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Challenging Climate Change

The Denial Countermovement

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INTRODUCTION

Shortly after James Hansen's June 1988 Senate testimony placed anthropogenic global warming on the public agenda in the United States, organized efforts to deny the reality and significance of the phenomenon began, reflected by formation the following year of the Global Climate Coalition (an industry-led front group formed to call global warming into question). These efforts to deny global warming—and human-caused climate change more generally¹—have continued over the ensuing quarter-century, involving an ever-growing array of actors, and often cresting when domestic or international action (e.g., the 1997 Kyoto Protocol) aimed at reducing greenhouse gas (GHG) emissions seems imminent. Organized denial reached an unprecedented level in 2009 when the newly elected Obama administration and a Democratic-controlled Congress increased the likelihood of U.S. action to reduce GHG emissions and the December 2009 Copenhagen Conference of the United Nations Framework Convention on Climate Change was approaching. The efforts have continued relatively unabated since then, cresting whenever climate change policymaking becomes salient on the U.S. or international agendas.

The fruits of this campaign are readily apparent in the U.S. Congress, where Republican majorities in the Senate and House of Representatives are attempting to prevent the Environmental Protection Agency from taking steps to control GHG emissions and doing their best to cut funding for federal programs dealing with climate change. Further, climate change denial² has become a virtual "litmus test" for Republican politicians, strongly enforced by elements of the conservative movement. Clearly the organized climate change denial campaign has achieved a great deal

of success. It has delegitimated to a considerable degree global warming as a widely agreed-upon societal problem, a status many thought had been achieved in the early 1990s (McCright and Dunlap 2000), and has generated near-hegemonic acceptance of denial among staunch political conservatives—especially elites and activists—as well as widespread skepticism within the U.S. public, particularly among self-identified conservatives and Republicans (McCright and Dunlap 2011b).

In emphasizing the impact of organized climate change denial, this chapter will depart from major assessment reports that ignore the topic, such as the U.S. Global Change Research Program's *National Climate Assessment* volumes and the first four assessment reports of the Intergovernmental Panel on Climate Change (IPCC), and others that give denial short shrift. For example, a chapter in the volume produced by Working Group III (Mitigation of Climate Change) in the latest IPCC report (Assessment Report 5) on "Sustainable Development and Equity" devotes only a single sentence to denial (IPCC 2014:300–301). While the National Research Council's Panel on America's Climate Choices pays more attention to climate change denial in its 2010 volume, *Informing an Effective Response to Climate Change*, it still provides quite limited treatment by focusing mainly on the denial campaign's impact on public understanding of climate change (U.S. National Research Council 2010:25, 30, 208, 214).

Specifically, this chapter will first outline historical and cultural conditions that have provided fertile soil for denial—ranging from the dominant Western worldview that developed over the past few centuries to the more recent emergence of neoliberalism as hegemonic ideology—and help explain why powerful interests are so opposed to recognizing and dealing with climate change. We then analyze the key strategies and tactics employed by the denial campaign, noting that climate change policy advocates' reliance on climate science makes their efforts particularly vulnerable to denial campaigns. We next identify the major actors involved in the denial campaign in the United States, giving overviews of each one. This is followed by a brief description of the diffusion of denial to other nations, suggesting that organized denial has evolved into a global advocacy network (Farquharson 2003) designed to combat the IPCC and international climate change policy advocacy network. Lastly, we provide a short conclusion and identify key priorities for future research.

In covering these issues, three caveats are necessary. First, we draw upon a much broader range of research and analyses of climate change denial than that conducted within sociology. Nevertheless, we draw heavily upon sociological perspectives and concepts when analyzing climate change denial. Second, early sections on the historical and cultural context in which climate change denial emerged follow a more narrative structure than do

later sections, where large numbers of empirical studies are available for review. Third, neither we nor the work we review claims that the failure of the United States to endorse international climate treaties or to pass domestic climate change legislation can be attributed solely or even primarily to the denial campaign.³ Nonetheless, the relevant literature suggests that the campaign to deny the reality and significance of anthropogenic climate change has been a crucial factor contributing to the current policy stalemate (Jamieson 2014).

HISTORICAL, CULTURAL, AND POLITICO-ECONOMIC ROOTS OF CLIMATE CHANGE DENIAL

It is not surprising that acknowledging the reality and seriousness of climate change has engendered so much opposition, led by the denial campaign. It is widely noted that the development of modern industrial societies has been based on an ever-growing use of energy from fossil fuels—the primary source of GHG emissions—and that the current way of life in such societies is dependent on the availability of fossil fuels (e.g., Foster, Clark, and York 2011; Neubauer 2011). However, the cultural roots of climate change denial run even longer and deeper than efforts to protect modern economies and lifestyles premised on endless and affordable energy.

Numerous analysts suggest that modern, industrial societies embody an anthropocentric view of the natural world stemming from the Judeo-Christian assumption that nature was created for human use. A subsequent “human–nature schism” (historically referred to as “man–nature dualism”) was solidified by Enlightenment thinking emphasizing the use of science and technology to master nature and transform the environment into resources for human use, thus creating the promise of unlimited progress. The capitalist-driven Industrial Revolution implemented this instrumental view of nature, generating great wealth and growing prosperity (albeit with widespread poverty) and instigating political developments that elevated individual rights and private property as central values (Barry 2007:34–49). By the mid-twentieth century, wealthy Western nations—epitomized by the United States—came to share (at least loosely) a “dominant social paradigm” that valued individual rights, *laissez-faire* government, private property, and free enterprise. This paradigm also placed great faith in the ability of these politico-economic conditions to combine with science and technology to yield abundant resources, economic growth, and endless progress (Dunlap and Van Liere 1984; Milbrath 1984).

The tremendous success of modern capitalist societies in producing economic growth and increasing prosperity, especially from the late 1940s to

the early 1970s, led their citizens, leaders, and most intellectuals to assume that growth and progress were inevitable, resulting in ever-better living standards for ever-more people (Antonio 2009). This mindset, which Douglas (2007:550) refers to as “growthism,”⁴ was challenged by energy crises beginning in 1973–1974, economic stagflation, and talk of “limits to growth,” but it gained renewed vigor with the staunchly conservative Reagan and Thatcher regimes in the United States and United Kingdom, respectively, and the heightened globalization of capitalism.

