinformation on the topic is persisting, enabled by new technology, and how anti- environmental groups are evolving strategies and aligning with like-minded movements to match our contemporary socio-political life.

Ideological Entrenchment

Due to decades of effort on the part of denialists, U.S. conservatives remain strongly resistant to believing in climate change, and this effect has only been bolstered by social media. Yet leaving technological affordances aside, what accounts for the persistence of climate change denial? Scholars have examined the issue through various scholarly lenses, such as psychology, anthropology, and political science; this work suggests that the issue cannot be narrowly encapsulated by one theory or element. Much of the work done so far has been interested in explanations relying on identity threats to distinct identities, like religious ones, and differing community levels of trust in media for news, scientific facts and the scientists performing the studies themselves, and politicians as credible sources of moral and policy guidance.

As we have already seen, one indicator of climate denialism's persistence is its strong association with political identity. In a way that is distinct from other kinds of scientific misinformation, like vaccine skepticism, rejection of the climate science consensus has from the start become a hallmark of American conservatism and conservative identity (McCright & Dunlap 2011; Fischer 2019). Collomb (2014) argues that for the conservative movement, rejecting climate change is a matter of ideological survival. A cornerstone of the U.S. conservative platform is an opposition to government regulation that would limit consumption, which is seen as an indicator of success and expanding economic prosperity. Therefore, government regulation of the fossil fuel industries, policies such as a carbon tax, and policies that would incentivize citizens towards sustainable consumption patterns are antithetical to conservative core beliefs.

Scholars understand the entrenchment of climate change denialism among conservatives via the phenomenon of "motivated reasoning," in which people are motivated to accept or reject certain information that aligns with their existing belief system and values. Accepting climate change would entail accepting a re-shuffling of economic and social orders, which is antithetical to traditional conservative identity (Hart & Nisbet 2012; Kahan 2016; Bardon 2019; Hornsey 2020). To demonstrate this, Saunders (2017) observes that the term "global warming" threatens the identity of Republicans more than "climate change" as it sounds all-encompassing. In a survey, Saunders found that Republicans were more likely to deny global warming is happening rather than climate change—despite them colloquially meaning the same thing.

Yet not all scholars are on board with the motivated reasoning model. Druckman and McGrath (2019) argue climate denialism can be more accurately explained by the fact that individuals hold differing levels of trust in source materials. Their research suggests that climate skepticism in certain groups is due to a lack of perceived credibility in climate

change information, such as if a scientific claim seems like it has a political slant or is intended to further an agenda. At its worst, an individual who believes the scientific claim had an ulterior motive could spread this belief online, starting a new conspiracy theory. Druckman and McGrath suggest that accurate climate change information should come from a group's trusted sources, such as religious or community leaders, rather than individuals or organizations who are outsiders.

Another theory that explains the success of climate denialism is "elite framing," trading on the notion that constituents trust their preferred politicians' opinion on the topic rather than from their own communities (Tesler 2018; Saunders 2017). Since polarization of the topic is indisputable (see: Guber 2013; Collomb 2014; McCright & Dunlap 2011; Fischer 2019), elite framing broadly builds on this already established relationship. A study by Brule, Carmichael, and Jenkins (2012) found that the words and actions of leading politicians were more effective in guiding climate opinions than extreme weather events, access to scientific information, and media coverage. Saunders (2017) also found that Republicans are particularly prone to believing climate change mis- and disinformation in the form of elite framing.

However, the politicization of climate change cannot fully account for the widespread adoption of climate skepticism. In many ways, accepting the reality of climate change and its consequences is an existential threat: it requires that most Americans accept that their current way of life, and capitalism as we know it, will need to drastically alter in the coming decades. This realization presents major obstacles in promoting the acceptance of climate change, even outside of how it interacts with partisan identity. Feygina et al. (2010) point out that as people we have an "epistemic need to maintain a sense of certainty and stability" that inclines us to defend the status quo, which in this case is a world not existentially threatened by climate change. Interestingly, they note that this is even the case for people who are disadvantaged under the existing status quo, which could explain the embrace of climate denial by low-income communities actively underserved by the existing market system.

The notion that Americans have an anti-intellectual streak that transcends partisanship has also been proposed as an explanation for the persistence of climate denial. Merkley's (2020) survey of thousands of Americans found a link between disbelief and a mistrust of experts like scientists, especially when a fact had a strong scientific consensus behind it—like climate change does. These findings are unique; they add to the picture of climate change rejection in the U.S. by exploring aspects of American political and social life that are distinct from consumerism and pro-small government views. As we see with other forms of scientific misinformation, the continued denigration of expertise and experts in society aids the spread of climate misinformation (Bennet & Livingston 2018; Elsasser & Dunlap 2013).

Merkley's study went further: he found a causal chain that suggested populism, or populist rhetoric, affects an individual's ability to properly process and accept scientific studies and scientific consensus. He dubbed this pattern "anti-intellectualism," following twentieth-century historian Richard Hofstadter's influential 1964 study. In short, a rise in populism breeds anti-intellectualism, whereby anti-intellectualism moderates an individual's ability to accept—or in this instance not accept—anthropogenic climate change (Merkley 2020). This link between populism, anti-intellectualism, and climate change denialism is particularly pertinent considering that many consider this the "age of populism" as its presence is increasing in the U.S., Europe, and other industrial nations globally (Berman 2021). Climate misinformation could be a long- chain symptom of populist sentiments. A more thorough understanding of the links between populism, anti-intellectualism, and climate change globally will help inform the push to build international coalitions against climate change.

