IDENTIFYING MESSAGING, THEMES, AND RHETORICAL STRATEGIES FOR EFFECTIVELY COMMUNICATING CLMATE CHANGE IN BOOKS FOR A GENERAL AUDIENCE

by

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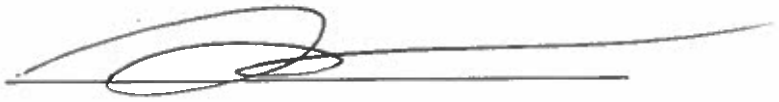
Approved: 

Professor Stephanie LeMenager

Since global warming came to the international stage in the 1980s, mass media, scientists, politicians, and other public figures have avoided addressing the problem for a multitude of reasons—the first being the social and political complexity of the issue. Most Americans believe that climate change is happening, and for the most part they believe that it is caused at least in part by human actions. Yet the media discourse still focuses on the science and debates between scientists and skeptics. Instead, I look to another accessible form of media for more effective climate change communication—books about climate change for a general audience. Authors like Bill McKibben, Thomas Friedman, Elizabeth Kolbert, Al Gore, and Naomi Klein offer messages about consequences and solutions to climate change that address the issue as more than just a scientific problem. These and other authors seek to interpret climate change and engage lay readers by focusing on institutions, worldviews, and social norms that are harmful to the environment rather than on individual behavior and responsibility. The works in my study employ useful frameworks in their messaging that are more salient to the discourse. My goal is to create a rubric for more effective climate change communication. By using books for a general audience I access directed ideas for action and solutions that are accessible to readers. These ideas, while already widely read, should be employed and synthesized more widely in order to empower people to take and demand action on all scales.

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PART I – Introduction

In almost all forms of media, global climate change is recognized as more than just a concern for climate scientists. Since the 1980s this issue has come to the forefront of public attention, aided and abetted by the constant flow of new scientific information. Yet a number of factors, among them public uncertainty and apathy, political stalling, and industry interests have also combatted climate action. Alan Rusbridger, the long time editor *The Guardian*, eloquently states in an introduction to the Guardian's new "Keep it in the Ground" campaign[1] that the question is not of whether or not climate change is happening, but rather how we will deal with the consequences.

> "For the purposes of our coming coverage, we will assume that the scientific consensus about man-made climate change and its likely effects is overwhelming. We will leave the skeptics and deniers to waste their time challenging the science. The mainstream argument has moved on to the politics and economics" (Rusbridger 2015).

Yet even the mainstream conversation on politics and economics tends to overlook issues regarding communication about and sociology behind climate change. It is therefore important to investigate the relationship between science and media, and between media and the public. It is crucial to study communication in regard to climate change, because the general public gains most of its scientific knowledge from mass media (Boykoff and Boykoff 2004). Though the mass media aims to reflect a balance of ideas from both climate scientists and climate change deniers, other forms of media are more directly targeted at educated audiences. The apparent disconnection between scientific consensus on climate change and public perception on the issue calls into

[1] In March 2015 *The Guardian* introduced a new multi-media campaign dedicated to covering climate change impacts, causes, and encouraging the Gates foundation and the Wellcome Trust to divest from fossil fuels.

question the media's ability to accurately interpret and communicate climate science and its political, economic, social, and psychological impacts (Maibach, Myers, and Leiserowitz 2014, McBean and Hengeveld 2000). While many studies on the mass media, prestige press, academic articles, and public perception in relation to climate change have been done, (Anderegg 2010, Bord, Fisher, and O'Conner 1998, Boykoff and Boykoff 2004, Maibach, Myers, and Leiserowitz 2014, McBean and Hengeveld 2000, Norgaard 2011) there is a lack of examination on other forms of media that are less accessible but are still relevant to educating the public about climate change.

An area of little study is on books written for a general audience. They are less widely read than mass media sources but are still relevant to educating the public about climate change. Since the 1980s, dozens of books have been written about global warming and climate change for a general audience, each with varying levels of popularity and readership, but most contain evocative messages and potential solutions.