The displacement of Keynesian economics, which accepted the necessity of governmental regulation of the economy, by the antiregulatory economics of neoliberalism, which demonized governmental intervention in principle, represented a transformation of conservatism. The goal of limited government was replaced by a staunch antigovernment orientation, representing a fundamental shift in governing philosophy that significantly reduced constraints on capital accumulation and growth (Bockman 2013; Neubauer 2011; Palley 2005). The rise of neoliberalism, along with the global spread of capitalism in an increasingly unregulated world (facilitated by neoliberalism), spawned what Antonio (2009) terms the “global growth imperative.” The global entrenchment of capitalism in recent decades has been fueled not only by the unquenchable desire for profit but by an unlimited faith in technological development (seemingly always referred to as “advances”) to overcome any potential resource limits and readily solve any (minor) environmental problems. Indeed, as reflected by influential techno-optimists such as Julian Simon (1981) and more recently Bjorn Lomborg (2001), there is a widespread belief that modern industrial societies have become “exempt” from nature’s constraints (Catton and Dunlap 1980). As Antonio (2009:30) notes, “Exemptionalist presuppositions anchor the growth imperative and many other facets of capitalist political economy, lifestyle habits, built environments, consumer culture, and development schemes”—that is, our modern way of life.

The problem of climate change has emerged within this historical, cultural, and political context, and it therefore comes as no surprise that powerful forces have denied the reality and significance of this global environmental problem. As leading social critic Naomi Klein (2011:14) argues, “The expansionist, extractive mindset, which has so long governed our relationship to nature, is what the climate crisis calls into question so fundamentally.” Unfortunately, this exemptionalist paradigm (Catton and Dunlap 1980), which assumes the possibility and desirability of endless growth and human freedom from ecological constraints, provides a valuable resource to those promoting denial. These widely held and deeply embedded beliefs furnish denialists a rich cultural toolkit (Swidler 1986) that allows them to label efforts to reduce GHG emissions as threatening economic growth and prosperity, the free-market system, individual rights, the American

way of life, and even Western civilization—discursive resources that they readily employ (e.g., Jacques, Dunlap, and Freeman 2008; McCright and Dunlap 2000).

THE CONSERVATIVE MOVEMENT, THE REAGAN PRESIDENCY, AND THE ASCENDANCE OF NEOLIBERALISM

The emergence of neoliberalism and its impact on the political culture of the United States and other industrialized nations (especially the United Kingdom) did not happen by chance but was the result of a well-funded and coordinated effort (Lapham 2004). The progressive social movements of the 1960s and implementation of federal government programs seen as creating a “welfare state” provoked a reaction among American conservative elites. Corporations and wealthy donors such as Joseph Coors banded together to fund a “countermovement” to combat these trends, building upon earlier efforts to foster conservatism and neoliberal ideology (Bellant 1990; Mirowski and Plehwe 2009), particularly in the United Kingdom (Cockett 1995). They funded conservative think tanks (CTTs) such as the Heritage Foundation, which function as countermovement organizations, with the goal of developing an apparatus for the incubation and diffusion of conservative ideas. CTTs quickly developed into a powerful political force widely recognized to have shifted American politics significantly rightward (Blumenthal 1986; Stefanic and Delgado 1996).

These CTTs (and their counterparts in other industrial nations) promoted an extreme version of the neoliberal ideas of economic thinkers such as Friedrich Hayek and Ludwig von Mises, one that jettisoned recognition of the necessity of a strong state to facilitate a successful market economy (Mirowski and Plehwe 2009; Neubauer 2011). In the process, they denigrated governmental regulations writ large, arguing that “unhindered markets are best able to generate economic growth and social welfare”—an ideology often termed “market fundamentalism” (Bockman 2013:14; also see Oreskes and Conway 2010). The inauguration of Ronald Reagan as president in 1981 represented the success of this revitalized conservative movement in altering the U.S. political landscape, as Margaret Thatcher’s 1979 election as prime minister had done in the United Kingdom (Antonio and Brulle 2011). The institutionalization of neoliberalism not only signified a major cultural shift, but also produced structural changes by reducing governmental regulations on corporations and by facilitating the accumulation of capital (Harvey 2005).

In the 1960s the growing environmental movement called attention to the negative consequences of unrestrained economic growth, especially

the unintended side effects of technological developments such as pesticide contamination and air and water pollution. The increasing visibility of such problems led to calls for governmental regulations to limit environmental degradation and promote environmental quality. Environmentalists achieved considerable success in passing environmental laws and setting up agencies such as the Environmental Protection Agency in the 1960s and early 1970s, when Keynesian thinking was still prevalent and the U.S. economy was strong (Neubauer 2011). But industry and its allies viewed these developments with alarm, and opposition to environmentalism quickly developed—primarily in the American West, where battles over access to natural resources raged (Switzer 1997)—and became a component of the wider conservative countermovement against the progressivism of the 1960s (Jacques et al. 2008; Lo 1982).

The Reagan administration rode the crest of antigovernment sentiment by implementing a neoliberal program of reducing governmental regulations, especially environmental ones. In short, conservative activists in the administration largely exercised what scholars have termed the “first dimension of power” (Lukes 1974) to oppose environmental policy and regulations via overt political actions, including appointing staunch antienvironmentalists to lead key agencies like the Environmental Protection Agency and the Department of the Interior (Kraft and Vig 1984). However, use of this blunt form of power attracted scrutiny. Appalled by the strong antienvironmental actions of the administration, several environmental organizations mounted campaigns to mobilize public opposition to the administration’s efforts to weaken environmental laws and inhibit their implementation (Dunlap 1987). Their successful efforts at fostering a public backlash helped a Democratic Congress temper, but certainly not stop, Reagan’s antienvironmental initiatives (Kraft and Vig 1984). Yet, by demonstrating that despite their growing antigovernment sentiment most Americans still supported measures to protect air and water quality and the environment more broadly (Dunlap 1987), the backlash served as a warning to conservatives (and business interests) hoping to dismantle federal (and state) environmental regulations to “get government off the back of industry.”

**FROM ANTIENVIRONMENTALISM TO CLIMATE CHANGE
DENIAL: EMPLOYING THE SECOND DIMENSION OF POWER
TO MANUFACTURE UNCERTAINTY AND CONTROVERSY**

The placement of global environmental problems (e.g., climate change, biodiversity loss, ozone depletion) on the international policy agenda in the early 1990s—symbolized by the 1992 Rio “Earth Summit”—presented

a much greater and more sustained challenge to conservatives' and industry's neoliberal agenda, especially the spread of privatization and unfettered markets globally, than had the typically localized environmental problems of earlier eras. Further, the dissolution of the Soviet Union in 1991 and the consequent decline in communism (conservatives' number-one enemy for decades) led the conservative movement to substitute a "green threat" for the declining "red threat" (Jacques et al. 2008).⁵ Climate change became the *bête noir* of conservatives due to its sweeping regulatory implications (Antonio and Brulle 2011). It is not surprising, then, that the conservative movement and industry began to mobilize in the early 1990s⁶ to block attempts at climate change policymaking—largely by denying the reality and seriousness of climate change (Gelbspan 1997, 2004).