Anthropogenic climate change denialism's staying power in American society, predominantly within conservative groups, has a harrowing history and prospect. Its deep entrenchment with identity, notably around American "values," makes it hard to tease apart and affect pro-climate change behavior from these groups. Probing this complexity is critical, and further research on reducing polarization and the rise of populism in the current U.S. political landscape would be a particularly relevant route of inquiry.

Combating Climate Denialism

Given the scope of the problem, what can be done? How can activists, policymakers, and the media effectively combat climate related disinformation, restore trust in scientific institutions, and bolster acceptance of knowledge about climate change? These questions sit at the center of an emerging, and challenging, area of inquiry. As we have previously explored in this literature review, climate denialism is a highly politicized issue in the American party system and information ecosystem (also see: Chinn et al. 2020). Researchers have been exploring ways to mitigate climate denial by using deliberate communication strategies that might help avoid charged partisan language.

Rhetorical changes, such as avoiding the term "climate change" in favor of phrases like "economic development" or "public health" have been shown to help de-politicize climate policy (Myers et al. 2012; Weathers & Kendall 2015; Romsdahl et al. 2019). Romsdahl et al. surveyed 232 local governments in the conservative Great Plains—defined in the study as: Montana, Wyoming, Colorado, North & South Dakota, Minnesota, Nebraska, Kansas, Oklahoma, and Texas—and found that many local governments framed green initiatives without invoking the term "climate change," instead choosing language based on shared values or related issues such as economic efficiency, stewardship/creation care, or

sustainability; when framed this way, these projects garnered greater public support (Romsdahl et al. 2019, Romsdahl 2020).

How to frame climate communication is a broad problem facing the field, extending beyond the politicization of the issue. Public opinion polls demonstrate that US audiences of print and broadcast media want more coverage of climate change, and think that they are not well informed on the issue (Gustafson et al, 2020). Yet experience has shown that this content needs to avoid inciting a backlash by viewers, regardless of their political beliefs. Research has found that negative, fearful rhetoric about climate change from traditional media sources causes viewer apathy. There is also a perception among viewers that traditional news sources sensationalize extreme weather and climate coverage, undermining their credibility (Whitmarsh 2008; Kaltenbacher & Drews 2020). Considering that the alternative is a stew of misinformation found online, a critical question for researchers and media organizations is how to create informative news from reputable sources.

While some media coverage in the space is insufficient, new communication methods that use games, humor, and fiction to alter knowledge and attitudes towards climate change have grown in popularity. Research has shown that games can help users to identify misinformation later (Basol et al. 2020), and gamification resilience testing has been growing as a possibility to combat climate denialism. For example, the game Cranky Uncle teaches players about critical thinking, building their resistance to climate misinformation. Humor can also alter perceptions and behaviors on climate change while avoiding fear or shock; for example, late night TV-hosts have held segments educating their viewers on climate change through satire and jokes. That being said, studies on the efficacy of this type of climate messaging has shown mixed results (Feldman 2017; Vraga et al. 2019; Kaltenbacher & Drews 2020). A potential new pathway for climate science communication is fiction; novels and stories that highlight the effects of climate change in the stories they tell. One study suggests that reading fiction about climate change can increase readers' perceived importance of climate change (Schneider-Mayerson et al. 2020).

A strategy for mitigating misinformation known as "inoculation" is gaining support among climate communication scholars and scientists. Inoculation is a preventative method whereby an individual is pre-exposed to climate denial information (Van der Linden et al. 2015b, Cook et al. 2016; Van der Linden et al. 2017). Researchers testing the strategy suggest that it is possible to "inoculate" people against climate change disinformation, or "pre-bunk" false claims against climate change, in two ways. One aspect of the strategy involves highlighting the extent of scientific consensus on the topic; a second aspect involves preventatively exposing individuals to specific false claims in order to debunk them. Cook (2016) also argues that the inoculation strategy is more efficient than just traditional

"debunking" of problematic information that occurs after a viewer has already been exposed to it. In debunking, many people resist the influence of new, true ideas because they have already become convinced by false information; this is called the "continued influence effect" (Cook 2016; Lewandowsky et al. 2012).

With more Americans over the past few years becoming concerned with climate change, there's the potential to engage with people whose opinions could shift. Instead of focusing on the resolute denialists, policymakers could focus on the moveable ones. Yale's Global Warming's Six Americas report (2021) visualizes this through a spectrum of six distinct groups that range from climate change belief to denialism. The "cautious" and "disengaged" groups sit roughly in the middle of this spectrum, and might hold the most potential to be swayed into anthropogenic climate change beliefs out of other denialist groups (Leiserowitz et al. 2022). Furthermore, when changing hearts and minds, studies have found that discussing personal values in intimate conversations can be effective in swaying denialists into believers. In comparison, conversations that strictly focused on discussing the facts of climate change were less persuasive (van Swol et al. 2021; Bloomfield et al. 2020). Connecting with skeptics and changing their opinions was more influenced by interpersonal connection than science.