Methods

Since the 1980s, scientific certainty and public awareness of global warming have been growing among the American public, as "1988 was a key year in the development of public concern for global warming in the United States. A severe drought and heat-wave coincided with James Hansen's 1988 testimony before Congress that global warming had begun" (Bord, Fisher, and O'Conner 1998, 76). And with this coincidence blossomed a genre described as "climate change literature for a general audience" (McKibben 2010). This genre is an extension of popular science that interprets science for a general audience, but also delves into social, economic, and policy spheres. Journalists, scientists, and other expert communicators populate the

authorship of this genre. For popular science books about the environment, there is often an added component of bias—the goal is not just to inform, but also to advocate for change and to move the audience. The prime example is *Silent Spring*, by Rachel Carson (Carson 1962). By bringing environmental concerns to the public's attention, Carson became one of the catalysts for the environmental movement. With the help of her work, the movement to ban the pesticide DDT was successful in the U.S. Within a few years, the U.S. Environmental Protection Agency was established, and *Silent Spring* is remembered as the zeitgeist of the modern environmental movement.

The new, more modern popular science writing on climate change follows in the same vein as Carson, though from a variety of angles. Some authors advocate social revolution, while others claim technological innovation is the best solution to the global climate problem. From this genre of books I have selected six of the most widely read and reviewed. Each has appeared on the *New York Times* Best Seller list and has received a great deal of attention after publication. Additionally each author touts a wide readership from his or her work as a journalist, writer, or public figure.

Several authors have published other books that were well received, but the six works listed in Figure 1 are the most representative from the popular science about climate change genre. They span from the first book on climate change for a popular audience to the most recently published and highly anticipated work published just prior to this study. Each author frames his or her argument differently, even Bill McKibben, the author that appears twice on the list. Twenty-one years and some ideological changes and experiences separate his works, making his change in opinion and rhetoric interesting to examine.

The End of Nature, Bill McKibben (1989)
An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do about It, Al Gore (2006)
Field Notes from a Catastrophe: Man, Nature, and Climate Change, Elizabeth Kolbert (2006)
Hot, Flat, and Crowded: Why we need a Green Revolution—and how it can Renew America, Thomas L. Friedman (2008)
Eaarth: Making a Life on a Tough New Planet, Bill McKibben (2010)
This Changes Everything: Capitalism vs. The Climate, Naomi Klein (2014)

Table 1. Popular science books used in this study.

In examining books that interpret climate science and propose methods and solutions, I examine the authors' methods for creating more comprehensive political and social understanding for the general public on a complicated issue, as defined in Edelman's *Constructing the Political Spectacle*.

> "Political understanding lies in awareness of the range of meanings political phenomena present and in appreciation of their potentialities for generating change in actions and beliefs. It does not spring from designating some one interpretation as fact, truth, or scientific finding" (Edelman 1988, 123).

With this in mind, the framing surrounding climate change as an issue is duly important because not only does it determine if an individual will choose to believe interpretations, but it can also determine if an individual will be moved to take action on these beliefs. While none of these authors are scientists, an essential element in their selection for this project is that each is an expert communicator wishing to share their interpretations of the climate problem with the public on what can be done about it. Where scientists cannot always bridge the gap between science and public awareness,

these authors seek to fill in, not only with scientific interpretations but also with advocacy for action.

Unlike most scientific papers, the target audience for these works is not academia. Rather, they are books written for a more general readership that seek to interpret climate change science and its political, social, and economic impacts. It is implied that the audiences are at least somewhat educated and have some awareness of the climate problem. Additionally, these books are not aimed at climate change skeptics, but rather at the concerned or cautious, the largest categories of American individuals identifies by Leiserowitz et al.

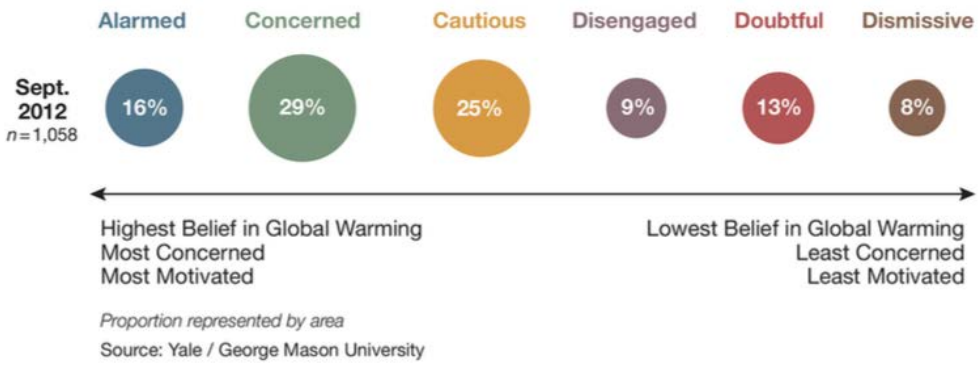

Figure 1. Six Americas represented by size of response group.