While mobilizing against climate policy early on, conservative activists learned from the Reagan administration's experience that it was unwise to attack environmental protection directly (exercising the first dimension of power), given that Americans are generally supportive of environmental protection and see it as a governmental responsibility. Conservative activists shifted to a more subtle form of power characterized by non-decision-making and agenda setting—what Lukes (1974), following Bachrach and Baratz (1970; see also Molotch 1970), refers to as the "second dimension of power." Briefly, conservatives and their industry allies learned to prevent the implementation of environmental policies that might threaten their political and economic interests by opposing the inputs to, and undermining the foundations of, such policy proposals earlier in the policy formation process (Bonds 2010).

The conservative movement recognized that those pushing for environmental policies—often coalitions of environmentalists, scientists, and policymakers—typically build their cases on the basis of scientific evidence of alleged environmental risks and hazards (Yearley 1991). Sociologists refer to this type of science, which examines the impacts of technologies and economic activities on the natural environment and public health, as "impact science" to contrast it with the more predominant "production science" that yields technological innovations and economic growth (Schnaiberg 1980; also see McCright and Dunlap 2010). Conservatives seized upon the strategy of "manufacturing uncertainty" that had been effectively employed for several decades by corporations and entire industries, most notably the tobacco industry, in efforts to protect their products from regulations and lawsuits by questioning the adequacy of evidence suggesting the products were hazardous (e.g., Michaels 2008; Oreskes and Conway 2010). Manufacturing uncertainty about the scientific evidence documenting environmental problems—labeled "junk science"—became the favored strategy employed by conservatives (and their industry allies) in promoting

antienvironmentalism, particularly when they focused their attention on climate change in the early 1990s (Dunlap and Jacques 2013; Jacques et al. 2008).

Manufacturing uncertainty about climate change is especially attractive given several features of climate science and the IPCC. First, the inherent interdisciplinarity and complexity of climate science make paradigmatic disagreements over appropriate methods and data collection/analyses endemic to the field. This increases the likelihood of scientific disputes and makes “consensus” more difficult to achieve, heightening the challenges already present in translating science to policymakers and the general public. Second, we are almost entirely dependent upon scientific experts to tell us about the reality, extent, and impacts of climate change. Such a strong dependence upon expertise amplifies the importance of trust in science and scientists—but also makes this trust more vulnerable to challenge.

Third, from its creation by the World Meteorological Organization and the United Nations Environmental Program in 1988, the IPCC has epitomized the marriage of science and policymaking, making climate science an attractive target for opponents of climate policy. Consequently, even though Powell (2011:47) argues that “From the get-go . . . the IPCC was a conservative organization predestined for understatement,” and subsequent analyses lend credibility to his claim (Brysse et al. 2013; Freudenburg and Muselli 2010, 2013), denialists commonly refer to the IPCC as “alarmist.” Finally, and more generally, additional scientific investigation and evidence tend to add complexity and uncertainty to most science-based policy issues; thus, the goal of settling disputes with more science seems unreachable (Sarewitz 2004; Yearley 2005). This is particularly the case when some “investigators” (such as “contrarian scientists”) have the explicit goal of generating uncertainty (e.g., McCright 2007).

The strategy of manufacturing uncertainty, which capitalizes upon these characteristics of climate science and the IPCC, has been employed by conservative activists and the wider range of actors in the denial campaign. In fact, Powell (2011) notes that unlike earlier corporate campaigns to manufacture uncertainty about scientific evidence regarding hazardous products, the climate change denial campaign has waged an unprecedented war on the entire field of climate science. For instance, the various elements of organized climate change denial have questioned the validity of climate models, challenged the use of paleoclimate data to establish historical trends, criticized statistical techniques employed by climatologists, argued that modern records of temperature trends have been “adjusted” to show false warming, and criticized many other aspects of climate science—all in an effort to show that evidence supporting anthropogenic global warming and its consequences is “uncertain” at best and “fraudulent” at worst (Dunlap and

Jacques 2013; McCright and Dunlap 2000; Rahmstorf 2004; Washington and Cook 2011).⁷

The strategy of manufacturing uncertainty has two related dimensions: challenging or undermining the validity and legitimacy of the field of climate science and attacking the integrity and authority of individual, or groups of, climate scientists (e.g., Hess 2014; McCright and Dunlap 2010; Michaels 2008).⁸ These tactics—labeled the “swift-boating” of climate science and scientists (Mann 2012)—have broadened over time to entail criticisms of pillars of modern science, including the peer-review process, the objectivity of refereed journals, the fairness of governmental grant making, and the credibility of institutions such as the American Association for the Advancement of Science and the U.S. National Academy of Sciences (Powell 2011). Members of the denial campaign employ both arms of this strategy within the government (e.g., in executive branch agencies and in Congress) and within the media (Hogan and Littlemore 2009; Powell 2011), depending on whether they are in positions of power or are operating outside of institutional channels.

Over time, manufacturing uncertainty has evolved into “manufacturing controversy,” creating the impression that there is major debate and dissent *within* the scientific community over the reality of anthropogenic climate change (Ceccarelli 2011).⁹ To accomplish this, corporations and especially CTTs have supported a small number of contrarian scientists (many with no formal training in climate science) and other self-styled “experts” (often social scientists affiliated with CTTs) to produce non-peer-reviewed reports and books, publish in a handful of marginal journals, hold “scientific” conferences, compile dubious lists of supposed scientists who question climate change, and in general mimic the workings of conventional science. The goal is to produce not just criticisms of, but alternatives to, mainstream science (Dunlap and Jacques 2013; Tollefson 2011)¹⁰, fashioning a “parallel scientific universe” (Mirowski 2008) that serves to generate confusion among the public and policymakers. Essentially, the denial campaign engages climate science in framing contests, continually countering the manner in which the threat of climate change is framed with ever-evolving counterclaims (Brulle 2014; McCright and Dunlap 2000).

These techniques are exemplified by the Heartland Institute forming a “Nongovernmental International Panel on Climate Change” or NIPCC as a direct counter to the IPCC, with the goal of making the basic claims of climate science—the Earth is warming, due in significant part to human activities, resulting in negative consequences—appear not only uncertain but the subject of major scientific controversy (Plehwe 2014). These counterclaims, along with the alleged misconduct of climate scientists, are heavily publicized to create the impression of serious disagreement on climate

change among scientists in the eyes of the public, media, and policymakers, thereby undermining any need to take action (Dunlap and Jacques 2013; Tollefson 2011).

As Ceccarelli (2013:762) puts it, a “manufactured scientific controversy” is not “a *real* scientific controversy, one that currently exists within a scientific community, rather one that only *appears* to exist” in the eyes of the public and policymakers. By creating the appearance of controversy within the *public realm*, denialists are able to appeal to values such as freedom of speech, fairness to both sides, and respecting minority viewpoints to add legitimacy to their claims—thereby bypassing the scientific realm in which peer review and accumulating knowledge eventually lead to the rejection of discredited claims (Ceccarelli 2011; Dunlap and Jacques 2013). There is no better example of a manufactured controversy than climate change, as illustrated by the fact that only a small minority of the American public believes that over 90 percent of climate scientists think that human-caused global warming is happening (Leiserowitz et al. 2014) even though the actual percentage likely exceeds 90 percent (Anderegg et al. 2010).