Policymakers can also adopt smarter strategies for communicating about climate change. Van Der Linden et al. (2015a) argue that there are five main ways to improve policy makers' public engagement with climate change. They advise: contextualizing climate change's current and localized risk to individuals; using local community norms for messaging; helping with engagement; outlining how their policies have social good if quickly enacted; and making ethical appeals for conservation. Weber & Stern (2011) emphasize that "non-persuasive communication," where the focus is on improving climate change understanding generally rather than promoting a specific policy, is also valuable for encouraging pro-environmental policy sentiments.

Next Steps for Research and Policy

Significant scholarly attention to the history of anti-climate propaganda production has made clear who are the producers of climate denial, who is influenced by these messages, and why climate denial persists. At present, researchers are coalescing around the question "what now?"

A large portion of the research on climate denialism focuses on the United States. This is understandable seeing that for a time, climate denial and skepticism appeared to be an American phenomenon heavily concentrated among U.S. conservatives. However, this has not remained true—particularly in places like Saudi Arabia and Indonesia (Buchholz 2020).

As high resource-extraction countries, the former a petrostate and the latter the primary global supplier of palm oil, this economic connection might be an explanation for denialism, but researchers are not yet certain. An international comparative approach might be necessary to understand local circumstances (Björnberg et al. 2017). While authors such as Krange, Kaltenborn, & Hultman (2019) have profiled non-U.S. centric climate denial, an expanded focus on the local characteristics of anti-climate change sentiment across the globe seems warranted, especially due to the recent global rise in populist movements. In the U.S. and in Europe, populist movements have also included negative attitudes towards mitigating climate change, which suggests that more research is needed to see if the link between populism and climate-change denial holds true globally.

Escalating partisan polarization in the current U.S. political system and media is contributing to the intensity of climate change denialism as a secondary effect (Dunlap, McCright & Yarosh 2016; Chinn et al. 2020). Continuing to research solutions to the polarization conundrum would thereby also decrease climate change denialism substantially. Some research has started tracking whether specific examples of pro-climate policy explanations have caused an increase or decrease in denialism, and further research would prove useful (Fisher, Waggle & Leifeld 2012).

On a broad scale, climate deniers might be swayed as more people experience climate upheaval first-hand, such as large wildfires and extreme flooding. Research that evaluates the relationship of altered weather patterns to shifts in public opinion could illuminate a connection. An extreme weather event could serve as a case study about how direct experience affects public opinion: researchers would have the opportunity to study local media coverage in the wake of the event, local politicians' responses, and community organizing efforts. Climate change activists and social scientists could also learn from these case studies to develop new pathways to belief for at-risk communities.

Another path forward would be to consider policy interventions that are tailored to the communities that are most likely to hold anti-climate change beliefs. The demographics of climate deniers in the United States are relatively clear, with distinct cultural, economic, historical, and social reasons to explain the persistence of their beliefs. Further research into what could decouple political conservatism and climate change denialism would prove useful as well. Most of the U.S. population believes in climate change, so respectful and sensitive intervention strategies to combat denialism should reflect the distinct questions and beliefs of these minority communities.

How people understand the issue of climate change is pivotal to how they will react to it. When misinformation obstructs this understanding, it prevents clear-eyed judgements about the world and can block a movement toward transformative environmental policies from

political representatives and business leaders. While climate change skepticism is decreasing in America, it is far from eradicated, and still exerts considerable political force. Finding ways to convince people that climate change exists is a great challenge but vital to ensure a healthy planet.

The author wishes to thank Adriana Disilvestro for her contributions to the article. Any opinions expressed in this article are the author's only, and not any public or private entities.

[workscited]

Bardon, A. (2019). The Truth About Denial: Bias and Self-Deception in Science, Politics, and Religion. In The Truth About Denial. Oxford University Press. https://oxford.universitypressscholarship.com/view/10.1093/oso/9780190062262.001.0001/oso-9780190062262

Bardon, A. (2020). Faith and politics mix to drive evangelical Christians' climate change denial. The Conversation. http://theconversation.com/faith-and-politics-mix-to-drive-evangelical-christians-climate-change-denial-143145

Barker, D. C., & Bearce, D. H. (2013). End-Times Theology, the Shadow of the Future, and Public Resistance to Addressing Global Climate Change. Political Research Quarterly, 66(2), 267–279.