In general, concerned individuals support action on climate but think that climate change is a future threat. Cautious individuals are likely to believe climate change is real and happening, but tend towards uncertainty (Leiserowitz et al. 2013). Combined, concerned and cautious individuals make up 54% of American adults. It would be prudent to target messages at these groups of individuals, who are already aware and have potential to be mobilized into the alarmed group. For the most part, books of the

popular science genre are targeted towards concerned and cautious individuals wishing to learn more about the climate change issue and how it may be addressed.

While reading the six works listed in Table 1, I identified and arguments that were substantial and transmissible for public consumption. I organized these ideas into five “best ideas” for communicating climate change. They comprise necessary rubric for communicators, but are not sufficient to successfully communicating the complexity of the issue. Rather these five best ideas reflect the most salient issues that must be addressed and unpacked in order to have a more free and educated public discourse. This examination begins with a brief summary of each work’s major themes and tone. The majority of my work examines the best ideas for how to communicate climate change, including how they are effective and the studies on psychology and behavior, sociology, economic and governing policies, and other areas that substantiate the ideas. I conclude with sixth idea—enabling readers to imagine a future. This final section also includes a summary of my outreach to climate fiction writers and potential applications for this study.

PART II – Literature Summary

***The End of Nature* by Bill McKibben, 1989**

"Prior to the mid-1980s in the United States, public awareness of, and concern about, global warming was very limited," claim Bord, Fisher, and O'Conner (75). But the growing evidence brought up a number of questions and public concerns. Bill McKibben's first book, *The End of Nature* (1989), first serialized in *The New Yorker*, was an attempt to address this growing concern. McKibben was at the time a freelance journalist and has since published many more books, contributed to many prestigious media outlets, and has spearheaded several environmental campaigns. He acknowledges, in a more recent introduction to his old work, that *The End of Nature* was the first book for a general audience about global warming. His work came at a time proximal to several large and disturbing discoveries about the status of the Earth. It also came at a time when increased action and awareness of these problems had the potential to make very real impacts.

Just two years before *The End of Nature* was published, the U.N. came together and signed the Montreal Protocol, restricting and phasing out the use of chlorofluorocarbons (CFCs). This treaty ultimately aimed at addressing the forming ozone hole over Antarctica, caused by reactions between CFCs and oxygen molecules. Within just a few years of discovering this chemical interaction, the international community came together and agreed to address the problem at its cause. The precedent set for this action has many implications for further international action in addressing global environmental issues. Additionally, "1988 was a key year in the development of

public concern for global warming in the United States" (Bord, Fisher, and O'Conner 1998, 76). It was the hottest year on record at the time for global temperatures, and the year that climate researcher James Hansen presented a congressional testimony on the near scientific certainty of man-made global warming.

With a precedent for international collaboration and a timely and recent attestation to the certainty of anthropogenic climate change, the time was ripe for a moving work of scientific prose, in the style of Rachel Carson's *Silent Spring*. While the *New York Times* hailed *The End of Nature* as a modern day *Silent Spring* it failed to spark a similar environmental movement (Griswold 2012). Like *Silent Spring*, *The End of Nature* uses prose, appeals to humanity, and implications of a postnatural world. As a young American writer, McKibben offers his perspective on what is wrong with the human relationship to the environment. In his eyes, the problem is a spiritual and physical disconnection from nature caused by individualism and long-term government and industry anti-environmental practices.