THE CONCEPTUALIZATION AND KEY COMPONENTS OF ORGANIZED CLIMATE CHANGE DENIAL

Journalists (e.g., Gelbspan 1997) and environmental advocacy organizations (e.g., Ozone Action 1996a, 1996b) were the first to describe organized climate change denial in the United States, followed shortly by analytical work by social scientists (e.g., Beder 1999; Lahsen 1999; McCright and Dunlap 2000, 2003). While the former focused primarily on the activities of various actors representing the fossil fuels industry (e.g., corporations, industry associations, and front groups), the latter directed more attention to the activities of CTTs and their affiliated contrarian scientists. In recent years, especially since 2010, growing numbers of social scientists, journalists, and science and environmental advocacy organizations have analyzed the denial campaign—typically its key components and their strategies, but increasingly the coordinated efforts of the growing number of actors involved in denying climate change.

Early analyses portrayed the denial campaign as driven primarily by industry (Beder 1999) or as a new focus of the growing antienvironmental countermovement launched by the conservative movement (McCright and Dunlap 2000, 2003). As more information has emerged about the complex set of actors involved in denying climate change, analysts have begun to refer to a “denial machine”¹¹ (Dunlap and McCright 2011), “climate denial movement” (Boykoff and Olson 2013), “sceptic movement” (Knight and

Greenberg 2011), “climate denier movement” (Hoffman 2011a), and “climate change countermovement” (Brulle 2014) in efforts to apply conceptual tools (e.g., framing, mobilization, political opportunity structure) from social movements and political sociology scholarship. Going forward, we employ “denial countermovement” to quickly denote the overall campaign to counteract the efforts of scientists, policymakers, and citizen interest groups to stimulate awareness of and action on climate change.

Describing the denial countermovement is challenging, as it has evolved and expanded greatly over the past quarter-century. There have been major changes in its key actors, supporters, and tactics, while the basic strategy of manufacturing uncertainty has expanded into manufacturing controversy. New components and tactics typically supplement rather than replace their predecessors, resulting in an increasingly complex and multifaceted countermovement that is ever changing in response to developments in climate science and policymaking (Dunlap and McCright 2010, 2011). Consequently, analyses by social scientists, journalists, and science and environmental advocacy organizations become dated rather quickly. No work to date has been sufficiently longitudinal to fully capture the evolution of the structure and dynamics of the denial countermovement over the past quarter-century—a priority for future research we address in our conclusion.

Nevertheless, there do exist in-depth, though partial, analyses of the denial countermovement, by Brulle (2014), Dunlap and McCright (2010, 2011), Greenpeace (2013), Hoggan and Littlemore (2009), McCright and Dunlap (2000, 2003), and Powell (2011). In what follows, we draw upon these works and other analyses to identify the core components of the denial countermovement and provide a sense of how they have emerged and evolved over the last quarter-century.¹²

Fossil Fuels Industry and Corporate America

By the early 1990s individual fossil fuels corporations (most notably ExxonMobil and Peabody Coal) and industry associations (e.g., American Petroleum Institute and Western Fuels Association) were leading efforts to deny the significance of climate change—funding contrarian scientists, CTTs, and various front groups promoting denial (Beder 1999; Union of Concerned Scientists 2007). These fossil fuels industry actors were joined by a wide range of other corporations and business associations like the National Association of Manufacturers and U.S. Chamber of Commerce in front groups such as the Global Climate Coalition, as industry mobilized to successfully oppose U.S. ratification of the 1997 Kyoto Protocol (Gelbspan 1997). With the 2000 election of George W. Bush, whose administration not only opposed action on climate change but also suppressed climate science

and institutionalized climate change denial (Lynch, Burns, and Stretesky 2010; McCright and Dunlap 2010), industry had less need to attack climate science—although corporations like ExxonMobil and Koch Industries continued to do so (Greenpeace 2007, 2010).

The situation began to change, however, following the publication of Al Gore's *An Inconvenient Truth* (2006), the wide release and Academy Awards for the documentary by the same name, and the awarding of the 2007 Nobel Peace Prize to the IPCC and Gore. Climate change was in the spotlight (Dunlap and Jacques 2013; Elsasser and Dunlap 2013) and was the subject of growing public attention (Brulle, Carmichael, and Jenkins 2012; Skocpol 2012). The 2008 election of Barack Obama and a Democratic Congress stoked corporate apprehension of both national legislation and international action (at the upcoming December 2009 UN Copenhagen climate conference in December 2009) (Pooley 2010). The oil and coal industries, with help from other corporations and industry associations, launched massive oppositional efforts, from Congressional lobbying to generating public opposition via front groups, "astroturf" campaigns, and advertising (Goddell 2010).

Although several large environmental organizations formed a coalition with a few major corporations to support industry-friendly cap-and-trade legislation in 2009–2010, intense opposition from industry clearly contributed to its demise (Pooley 2010; Skocpol 2012). Much of corporate America continues to lobby against action on climate change and has increased its support for candidates opposed to climate policymaking, with notable success in recent elections (Atkin 2014). Overall, despite a good deal of pro-climate marketing, it appears that many major corporations and business associations (especially the U.S. Chamber of Commerce) continue to oppose action to reduce or even limit GHG emissions—sometimes openly via lobbying but often behind the scenes, employing both the first and second dimensions of power (Cray and Montague 2014; Goldman and Carlson 2014; Union of Concerned Scientists 2012). Perhaps because of the difficulty of obtaining relevant information, the corporate world's role in climate change denial has been largely neglected by sociologists, with Perrow (2010) being an exception (also see Chapter 3).

Conservative Think Tanks and Foundations

CTTs are arguably the most visible component of the denial countermovement and have been the focus of considerable investigation by citizen interest groups (Greenpeace 2013), journalists (Mooney 2005), and social scientists (see below). This likely stems from their activities being relatively transparent and because they have played an integral role in denying climate

change since the late 1980s. In the late 1990s, when several major corporations retreated from overt sponsorship of denial activities in response both to negative publicity and the growing credibility of climate science, CTTs stepped up their efforts (Layzer 2007). In fact, their staunch commitment to promoting neoliberalism engenders an ideologically based antipathy toward climate change (and its regulatory implications) relatively autonomous from material interests (McCright and Dunlap 2010; Neubauer 2011). Of course, they nonetheless provide “cover” for corporate interests who can fund CTTs to attack climate science while remaining cloaked.

Although CTTs function as countermovement organizations, providing an intelligentsia for promoting and protecting neoliberal interests (Neubauer 2011), they portray themselves as an alternative academia and their spokespersons as unbiased experts (Beder 2001)—making them excellent weapons in the war on climate change and science. CTTs spawn an enormous amount of denial information, and their status provides it and their “climate experts” (both in-house and sponsored) considerable credence in the media and within policy circles (McCright and Dunlap 2000, 2003). CTTs provide the “connective tissue” that helps hold the denial countermovement together and serve as vehicles for broadening its reach (Neubauer 2011; Plehwe 2014).