Basol, M., Roozenbeek, J., & Linden, S. van der. (2020). Good News about Bad News: Gamified Inoculation Boosts Confidence and Cognitive Immunity Against Fake News. Journal of Cognition, 3(1), 2. https://doi.org/10.5334/joc.91

Bennett, W. L., & Livingston, S. (2018). The disinformation order: Disruptive communication and the decline of democratic institutions. European Journal of Communication, 33(2), 122–139. https://doi.org/10.1177/0267323118760317

Berman, S. (2021) The Causes of Populism in the West, Annual Review of Political Science, 24, 71-88. https://doi.org/10.1146/annurev-polisci-041719-102503

Björnberg, K. E., Karlsson, M., Gilek, M., & Hansson, S. O. (2017). Climate and environmental science denial: A review of the scientific literature published in 1990–2015. Journal of Cleaner Production, 167, 229–241. https://doi.org/10.1016/j.jclepro.2017.08.066

Bloomfield, E. F., & Tillery, D. (2019). The Circulation of Climate Change Denial Online: Rhetorical and Networking Strategies on Facebook. Environmental Communication, 13(1),

23–34. https://doi.org/10.1080/17524032.2018.1527378

Bloomfield, E. F., Van Swol, L. M., Chang, C.-T., Willes, S., & Ahn, P. H. (2020). The Effects of Establishing Intimacy and Consubstantiality on Group Discussions About Climate Change Solutions. Science Communication, 42(3), 369 394. https://doi.org/10.1177%2F1075547020927017

Boykoff, M. T., & Boykoff, J. M. (2004). Balance as bias: Global warming and the US prestige press. Global Environmental Change, 14(2), 125–136. https://doi.org/10.1016/j.gloenvcha.2003.10.001

Boykoff, M. and Goodman, M. (2009). Conspicuous redemption? Reflections on the promises and perils of the 'Celebritization' of climate change. Geoforum, 40(3), 395-406. https://doi.org/10.1016/j.geoforum.2008.04.006

Bricker, Brett Jacob (2013) Climategate: A Case Study in the Intersection of Facticity and Conspiracy Theory, Communication
Studies, 64:2, 218-239, DOI: 10.1080/10510974.2012.749294

Brulle, R. J., Carmichael, J., & Jenkins, J. C. (2012). Shifting public opinion on climate change: An empirical assessment of factors influencing concern over climate change in the U.S., 2002–2010. Climatic Change, 114(2), 169–188. https://doi.org/10.1007/s10584-012-0403-y

Buchholz, K. (2020, December 3). Infographic: Where Climate Change Deniers Live. Statista Infographics. https://www.statista.com/chart/19449/countries-with-biggest-share-of- climate-change-deniers/

Cameron, D. (2020, September 11). Debunked "Antifa" Wildfire Rumors Spread on Facebook Overload 911, Spur Calls to Violence. Gizmodo. https://gizmodo.com/debunked-antifa- wildfire-rumors-spread-on-facebook-over-1845029629

Chinn, S., Hart, P. S., & Soroka, S. (2020). Politicization and Polarization in Climate Change News Content, 1985-2017. Science Communication, 42(1), 112–129. https://doi.org/10.1177%2F1075547019900290

Cloud, Doug (2020) "The Corrupted Scientist Archetype and Its Implications for Climate Change Communication and Public Perceptions of Science", *Environmental Communication*, DOI: 10.1080/17524032.2020.1741420

Coan, T. G., Boussalis, C., Cook, J., & Nanko, M. O. (2021). Computer-assisted classification of contrarian claims about climate change. Scientific Reports, 11(1),

22320. https://doi.org/10.1038/s41598-021-01714-4

Collomb, J.-D. (2014). The Ideology of Climate Change Denial in the United States. European journal of American studies, 9(1), Article 1. https://doi.org/10.4000/ejas.10305

Cook, J. (2016, October 26). Countering Climate Science Denial and Communicating Scientific Consensus. Oxford Research Encyclopedia of Climate Science. https://doi.org/10.1093/acrefore/9780190228620.013.314

Cook, J. (2019). Understanding and Countering Misinformation About Climate Change. In I. E. Chiluwa & S. A. Samoilenko (Eds.), Handbook of Research on Deception, Fake News, and Misinformation Online (pp. 281–306). IGI Global. https://doi.org/10.4018/978-1-5225-8535-0.ch016

Cook, J., & Washington, H. (2011). Climate Change Denial: Heads in the Sand. Earthscan. https://www.routledge.com/Climate-Change-Denial-Heads-in-the-Sand/Washington-Cook/p/book/9781849713368

Dave, A., Boardman Ndulue, E., Schwartz-Henderson, L., & Weiner, E. (2020, July 22). Targeting Greta Thunberg: A Case Study in Online Mis/Disinformation. The German Marshall Fund of the United States. https://www.gmfus.org/publications/targeting-greta-thunberg-case-study-online-misdisinformation

De Witte, M. (2018, July 16). Poll shows consensus for climate policy remains strong. Stanford News. https://news.stanford.edu/2018/07/16/poll-shows-consensus-climate-policy-remains-strong/

Donovan, J. (2020). Deconstruction Disinformation's Threat to Democracy. The Fletcher Forum of World Affairs, 44(1), 153-160. https://www.jstor.org/stable/48599286

Druckman, J. N., & McGrath, M. C. (2019). The evidence for motivated reasoning in climate change preference formation. Nature Climate Change, 9(2), 111–119. https://doi.org/10.1038/s41558-018-0360-1

Dunlap, R. E., & McCright, A. M. (2011, August 18). Organized Climate Change Denial. The Oxford Handbook of Climate Change and Society. https://doi.org/10.1093/oxfordhb/9780199566600.003.0010