***An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do about It* by Al Gore, 2006**

Al Gore, unique among the other authors I treat in this essay because he is a politician, spends a considerable part of his text establishing his authority as a speaker and educator on the climate crisis. He is well published in the last twenty years, and was awarded the Nobel Peace Prize in 2007. Yet in *An Inconvenient Truth*, Gore works hard to affirm his commitment as a public servant both in and out of office, as if he has something to prove. His time in Congress, as vice-president, and as a presidential candidate is his evidence for the work he tried to do. Several times he implies that he

has failed in his attempts to sway Congress and public opinion from the trend of ignoring the climate problem. Despite his perceived failure, he has continued as a spokesperson and public figure—perhaps the most visible and vocal figure for global warming and climate change. His image is compelling because of his expertise in politics and business, his history as a spokesman, and his connections. Readers get more Gore family history than they might have bargained for, but it is often skillfully woven into the fabric of his argument. With family anecdotes, Gore achieves a second purpose, strongly cementing himself as a family man with concerns for his children's future.

Gore's book is also attractive to the potential reader. Using images makes this book more engaging than other works of climate change. The format recalls to when the Sierra Club first started producing coffee table books to draw attention to conservation in the American West (Dunaway 2005). It is much more likely to be idly picked up and read than any of my other texts. In this sense, it is much more accessible. In addition to being physically accessible, the message within is also accessible to readers. Gore may think that he failed in Congress and in his crusade to inspire action on global warming, but shaping the messaging is one thing he did effectively. First, he and his works have earned name recognition. Second, he crafted a message that is clear, concise, and repeated. In text form, movie form, in clips on the Internet of countless speeches and slideshows, his message is repeated. Gore is cited in all the books on climate change published after his own (Friedman 2008, McKibben 2010, Klein 2014). He gives readers a common vocabulary, and this text is the basis on which all others have improved.

***Field Notes from a Catastrophe: Man, Nature, and Climate Change* by Elizabeth Kolbert, 2006**

The New Yorker journalist Elizabeth Kolbert's goal for *Field Notes*, stated in her preface, is to "convey as vividly as possible, the reality of global warming" (Kolbert 2006, 2). From her accumulated evidence and anecdotes, the climate change reality is clear. Most of her interviewees are scientists in the field or lab, sharing their portion of the "truth" about global warming. Rather than actual field notes—rough sketches, scribbled notes, and first impressions—Kolbert offers a broad gauge of the global situation based on the scientific research.

While Kolbert doesn't always speak with her own words, the stories she elected to include in her book tell the best narrative for her purposes. Based on this assumption, the reader picks up a theme of concern for human reliance on an Earth in peril, and the assessment that there is no single catch-all solution. Yet as a journalist Kolbert adheres to a strict no-advocacy policy. In this sense, her book is highly conservative. Kolbert uses interviews to tell a story, but the examples she uses do not form a cohesive argument. Beyond presenting the data and interpretations from various disciplines, Kolbert examines mitigation strategies put into practice at the city level. However, she takes no controversial positions on environmental justice. She does not place the blame for climate change on anyone or anything, nor does she assert a position on other contentious issues. Kolbert's scope is very focused on the United States and Western Europe. Out of the six books examined in this study, *Field Notes from a Catastrophe* brings the least to the conversation on useful messaging. It is informative and diplomatic, yet lacks opinion and is toothless. In Kolbert's defense, her book was

published in 2006, the same year as Gore's *An Inconvenient Truth*, so his work was not canon yet. Lacking a baseline, Kolbert sought to create her own with this work.

***Hot, Flat, and Crowded: Why we need a Green Revolution—and how it can Renew America* by Thomas L. Friedman, 2008**

Thomas Friedman, already touting a large contingent of readers and followers from his work as a columnist at *The New York Times*, shares his vision for a national project that will solve the societal affliction for burning fossil fuels. He calls for this project to be a rallying point to unite Americans against the enemy of the global climate crisis.

Throughout his book he emphasizes the importance of American leadership in personal liberties, humanitarianism, innovation, and more. He calls upon some of the more antiquated things that are synonymous with being American: idealism, collaboration, and volunteerism in addition to innovation. Interestingly though, he doesn't call on the American history of collective sacrifice, all the while still stressing the importance of a conservation ethic. This selection of collective American attributes is very intentional, as it is his prerogative as an American to preserve, at least to some extent, his perception of the American way of life. Friedman's vision is a revolutionary overhauling project. It illustrates the goal for a utopia that unites people and integrates the technology, energy, and transportation sectors. Unfortunately the qualities of this narrative make it feel ungrounded in time. The science fiction qualities, like his ideal technology-based future, make the entire work feel out of touch, especially Friedman fails to include relevant geopolitical events, presidential administrations, and international agreements.