Numerous CTTs have been involved in denying climate change at least since the early 1990s, ranging from large ones central to the conservative movement (e.g., the Heritage Foundation, Hoover Institution, and Competitive Enterprise Institute) to smaller ones that specialize in climate change (such as the Heartland Institute and the Marshall Institute) (Lahsen 2008; McCright and Dunlap 2000, 2003; Oreskes and Conway 2010). Their crucial roles encompass the production of a vast literature challenging climate science (McCright and Dunlap 2000), including books that often attract considerable attention (Dunlap and Jacques 2013), as well as sponsoring contrarian scientists, holding events for sympathetic members of Congress, providing “experts” for congressional testimony and the media, helping organize front groups for specific campaigns, and harassing climate scientists via freedom-of-information requests (McCright and Dunlap 2003; Powell 2011)—all designed to enhance the appearance of scientific credibility for the denial countermovement while questioning the credibility of mainstream scientists (Oreskes and Conway 2010).

Besides analyzing these broad roles of CTTs, social scientists have provided in-depth analyses of individual think tanks, especially the Marshall Institute (Lahsen 2008; Oreskes and Conway 2010) and the Heartland Institute (Boykoff and Olson 2013; Hoffman 2011a; Plehwe 2014).¹³ Studies of the discourse and framing used by the denial community are becoming more common following McCright and Dunlap’s (2000) early effort, ranging from examinations of specific organizations (Greenberg, Knight,

and Westersund 2011; Knight and Greenberg 2011; McKewon 2012b) to analyses of societal debates over climate change (Hoffman 2011a, 2011b; Malone 2009).

Most recently, Brulle (2014) provides a path-breaking analysis of the overall structure and funding of the denial countermovement, examining 91 countermovement organizations (CTTs and advocacy organizations) and the 140 conservative foundations that have funded them. His network analysis reveals the foundations that provide greatest support for the denial countermovement, the CTTs that receive disproportionate funding from them, and trends over time—the central one being the increasing distribution of untraceable “dark money” through Donors Trust. Consequently, a majority of the funding cannot be traced to other foundations; nevertheless, Brulle’s (2014) analysis clearly demonstrates a high degree of cohesion among core elements of the denial countermovement as presumed by other analysts and paves the way for future research.

Contrarian Scientists

A small number of contrarian scientists have played a vital role in promoting climate change denial from the outset, when the physicists who founded the Marshall Institute—Robert Jastrow, William Nierenberg, and Frederick Seitz—issued a report that the George H. W. Bush administration relied on to downplay global warming (Lahsen 2008; Oreskes and Conway 2010). Individuals with scientific credentials (whether relevant to climate science or not) are essential for manufacturing uncertainty and controversy, and corporations, industry associations, and CTTs have made heavy use of such contrarian scientists. While some, like Patrick Michaels, have had strong links to industry, negative publicity over such ties has driven most contrarians to affiliating with CTTs (e.g., Gelbspan 1997; Hoggan and Littlemore 2009). In fact, at present most highly visible contrarian scientists have affiliations with one or more CTTs, ranging from full-time appointments (e.g., Patrick Michaels at the CATO Institute) to serving on boards, advisory committees, and expert panels; speaking at CTTs and their conferences; participating in press and congressional briefings; and especially publishing denial material. These affiliations enable contrarian scientists to reach larger audiences and provide access to conservative policymakers while avoiding the stigma of being spokespersons for the fossil fuels industry (Lahsen 2005; McCright 2007; McCright and Dunlap 2003; Oreskes and Conway 2010).

The academic credentials of contrarian scientists vary greatly, both in terms of the relevance of their degrees to climate science and their scholarly records.¹⁴ Richard Lindzen of MIT is a rare example of a contrarian climate scientist with excellent credentials, while others have strong credentials but

backgrounds marginal to climate science (like the Marshall Institute founders), training relevant to climate science but marginal scholarly records, or neither relevant training nor scholarly credentials (Anderegg et al. 2010; McCright 2007; Dunlap and Jacques 2013; Lahsen 2005, 2008; Oreskes and Conway 2010; Powell 2011). However, sponsorship by CTTs can turn even the latter into scientific “experts” who receive significant media attention and thus contribute to the “controversy” about climate change in the public and policy realms. While their credentials vary widely, the vast number of contrarian scientists share two common traits. They are overwhelmingly older, white males, and they are staunch conservatives, sharing a commitment to neoliberal fears of governmental control (Lahsen 1999; McCright and Dunlap 2011a; Oreskes and Conway 2010). Their shared ideology predisposes them to question the significance of a problem that will inevitably require governmental action and draws them to CTTs.

Front Groups and Astroturf Campaigns

Corporations and industry associations not only support CTTs to shield their denial activities, but on their own or in conjunction with CTTs continually set up front groups and shorter-term, more narrowly focused “astroturf” campaigns to mask their efforts to deny climate change and undermine climate legislation. Most of what we know about front groups and astroturf campaigns involved in the denial countermovement comes from journalists (especially Gelbspan 1997, 2004; Hoggan and Littlemore 2009; Pooley 2010; Powell 2011) and citizen interest groups (Cray and Montague 2014; Greenpeace 2010, 2013), as relatively few social scientists (Lahsen 2005; Oreskes 2010; Oreskes and Conway 2010) have offered analyses of these efforts.¹⁵ Our review will therefore be brief (see Dunlap and McCright 2011 for more detail).

The earliest front group was arguably the most significant, as the Global Climate Coalition—formed in 1989 in response to the establishment of the IPCC—was sponsored by major fossil fuels companies, automobile manufacturers, and industry associations and immediately challenged climate science and the need for climate policies. The Kyoto Protocol was a primary target, and the coalition played a critical role in blocking U.S. ratification (McCright and Dunlap 2000). It disbanded in 2002 after several corporations dropped out and it became clear its goals were shared by the George W. Bush administration. Next came the Information Council on the Environment, established in 1991 by coal and utility interests to undermine climate science. It disappeared when its plan to “reposition global warming as a theory (not fact)” was leaked to the press (Pooley 2010:41), only to be followed by the Greening Earth Society. Set up by the Western

Fuels Association and relying on a handful of contrarians (including Patrick Michaels), it launched a sophisticated campaign to undermine climate science by arguing that increased levels of atmospheric CO₂ would be beneficial (Oreskes 2010). Reflecting the earlier-noted shift from industry to CTTs as the core of the denial countermovement, the Cooler Heads Coalition emerged in 1997. It is a loose coalition of key CTTs, centered at the Competitive Enterprise Institute, and has been particularly aggressive in attacking climate science and scientists.¹⁶ More recently, the American Legislative Exchange Council, an industry-funded group that provides sympathetic politicians with ready-made legislation, has promoted measures in several states to restrict climate change education (Forecast the Facts 2014).