Dunlap, R., & McCright, A. M. (2012). Organized Climate Change Denial. The Oxford Handbook of Climate Change and Society, 144–160. https://doi.org/10.1093/oxfordhb/9780199566600.003.0010

Elgesem, D., Steskal, L., & Diakopoulos, N. (2015). Structure and Content of the Discourse on Climate Change in the Blogosphere: The Big Picture. Environmental Communication, 9(2), 169–188. https://doi.org/10.1080/17524032.2014.983536

Elsasser, S. W., & Dunlap, R. E. (2012). Leading Voices in the Denier Choir: Conservative Columnists' Dismissal of Global Warming and Denigration of Climate Science—Shaun W. Elsasser, Riley E. Dunlap, 2013. https://doi.org/10.1177/0002764212469800

Facebook Downs Inauthentic Cluster Inspired by QAnon (Takedown, pp. 1–19). (2020). Graphika. https://graphika.com/reports/facebook-downs-inauthentic-cluster-inspired-by-qanon/

Farmer, G. T., & Cook, J. (2013). Understanding Climate Change Denial. In G. T. Farmer & J. Cook (Eds.), Climate Change Science: A Modern Synthesis: Vol. Volume 1-The Physical Climate (pp. 445–466). Springer Netherlands. https://doi.org/10.1007/978-94-007-5757-8_23

FBI Portland. (2020, September 11). Reports that extremists are setting wildfires in Oregon are untrue. Help us stop the spread of misinformation by only sharing information from trusted, official sources. https://t.co/ENc4c3kjep [Tweet]. @FBIPortland. https://twitter.com/FBIPortland/status/1304485033210769409

Feldman, L. (2017, June 16). Assumptions About Science in Satirical News and Late-Night Comedy. The Oxford Handbook of the Science of Science Communication. https://doi.org/10.1093/oxfordhb/9780190497620.013.35

Feygina, I., Jost, J. T., & Goldsmith, R. E. (2010). System Justification, the Denial of Global Warming, and the Possibility of "System-Sanctioned Change." Personality and Social Psychology Bulletin, 36(3), 326–338. https://doi.org/10.1177/0146167209351435

Fisher, D. R., Waggle, J., & Leifeld, P. (2013). Where Does Political Polarization Come From? Locating Polarization Within the U.S. Climate Change Debate. American Behavioral Scientist, 57(1), 70–92. https://doi.org/10.1177%2F0002764212463360

Fischer, F. (2019). Knowledge politics and post-truth in climate denial: On the social construction of alternative facts. Critical Policy Studies, 13(2), 133–152. https://doi.org/10.1080/19460171.2019.1602067

Fischer, S. (2021, October 7). Google, YouTube to prohibit ads and monetization on climate denial content. Axios. https://www.axios.com/google-youtube-climate-change-734f2b05-40e2-4e05-9100-39de589b3b0a.html

Grasso, M. (2019). Oily politics: A critical assessment of the oil and gas industry's contribution to climate change. Energy Research & Social Science, 50, 106–115. https://doi.org/10.1016/j.erss.2018.11.017

Guber, D. L. (2013). A Cooling Climate for Change? Party Polarization and the Politics of Global Warming. American Behavioral Scientist, 57(1), 93–115. https://doi.org/10.1177/0002764212463361

Gustafson, A., Leiserowitz, A., Maibach, E., Kotcher, J., Rosenthal, S. A., & Goldberg, M. H. (2020). Climate Change in the Minds of U.S. News Audiences [Preprint]. PsyArXiv. https://doi.org/10.31234/osf.io/95tsr

Hamilton, L. C., Hartter, J., Lemcke-Stampone, M., Moore, D. W., & Safford, T. G. (2015). Tracking Public Beliefs About Anthropogenic Climate Change. PLOS ONE, 10(9), e0138208. https://doi.org/10.1371/journal.pone.0138208

Hansen, A. (2018). Environment, media and communication. https://www.taylorfrancis.com/books/9781317231639

Hart, P. S., & Nisbet, E. (20112012). Boomerang Effects in Science Communication: How Motivated Reasoning and Identity Cues Amplify Opinion Polarization About Climate Mitigation Policies. Communication Research, 6(39), 701–723. https://doi.org/10.1177/0093650211416646

Heimlich, R. (2011, December 2). White Evangelical Protestants and the Partisan Divide. Pew Research Center. https://www.pewresearch.org/fact-tank/2011/12/02/white-evangelical-protestants-and-the-partisan-divide/

Hornsey, M. J. (2020). Why Facts Are Not Enough: Understanding and Managing the Motivated Rejection of Science. Current Directions in Psychological Science, 29(6), 583–591. https://doi.org/10.1177/0963721420969364

Hornsey, M. J., Harris, E. A., & Fielding, K. S. (2018). Relationships among conspiratorial beliefs, conservatism and climate scepticism across nations. Nature Climate Change, 8(7), 614–620. https://doi.org/10.1038/s41558-018-0157-2

Howe, P., Mildenberger, M., Marlon, J., & Leiserowitz, A. (2015) "Geographic variation in opinions on climate change at state and local scales in the USA," Nature Climate Change. DOI: 10.1038/nclimate2583.