***Eaarth: Making a Life on a Tough New Planet* by Bill McKibben, 2010**

More than 20 years after his debut into the realm of climate change literature, including the publication of several more books, McKibben is a more mature writer with a significantly less philosophical approach to the reality of global climate change. *Eaarth*—with two a's—features the story of a post-Earth world that McKibben says is irreversible. Unlike earlier sentiments though, he sees the task of adjusting to climate change as a downsizing effort. His main message emphasizes decentralizing from governing bodies and economic systems, replaced by strong regional networks and social communities.

McKibben's narrative appeals almost exclusively to Americans, particularly the portion where he touches upon the years following the ratification of the Constitution regarding federalism and state sovereignty. This is an appeal to the patriots who may feel that capitalism and consumerism is the American way of life. Instead, he says, regionalism and state independence is the historically American way. He seems to be very much in favor of the idea that patriotism can unite us Americans to one cause: "I'd never think that patriotism and dissent were opposites" (McKibben 2010, 109). By turning these values around, he aims to address "business as usual" politics and economics without demanding a radical social revolution. Instead, he aims to address the niche of regional independence and decentralizing globalized economies and governance.

***This Changes Everything: Capitalism vs. The Climate* by Naomi Klein, 2014**

Naomi Klein's *This Changes Everything* is the most recent in a set of three books identifying neoliberal capitalism as an overarching perpetrator of climate change.

Klein, a contributor to *The New York Times*, *The New Yorker*, and various other publications, also authored two previous books, earning her one of the largest readerships among the authors in this study. In her introduction, Klein cites the personal and societal ailment "everyday denial," in which all people, intentionally or not, participate in perpetuating systems or actions that contribute to climate change. However, it is not individual fault she speaks of, but entrenched systems and mindsets of the prevailing economic and political worldviews.

"Climate change has never received the crisis treatment from our leaders," and this is because of, according to Klein, the intertwined nature of business and politics (Klein 2014, 6). She capitalizes on the concept of Upton Sinclair's famous censure, "It is difficult to get a man to understand something, when his salary depends upon his not understanding it!" (Klein 2014, 46). With very little faith in the government's ability to make the necessary changes to mitigate further climate degradation, Klein turns to extra-systemic sources of motivation. Her vision for change is radical, organized political will, which she calls "Blockadia". Klein's purpose is best summed up in a pithy excerpt from her conclusion.

> "It must always be remembered that the greatest barrier to humanity rising to meet the climate crisis is not that it is too late or that we don't know what to do. There is just enough time, and we are swamped with green tech and green plans. And yet the reason so many of us are inclined to answer Brad Werner's provocative question [Is Earth fucked?] in the affirmative is that we are afraid—with good reason—that our political class is wholly incapable of seizing those tools and implementing those plans, since doing so involves unlearning the core tenets of the stifling free-market ideology that governed every stage of their rise to power" (Klein 2014, 460).

Klein focuses on exploding institution-based worldviews throughout her dense book. Her ideal action takes the form of blocking the perpetrators of continued environmental degradation with fierce organized community action.

PART III – Best ideas for communicating climate change

Effectiveness

In reading through these general books about climate change I sought the ones that would be most effective in convincing a reader to do more than simply put down the book and go on with life. The problem of everyday denial is that the causes and effects of climate change are delayed in time and space, leaving room for an apathetic reaction towards the consequences (Norgaard 2011). Relative to the issue of climate change, ideas as to what is effective are mostly undefined or abstract. Leiserowitz and Fernandez offer a framework of prevailing worldviews, institutions, and norms that don't work because they "maintain and reinforce a self-destructive relationship with the natural world" (Leiserowitz and Fernandez 2007, 61). By taking these problematic norms into consideration, I eliminate several of the least effective strategies highlighted by authors and identity some of the best ideas for stimulating the discourse around climate change. I see these ideas as crucial to communicating the climate change problem because of the implications of continued inaction. "For without a broader consensus on climate change in the United States, Americans and the people around the globe will be unable to formulate effective social, political, and economic solutions to the changing circumstances of our planet" (Hoffman 2012, 32).