Two front groups closely associated with the Koch brothers, Americans for Prosperity and Freedom Works, have played central roles in sponsoring short-term astroturf campaigns aimed at blocking climate legislation and Obama's agenda more generally. For example, Americans for Prosperity sponsored "Hot Air Tours" in 2008, and Freedom Works joined with the American Petroleum Institute in promoting 2009 "Energy Citizens" rallies to promote opposition to climate legislation. These types of campaigns, organized with the help of public relations firms, have long been used by industry and CTTs to mimic grassroots campaigns of ordinary citizens but are clearly top-down efforts (Beder 1998).

A final example of front groups and "astroturf" campaigns comes from the Religious Right. In response to growing concern over climate change within the Christian community, reflected by the Evangelical Climate Initiative (Wilkinson 2012), conservative Christians began to embrace climate change denial (McCammack 2007). A front group termed the Interfaith Stewardship Alliance was set up with corporate support (it was renamed the Cornwall Alliance for Stewardship of Creation) and has engaged in a wide range of antienvironmental activities. Headed by Calvin Beisner, who has a long history of involvement with industry, CTTs, and conservative causes, the Cornwall Alliance has issued an "Evangelical Declaration on Global Warming" that was laden with denialist claims and designed to counteract progressive Christians' efforts to generate support for dealing with climate change (People for the American Way 2011). Despite its "Christian face," the Cornwall Alliance is a staunch supporter of neoliberal ideas and causes.

Conservative Politicians

Republican politicians' traditionally strong embrace of neoliberal ideology has made them less likely than Democrats to support environmental protection, and the rightward shift in the Republican Party over the past two decades—recently enhanced by the Tea Party—has created a chasm

between them and their Democratic counterparts on environmental issues (McCright, Xiao, and Dunlap 2014), most notably climate change. Republican members of Congress have held hearings to attack climate scientists and challenge evidence for climate change since the 1990s (Mann 2012; McCright and Dunlap 2003). While Republicans historically have slighted scientific expertise in hearings on climate change (Park, Liu, and Vedlitz 2014), in recent years they have been inviting larger numbers of contrarian scientists (and other members of the denial countermovement) to testify, helping create the illusion of scientific controversy (Koebler 2014). Most strikingly, Senator James Inhofe, who called for criminal investigation of leading climate scientists following “Climategate” (Nature 2010), uses the Committee for Environment and Public Works (which he again chairs following the 2014 election) as a megaphone for denialists.

Republicans’ ideological predisposition to deny climate change has been enhanced by heavy contributions from the fossil fuels industry (Atkin 2014). In the 113th Congress a majority of Republican House members, and 90 percent of Republican leaders in both the Senate and the House, were on record denying basic tenets of climate science (Germain 2014). Furthermore, via Americans for Prosperity, the Koch brothers have induced hundreds of Republican politicians, including most leaders of the House, to sign their “No Climate Tax” pledge (Mayer 2013). These developments suggest that the Republican-controlled Congress may be even more successful in institutionalizing climate change denial than was the George W. Bush administration—which turned the White House into a key component of the denial countermovement (Lynch et al. 2010; McCright and Dunlap 2010). Ongoing efforts to undermine the Obama administration’s climate initiatives, including combating climate science via funding cuts, represent a reliance on the first face of power reminiscent of the early Reagan administration (Hess 2014).

Conservative Media

Another essential component of the denial countermovement is the conservative media, which has been vital in conveying denial to the American public and beyond (Boykoff 2013). For much of the past quarter-century, key outlets for climate change denial have been conservative newspapers (e.g., *Wall Street Journal*, *New York Post*, *Washington Times*), magazines (e.g., *The Weekly Standard*, *National Review*, and *The American Spectator*), talk radio (e.g., Rush Limbaugh), television (e.g., Fox News reporters and popular commentators such as Bill O’Reilly and Sean Hannity), and prominent syndicated columnists and personalities whose influence transcend a single medium (e.g., George Will, Charles Krauthammer, Glenn Beck). In

crediting conservative media for helping to move the United States rightward in recent decades, Jamieson and Cappella (2008) view it as an “echo chamber” that endlessly circulates and amplifies ideologically driven claims to its audiences. This seems to be an apt metaphor here, as the barrage of assaults on climate science—and increasingly climate scientists—from the conservative media not only inundates committed conservative audiences but also reaches a large segment of the general public.

In the expansive literature on climate change media coverage, a few robust findings demonstrating the influence of conservative media have emerged. As expected, conservative media outlets promote climate change denial more strongly and more often than do nonconservative outlets (Feldman et al. 2012; McKewon 2012b; McKnight 2010; Painter and Ashe 2012). This pattern holds for news coverage and especially for editorial and opinion pieces (Painter and Ashe 2012). In fact, climate change denial appears quite prominently in editorial and opinion columns of newspapers in general—more so than in news sections (Elsasser and Dunlap 2013; McKewon 2012a, 2012b; Young 2013). Perhaps best known for promoting climate change denial are the Rupert Murdoch–owned News Corporation media outlets in Australia, Britain, and the United States (McKnight 2010; see also Feldman et al. 2012 on the United States and McKewon 2012b on Australia).

Likely due to the success of the conservative echo chamber in influencing the American media environment, U.S. media in general give significantly more coverage to climate change denial claims and claims makers than do media in any other country (Boykoff 2013; Grundmann 2007; Grundmann and Scott 2014; McKnight 2010; Painter and Ashe 2012). Outside of the United States, media outlets in other Anglo countries such as Australia and the United Kingdom feature climate change denial more prominently than do those in other developed and developing nations—where denial claims and claims makers receive only scant attention (Grundmann and Scott 2014; Painter and Ashe 2012; Sharman 2014).

Denial Blogosphere

The last decade has seen the emergence of a crucial new extension of the conservative echo chamber and major addition to the climate change denial countermovement: the denial blogosphere, or what Pooley (2010) terms the “denialosphere.” These online blogs, on which self-described climate skeptics and contrarian scientists question the reality and significance of climate change and dispute climate science *per se*, increasingly supplement—and to some degree supplant—the more traditional media outlets above. While a few denial blogs are hosted by contrarian scientists (e.g., Judith Curry),

the most popular North American blogs are run by a retired TV meteorologist (wattsupwiththat.com), a retired mining executive and dedicated critic of the “hockey stick” model of historical climate trends (climateaudit.org), and a self-styled “warrior” in the climate wars (www.climatedepot.com). The skeptical bloggers tend to have large and avid audiences, with new posts often stimulating hundreds of comments that frequently express intense vitriol for climate scientists and climate change activists and policy proponents. The number of English-language denial blogs has grown dramatically since their first appearance in 2005; they now total over 170 (Sharman 2014), so we can expect their impact to increase.¹⁷

These blogs came to the fore in 2009 when several played key roles in generating and then publicizing the controversies over “Climategate” and a few relatively minor errors in the 2007 IPCC Fourth Assessment Report.¹⁸ Some bloggers have become celebrities in the denial community and are routinely granted access to broader media, especially conservative media. The “auditing” of climate science on the blogosphere has opened the field up to intense scrutiny and made climate scientists the targets of severe harassment (Mann 2012; Powell 2011). As testament to the international influence of the U.S.-based climate change denial countermovement, several recent analyses document that activists and organizations in the U.S. denial campaign have strong ties to much of the denial blogosphere based in the United Kingdom (Gavin and Marshall 2011; Lockwood 2011), France (Niederer 2013), the Netherlands (Niederer 2013), and a range of European and non-European countries (Sharman 2014).