InfluenceMap. (2020, October). Climate Change and Digital Advertising. https://influencemap.org/report/Climate-Change-and-Digital-Advertising-86222daed29c6f49

ab2da76b0df15f76

IPCC. (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC.

IPCC, & Contribution of Working Groups I, II and III. (2014). AR5 Synthesis Report: Climate Change 2014 (No. 5). IPCC. https://www.ipcc.ch/report/ar5/syr/

Ivanova, I. (2020, September 16). Environmentalists pan Facebook's new climate change hub. CBS News. https://www.cbsnews.com/news/facebook-climate-change-denial-information-center/

Jacques, P. J., Dunlap, R. E., & Freeman, M. (2008). The organisation of denial: Conservative think tanks and environmental scepticism. Environmental Politics, 17(3), 349–385. https://doi.org/10.1080/09644010802055576

Jolley, D., & Douglas, K. M. (2014). The social consequences of conspiracism: Exposure to conspiracy theories decreases intentions to engage in politics and to reduce one's carbon footprint. British Journal of Psychology, 105(1), 35–56. https://doi.org/10.1111/bjop.12018

Kahan, D. M. (2015). In Emerging Trends in the Social and Behavioral Sciences. In R. A. Scott, M. Kosslyn, & M. Buchmann (Eds.), Emerging trends in the social and behavioral sciences: An interdisciplinary, searchable, and linkable resource (pp. 1–16). http://onlinelibrary.wiley.com/book/10.1002/9781118900772

Kahan, D. M., Jenkins Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. Journal of Risk Research, 14(2), 147–174. https://doi.org/10.1080/13669877.2010.511246

Kaltenbacher, M., & Drews, S. (2020). An Inconvenient Joke? A Review of Humor in Climate Change Communication. Environmental Communication, 14(6), 717–729. https://doi.org/10.1080/17524032.2020.1756888

Khoo, M., & Ryan, M. (2020, August 28). Climate, Clicks, Capitalism, and Conspiracists. Medium. https://foe-us.medium.com/climate-clicks-capitalism-and-crazies-a336640b47d

Koteyko, N., Jaspal, R., & Nerlich, B. (2013). Climate change and "climategate" in online reader comments: A mixed methods study. The Geographical Journal, 179(1), 74–86.

Krange, O., Kaltenborn, B. P., & Hultman, M. (2019). Cool dudes in Norway: Climate change denial among conservative Norwegian men. Environmental Sociology, 5(1), 1–11.

https://doi.org/10.1080/23251042.2018.1488516

Lachapelle, P., & Albrecht, D. (Eds.). (2018). Public Opinion on Climate Change in Rural America. In Addressing Climate Change at the Community Level in the United States (pp. 33–49). Routledge. https://doi.org/10.4324/9781351211727

Lasky, N., & Korenha, M. (2020, September 28). Climate Deniers Turn to QAnon to Spread Misinformation. Our Daily Planet. https://www.ourdailyplanet.com/story/climate-deniers-turn-to-qanon-to-spread-misinformation/

Leiserowitz, A., Maibach, E., Rosenthal, S., Kotcher, J., Ballew, M., Goldberg, M. H., & Gustafson, A. (2018). Climate Change in the American Mind: December 2018. Yale University and George Mason University. https://climatecommunication.yale.edu/publications/climate-change-in-the-american-mind-december-2018/

Leiserowitz, A. Maibach, E., Rosenthal, S., Kotcher, J., Neyens, L., Marlon, J., Carman, J., Lacroix, K., & Goldberg, M. (2022). Global Warming's Six Americas, September 2021. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication.

Leiserowitz, A. A., Maibach, E. W., Roser-Renouf, C., Smith, N., & Dawson, E. (2013). Climategate, Public Opinion, and the Loss of Trust. American Behavioral Scientist, 57(6), 818–837. https://doi.org/10.1177%2F0002764212458272

Lewandowsky, S., Cook, J., Fay, N., & Gignac, G. E. (2019). Science by social media: Attitudes towards climate change are mediated by perceived social consensus. Memory & Cognition, 47(8), 1445–1456. https://doi.org/10.3758/s13421-019-00948-y

Lewandowsky, S., Ecker, U. K. H., Seifert, C. M., Schwarz, N., & Cook, J. (2012). Misinformation and Its Correction: Continued Influence and Successful Debiasing. Psychological Science in the Public Interest, 13(3), 106–131. https://doi.org/10.1177/1529100612451018

Lutzke, L., Drummond, C., Slovic, P., & Árvai, J. (2019). Priming critical thinking: Simple interventions limit the influence of fake news about climate change on Facebook. Global Environmental Change, 58, 101964. https://doi.org/10.1016/j.gloenvcha.2019.101964

Mann, M. E. (2021). New Climate War: The Fight to Take Back Our Planet. PublicAffairs.
Mason, Lilliana. (2018). Uncivil Agreement: How Politics Became Our Identity. Chicago: University of Chicago Press.

McCright, A. M., & Dunlap, R. E. (2011). Cool dudes: The denial of climate change among conservative white males in the United States. Global Environmental Change, 21(4), 1163–1172. https://doi.org/10.1016/j.gloenvcha.2011.06.003

Merkley, E. (2019). Anti-Intellectualism, Anti-elitism, and Motivated Resistance to Expert Consensus [Annual Meeting of the Western Political Science Association]. University of British Columbia.

Merkley, E. (2020). Anti-Intellectualism, Populism, and Motivated Resistance to Expert Consensus. Public Opinion Quarterly, 84(1), 24–48. https://doi.org/10.1093/poq/nfz053

Metcalfe, J. (2015, April 7). Which States Have the Most Climate Change Skeptics?Bloomberg.com. https://www.bloomberg.com/news/articles/2015-04-07/these-maps-show-which-u-s-states-have-the-most-climate-change-skeptics

Milman, O., & Harvey, F. (2019, May 8). US is hotbed of climate change denial, major global survey finds. The Guardian. https://www.theguardian.com/environment/2019/may/07/us-hotbed-climate-change-denial-international-poll

Myers, T. A., Nisbet, M. C., Maibach, E. W., & Leiserowitz, A. A. (2012). A public health frame arouses hopeful emotions about climate change. Climatic Change, 113(3), 1105–1112. https://doi.org/10.1007/s10584-012-0513-6

Olson-Hazboun, S. K., & Howe, P. D. (2018). Public Opinion on Climate Change in Rural America: A Potential Barrier to Resilience. In P. Lachapelle & D. Albrecht (Eds.), Addressing Climate Change at the Community Level in the United States (pp. 34–50). Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781351211727-3/public-opinion-climate-change-rural-america-shawn-olson-hazboun-peter-howe

Oreskes, N., & Conway, E. M. (2011). Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Climate Change (Reprint edition). Bloomsbury Publishing.

Oswald, L., Bright, J. (2022) How Do Climate Change Skeptics Engage with Opposing Views Online? Evidence from a Major Climate Change Skeptic Forum on Reddit, Environmental Communication, DOI: 10.1080/17524032.2022.2071314

Painter, J., & Ashe, T. (2012). Cross-national comparison of the presence of climate scepticism in the print media in six countries, 2007–10. 7(4), 044005. https://doi.org/10.1088/1748- 9326/7/4/044005

Pearce, W., Niederer, S., Özkula, S. M., & Sánchez Querubín, N. (2018). The social media life of climate change: Platforms, publics, and future imaginaries. WIREs Climate Change, 10(2), e569. https://doi.org/10.1002/wcc.569

Penney, V. (2020, September 14). How Facebook Handles Climate Disinformation—The New York Times. The New York Times. https://www.nytimes.com/2020/07/14/climate/climate-facebook-fact-checking.html

Pew Research Center. (2020, June 23). Two-Thirds of Americans Think Government Should Do More on Climate. Pew Research Center Science & Society. https://www.pewresearch.org/science/2020/06/23/two-thirds-of-americans-think-government-should-do-more-on-climate/

Riley E. Dunlap, Aaron M. McCright & Jerrod H. Yarosh (2016) The Political Divide on Climate Change: Partisan Polarization Widens in the U.S., Environment: Science and Policy for Sustainable Development, 58:5, 4-23, DOI: 10.1080/00139157.2016.1208995

Romsdahl, R. J. (2020). Deliberative framing: Opening up discussions for local-level public engagement on climate change. Climatic Change, 162(2), 145–163. https://doi.org/10.1007/s10584-020-02754-x

Romsdahl, R. J., Wood, R. S., Harsell, D. M., & Hultquist, A. (2019). Framing local climate change policies in the US Great Plains. Journal of Environmental Policy & Planning, 21(6), 734–753. https://doi.org/10.1080/1523908X.2019.1673154

Ross, A. and Rivers, D. (2019). Internet Memes, Media Frames, and the Conflicting Logics of Climate Change Discourse, Environmental Communication, 13(7), 975-994, https://doi.org/10.1080/17524032.2018.1560347

Samantray, A., & Pin, P. (2019). Credibility of climate change denial in social media. Palgrave Communications, 5(1), 1–8. https://doi.org/10.1057/s41599-019-0344-4

Saunders, K. L. (2017). The impact of elite frames and motivated reasoning on beliefs in a global warming conspiracy: The promise and limits of trust. Research & Politics, 4(3), 2053168017717602. https://doi.org/10.1177/2053168017717602

Schäfer, M. S. (2015). Climate Change and the Media. In J. D. Wright (Ed.), International Encyclopedia of the Social & Behavioral Sciences (Second Edition) (pp. 853–859). Elsevier. https://doi.org/10.1016/B978-0-08-097086-8.91079-1

Schneider-Mayerson, M., Gustafson, A., Leiserowitz, A., Goldberg, M. H., Rosenthal, S. A., & Ballew, M. (2020). Environmental Literature as Persuasion: An Experimental Test of the

Effects of Reading Climate Fiction. Environmental Communication, 0(0), 1–16. https://doi.org/10.1080/17524032.2020.1814377

Sîrbu, A., Pedreschi, D., Giannotti, F., & Kertész, J. (2019). Algorithmic bias amplifies opinion fragmentation and polarization: A bounded confidence model. PLOS ONE, 14(3), e0213246. https://doi.org/10.1371/journal.pone.0213246