The denial blogosphere stimulates participation in climate change denial across social media more generally (Berkhout 2010). For instance, denial blogosphere posts are regularly circulated on social media websites such as Twitter and Facebook. Further, climate change denial claims seem to be especially conspicuous in online reader comments on newspaper websites (DeKraker et al. 2014; Koteyko et al. 2012). The increasing use of social media helps disseminate denial claims well beyond the actors in the denial movement to broader audiences. Overall, the Web, blogosphere, and social media all facilitate the international spread of climate change denial.

THE INTERNATIONAL DIFFUSION OF DENIAL AND EMERGENCE OF A GLOBAL ADVOCACY NETWORK

We have focused heavily on the structure and strategy of the denial countermovement in the United States, where it originated and remains most firmly rooted and thus has been the subject of a considerable amount of investigation and research. However, climate change denial has diffused

internationally, frequently assisted by American CTTs and contrarian scientists and of course more recently facilitated by the global communication technologies just reviewed.

In addition, several international CTT networks have played leading roles in diffusing denial. These include the Atlas Economic Research Foundation (originating in the United Kingdom but based in the United States), the Economic Freedom Network (established by Canada's Fraser Institute) and the U.K.-based International Policy Network. The latter has established the "Civil Society Coalition on Climate Change" consisting of supposed "independent civil society organizations" (often tiny front groups consisting of a few individuals) in over forty nations, all sharing the goal of denying the reality of climate change and the need to act on it (Dunlap and McCright 2011). Much of what we know about the networks that have spread denial comes from nonacademics (Greenpeace 2013; Harkinson 2009), although a recent analysis of links between CTTs and books espousing climate change denial demonstrates the pioneering role of American CTTs and contrarian scientists and the critical role now being played by CTTs in other nations in the publication of these books (Dunlap and Jacques 2013).

Not surprisingly, climate change denial is most firmly rooted in nations with very strong commitments to neoliberalism and a powerful fossil fuels industry, as the United Kingdom, Australia, and Canada follow the United States as strongholds of denialism. This is reflected not only in their production of denial books (Dunlap and Jacques 2013) but also in the rapidly growing number of social science analyses of the denial countermovement within these nations. For instance, Hamilton's early (2007) in-depth analysis of denial in Australia is supplemented by McKewon's (2012a, 2012b) studies, Lack's (2013) detailed portrait of denial actors in the United Kingdom extends earlier work by Douglas (2009) and Gavin and Marshall (2011), and numerous studies are emerging in Canada in recent years (Greenberg, Knight, and Westersund 2011; Knight and Greenberg 2011; Young 2013; Young and Coutinho 2014).

While not as strong as in the Anglo world, climate change denial is clearly spreading to many other nations, particularly across Europe, leading to analyses in France (Zaccai, Gemenne, and Decroly 2012), Sweden (Anselm and Hultman 2013), and the Netherlands (van Soest 2011).¹⁹ We need more studies in other nations, and especially cross-national comparisons, as undoubtedly the sources and nature of denial vary across national contexts.

At the same time, more attention needs to be paid to the international coordination of denial activities, beyond the roles of key actors from the United States, United Kingdom, and Canada in stimulating denial organizations abroad (as noted above). In recognition of the organizational

complexity and increasingly global reach of the denial countermovement, Donald (2011) argues for using the concept of “global advocacy network” developed by Farquharson (2003) to analyze the international debate over tobacco restrictions. Building upon and extending two well-established social science perspectives—advocacy coalition framework (Sabatier and Jenkins-Smith 1993) and transnational advocacy networks (Keck and Sikkink 1999)—the global advocacy network concept offers an excellent tool for conceptualizing the full range of denial countermovement actors (organizations and individuals), strategies, and goals. It also clarifies the essence of climate change denial—that it is designed specifically to counteract a competing global advocacy network: the IPCC, civil society organizations, policymakers, and others trying to promote efforts to deal with climate change. Thus, like other countermovements, climate change denial constantly evolves in response to its opponent.

CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

This chapter has provided an overview of the state of knowledge on the emergence, trajectory, and dynamics of organized climate change denial, paying attention to its evolution and international diffusion. It has demonstrated that by constantly challenging the reality and significance of climate change, the denial countermovement represents a powerful obstacle to mobilizing societal action aimed at reducing GHG emissions. Indeed, a successful climate change denial campaign—and the rejection of impact science more generally—may undermine long-term societal resilience in a warming world. By substituting ideology for science to protect the neoliberal order in the global capitalist system, a successful denial countermovement inhibits efforts to mitigate and/or adapt to climate change in a warming world (Dunlap 2014; McCright 2011).²⁰

Given the significance of what is at stake, we end by identifying a few key research priorities to guide scholarship in this area in the future. First, we generally lack much theorizing that explains the emergence, structure, and impacts of organized climate change denial. One exception to date is the Anti-Reflexivity Thesis (e.g., McCright and Dunlap 2010; also see Antonio and Brulle 2011; Young and Coutinho 2014), which conceptualizes the conservative movement and industrial sector as a rearguard force defending the industrial capitalist system from widespread scientific, political, and public acknowledgment of the system’s unintended and unanticipated consequences, such as climate change. While this perspective is still in its infancy and can benefit from elaboration, it nevertheless appears to offer considerable purchase for understanding how and why key forces of organized

climate change denial employ the strategies of manufacturing uncertainty and controversy to oppose the claims of environmentalists and scientists about climate change.

Hess (2014) introduces the term “epistemic rift” to conceptualize how the denial countermovement has created a rupture between science and policymaking. While such efforts that build upon or complement the Anti-Reflexivity Thesis are crucial, our sociological understanding of organized climate change denial also will benefit from alternative conceptualizations and theoretical efforts. For example, advances may be made by drawing insights from the social movements literature to more fully develop the theoretical notions of organized climate change denial as a countermovement and global advocacy network. Further advances may be made by drawing insights from the sociology of science literature to clarify how other climate change denial machine components engage with, and provide resources and venues for, contrarian scientists and attempt to mimic the authority of mainstream climate science while undermining it in the process.

Second, much of what we know about the major components of the denial countermovement in recent years has been provided by journalists and science and environmental advocacy organizations. While these efforts are highly valuable, the time is ripe for social scientists, especially sociologists, to step up our contributions. Four such endeavors seem especially important. Briefly, we need network analyses of the key components of the denial countermovement, extending Brulle’s (2014) examination of connections between foundations and CTTs to include, for example, connections between CTTs and contrarian scientists. Also, we need research on patterns of funding for components of the denial countermovement—again, beyond Brulle’s (2014) work—especially focusing on funding from corporations, which is more challenging to examine than that from foundations. Further, we need continued analyses of the discourses, claims, and frames employed by key components in the denial countermovement. Lastly, we should investigate denial countermovement components, strategies, and tactics not only within individual nations but also across nations to analyze the evolution of the denial countermovement into a full-fledged global advocacy network.

Third and finally, no work to date has been sufficiently longitudinal to fully capture the evolution of the structure, dynamics, and tactics of the denial countermovement. A few works imply that different “eras” of climate change denial may be discerned (Aykut et al. 2012; Levy and Spicer 2013). Evidence suggests that key components of the denial countermovement have emerged and become more or less central to the denial campaign over time, as we attempted to characterize in earlier sections. Yet, a more complete understanding of organized climate change denial over the last quarter-century, including the international diffusion of denial around

the world, demands the collection and rigorous, systematic examination of longitudinal data.

NOTES

1. We use “global warming” and “climate change” interchangeably, despite the broader focus of the latter, as both are used in policy and public debates about climate science—with global warming being the more common term in the 1980s and 1990s. We do so with the clear implication that we are referring to *anthropogenic* or human-caused warming and consequent climatic changes.

2. Denial and skepticism are often treated as a continuum, from outright denial of the reality of anthropogenic climate change and refusal to accept evidence of its existence to skepticism about various aspects of climate change—especially its significance, degree of human causation, potential negative impacts, and the necessity/possibility of ameliorating it. The former tends to be held by key actors in the denial machine, while the latter is more prevalent among broader sectors of the general public. Denialists (some of whom argue that the “denier” label is derogatory) like to label themselves as open-minded skeptics who are willing to revise their beliefs in lieu of additional evidence (Brin 2010; Diethelm and McKee 2009). Yet, Washington and Cook (2011) argue that denial and skepticism, especially when the latter is claimed by denialists trying to don the skeptical hat worn by all good scientists, are in fact opposing perspectives.

3. Indeed, scholars point to additional factors that contribute to this failure. First, as a “super-wicked” problem, climate change is an especially difficult subject for effective policymaking (Lazarus 2009). Second, despite reversing the denialist stance of the George W. Bush administration (McCright and Dunlap 2010), the Obama administration did not prioritize carbon emission reduction policies during the open “policy window” when Democrats briefly controlled the presidency and Congress (Pooley 2010). And third, there are many factors besides lack of leadership by the United States that have blocked effective international action, especially international and intergenerational equity considerations (McCright and Dunlap 2003; Roberts and Park 2007).

4. Douglas (2007:550) describes growthism as follows: “Its central tenet is that the global economy can keep on expanding indefinitely—for all practical purposes, forever. Its second principle is that growth is good, and that more growth is always better than less. Its third principle is that increasing growth should be society’s over-riding priority.”

5. Growing ideological and partisan polarization over environmental protection, first among political elites (institutionalized by the Gingrich-led Congress) and then the general public, began in the first half of the 1990s (McCright, Xiao, and Dunlap 2014).

6. Actually, the earliest efforts began at the end of the 1980s, following James Hansen’s 1988 Senate testimony, but they clearly escalated in the early 1990s.

7. For a continually updated list of specious claims used to attack climate science, see <http://www.skepticalscience.com>.

8. See McCright and Dunlap (2010) for an extensive discussion of the specific non-decision-making techniques associated with manufacturing uncertainty that conservative activists have employed since the mid-1990s. Also, Hess (2014) focuses on key non-decision-making techniques by Republicans in control of Congress in recent years (e.g., trying to cut government research funding on climate change).

9. Perhaps the strongest evidence of the relatively strong degree of scientific consensus on the basic claims of climate science is that presented by Anderegg, Prall, Harold, and Schneider (2010).

10. Bonds (2010) notes how these efforts involve not just contesting but producing “knowledge,” the latter referring to the creation of a body of (mis)information that is used to counter scientific findings.

11. Science journalist Sharon Begley (2007) introduced the term in her *Newsweek* cover story and others have adopted it.

12. For relatively brief but more in-depth (than we provide here) descriptions of most of the key components of the denial countermovement, see Dunlap and McCright (2010; 2011). Figure 10.1 in Dunlap and McCright (2011:147) is an attempt to visually portray the structure of, and interrelationship among, key components within the denial machine.

13. Social critic Naomi Klein (2011) also provides an in-depth look at the Heartland Institute’s “International Conference on Climate Change.”

14. Various lists of contrarian scientists have been published, but perhaps the most extensive (and updated) list can be found on the Research Database of DeSmog blog (which includes many other individuals in the denial countermovement): www.desmogblog.com.

15. For a rare study of astroturfing *within* the fossil fuels industry, see Mix and Waldo’s (2014) insightful analysis of how a natural gas company employed an astroturf campaign to prevent construction of a coal-fired electrical plant that it viewed as a potential competitor.

16. In affiliation with a smaller front group (the American Tradition Institute), the Competitive Enterprise Institute has specialized in harassing scientists by filing Freedom of Information Act requests to gain access to their email and records (see Mann 2012:367).

17. There are nearly as many in other languages as well. A Portuguese blog identifies many of the leading denial websites in some European, Asian, and Latin American countries: <http://ecotretas.blogspot.com/p/skeptical-views-in-non-english.html>.

18. Having the denialosphere at its service provides the denial campaign a highly effective means of spreading its message, as reflected by its success in turning a tiny and highly unrepresentative sample of thirteen years’ worth of personal e-mails hacked from the Climate Research Unit at the University of East Anglia into a major scandal that generated a decline in public belief in climate change and trust in climate scientists (Leiserowitz et al. 2012)—despite the fact that several investigations have concluded the e-mails neither demonstrate unethical behavior nor

undermine climate science (Holliman 2011; Powell 2011:Chapter 12). See Sheppard (2011) and Greenpeace (2011) for insightful analyses of the key players involved in manufacturing Climategate.

19. Dutch economist Labohm (2012), a leading figure in the denial counter-movement, provides a upbeat overview of what he calls “climate scepticism” in European nations, noting individuals and/or groups in several additional nations, including Russia, Portugal, Denmark, Italy, Spain, the Czech Republic, Switzerland, and Germany. It is published in a small journal that caters to climate change denialists.

20. See Chapters 6 and 7 of this volume for the importance of adaptation and mitigation efforts.

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