Tesler, M. (2017). Elite Domination of Public Doubts About Climate Change (Not Evolution): Political Communication: Vol 35, No 2. 35(2), 306–326. https://doi.org/doi.org/10.1080/10584609.2017.1380092

Treen, K. M., Williams, H. T. P., & O'Neill, S. J. (2020, A). Online misinformation about climate change. WIREs Climate Change, 11(5), e665. https://doi.org/10.1002/wcc.665

Treen, K., Williams, H. T. P., & O'Neill, S. (2020, B). How climate change misinformation spreads online. Carbon Brief. https://www.carbonbrief.org/guest-post-how-climate-change-misinformation-spreads-online

Treen, K., Williams, H.T.P., O'Neill, S., Coan, T.G. (2022) Discussion of Climate Change on Reddit: Polarized Discourse or Deliberative Debate?, Environmental Communication, DOI: 10.1080/17524032.2022.2050776

Uscinski, J. E., & Olivella, S. (2017). The conditional effect of conspiracy thinking on attitudes toward climate change. Research & Politics, 4(4), 2053168017743105. https://doi.org/10.1177/2053168017743105

Van der Linden, S. (2015). The conspiracy-effect: Exposure to conspiracy theories (about global warming) decreases pro-social behavior and science acceptance. Personality and Individual Differences, 87, 171–173. https://doi.org/10.1016/j.paid.2015.07.045

Van der Linden, S., Leizerowitz, A. A., Feinberg, G. D., & Maibach, E. W. (2015 B). The Scientific Consensus on Climate Change as a Gateway Belief: Experimental Evidence. PLoS ONE, 10(2). https://doi.org/10.1371/journal.pone.0118489

Van der Linden, S., Maibach, E., & Leiserowitz, A. (2015 A). Improving Public Engagement With Climate Change: Five "Best Practice" Insights From Psychological Science. Perspectives on Psychological Science: A Journal of the Association for Psychological Science, 10(6), 758–763. https://doi.org/10.1177/1745691615598516

Veldman, R. G. (2019). The Gospel of Climate Skepticism: Why Evangelical Christians Oppose Action on Climate Change (1st ed.). University of California Press. https://doi.org/10.2307/j.ctvpb3zdh

Van Swol, L. M., Bloomfield, E. F., Chang, C.-T., & Willes, S. (2021). Fostering climate change consensus: The role of intimacy in group discussions. Public Understanding of Science, 09636625211020661. https://doi.org/10.1177%2F09636625211020661

Vicario, M., Bessi, A., Zollo, F., et al. (2016). The spreading of misinformation. PNAS, 113(3), 554-559. https://doi.org/10.1073/pnas.1517441113

Vraga, E. K., Kim, S. C., & Cook, J. (2019). Testing Logic-based and Humor-based Corrections for Science, Health, and Political Misinformation on Social Media. Journal of Broadcasting & Electronic Media, 63(3), 393–414. https://doi.org/10.1080/08838151.2019.1653102

Walter, S., Brüggemann, M., & Engesser, S. (2018). Echo Chambers of Denial: Explaining User Comments on Climate Change. Environmental Communication, 12(2), 204–217. https://doi.org/10.1080/17524032.2017.1394893

Washington, H., & Cook, J. (2011). Climate Change Denial: Heads in the Sand. Routledge.

Weathers, M. R., & Kendall, B. E. (2016). Developments in the Framing of Climate Change as a Public Health Issue in US Newspapers. Environmental Communication, 10(5), 593–611. https://doi.org/10.1080/17524032.2015.1050436

Weber, E. U., & Stern, P. C. (2011). Public understanding of climate change in the United States. American Psychologist, 66(4), 315–328. https://doi.org/10.1037/a0023253

Whitmarsh, L. (2009). What's in a name? Commonalities and differences in public understanding of "climate change" and "global warming." Public Understanding of Science, 18(4), 401–420. https://doi.org/10.1177/0963662506073088

Whitmarsh, L. (2011). Scepticism and uncertainty about climate change: Dimensions, determinants and change over time. Global Environmental Change, 21(2), 690–700. https://doi.org/10.1016/j.gloenvcha.2011.01.016

Why is YouTube Broadcasting Climate Misinformation to Millions? (pp. 1–66). (2020). https://secure.avaaz.org/campaign/en/youtube_climate_misinformation/

Woods, H. S., & Hahner, L. A. (2019). Make America Meme Again: The Rhetoric of the Alt-Right (New edition). Peter Lang Inc., International Academic Publishers.

Zaleha, B. D., & Szasz, A. (2015). Why conservative Christians don't believe in climate change. Bulletin of the Atomic Scientists, 71(5), 19–30. https://doi.org/10.1177/0096340215599789

Zhang, B., van der Linden, S., Mildenberger, M., Marlon, J. R., Howe, P. D., & Leiserowitz, A. (2018). Experimental effects of climate messages vary geographically. Nature Climate Change, 8(5), 370–374. https://doi.org/10.1038/s41558-018-0122-0

[/workscited]