The best ideas below interpret the strongest strategies for communicating climate change offered within the texts in this study. Each idea is supplemented with evidence from academic papers and studies. The first idea examines changing the climate change conversation, while the following four ideas relate to the content of the

message that communicators should include. In the concluding section, there is a final idea on using the five best ideas to re-envision a collective future.

Best idea 1: Changing the discourse and reframing the narrative

The first and most all-encompassing idea is to change the language used to communicate about climate change. By revisiting the basic assumptions surrounding the climate change conversation, we can identify the roots of everyday denial and inaction (Norgaard 2011). Additionally, by reframing the narratives about climate change, there is potential to affect and bolster the other ideas. Often the assumption is that "the truth will set us free. If we just tell people the facts, since people are basically rational beings, they'll reach the right conclusions," but unfortunately that is not the case: "we know from cognitive science that people do not think like that. People think in frames… to be accepted, the truth must fit people's frames" (Lakoff 2004, 17). For this strategy, it is important to acknowledge that "people interpret information by fitting it to preexisting narratives… that mesh with their worldview," and the best way to focus on this is to "trigger a new way of thinking about the personal relevance of climate change" (Hoffman 2012, 35).

In order to communicate in a way that will be accepted, communicators must first address words, connotations, and framing, then utilize them in the context of communication through mass media, education and scientists. With this usage communicators should then avoid climate change as an "end of the world" scenario, and instead communicate a middle-ground outcome.

Reclaiming words and connotations

The first aspect of changing the narrative is reclaiming valuable words. The suggestion to reframe the connotations of words has potential to be extremely effective. In advertising, political speeches, or anywhere else there is directed messaging, there are words like "fast", "growth", "low-price", and "sustainable", all of which imply new, fresh, and continued consumption. Plainly put, attraction to these words is destructive—it encourages further growth, expansion, and consumerism. The following excerpt from *Eaarth* suggests repurposing old words for new purposes.

> "We're so used to *growth* that we can't imagine alternatives; at best we embrace the squishy *sustainable*, with its implied claim that we can keep on as before. So here are my candidates for words that my help us think usefully about the future.
>
> Durable
>
> Sturdy
>
> Stable
>
> Hardy
>
> Robust
>
> These are squat, solid, stout words. They conjure a world where we no longer grow by leaps and bounds, but where we *hunker down*, where we *dig in.* They are words that we associate with maturity, not youth; with steadiness, not flash." (McKibben 2010, 102-3)[2].

A shift in marketable vocabulary can—in time—change philosophical or unconscious relationships and could therefore realign public values with conservation ideals (Friedman 2008). Another valuable word worth reclaiming is "sacrifice" (Leiserowitz and Fernandez 2007, 60). The connotations of sacrificing for the greater good, for God,

[2] Original formatting preserved.

and for one's country carry a lot of meaning that contribute similarly to conserving and reducing our usage of the Earth's resources.

Further ideas on the topics of framing arguments and narratives will be expounded in later sections. The bottom line for reframing is to make the narratives accessible and meaningful—more than simply stating the facts or threatening the end-times. This idea of reframing the conversation and reclaiming valuable words is undeniably the first step for clearer and more effective climate change communication. The next logical step is to evaluate how climate change is currently presented and to implement new frames.

Journalistic "balance"

A trend in mass media communication in the 1990s, 2000s, and 2010s has been particularly effective in stagnating learning and muddling public opinion in regard to climate change. Journalistic balance in print media, major television news networks, and on radio stations is offering equal airtime to climate scientists and climate change skeptics (Boykoff and Boykoff 2004, McBean and Hengeveld 2000). While it is theoretically admirable to facilitate conversation from differing viewpoints, "adherence to the norm of balanced reporting leads to informationally biased coverage of global warming," and is unrepresentative of the actual scientific consensus (Boykoff and Boykoff 2004, 134). The actual ratio is not one to one, as the equal time bias might suggest, but rather 97 to 3[3], as in 97% of climate scientists now agree that climate

3 In May 2014, HBO's Last Week Tonight with John Oliver aired a segment where Oliver presents "A Statistically Representative Climate Change Debate". As 97 scientists and 3 skeptics debate, the segment ends with the line, "I can't hear you over the weight of scientific evidence!" (Stanton 2014).

change is both happening right now and is anthropogenic (Maibach, Myers, and Leiserowitz 2014, Anderegg 2010).

It is crucial to dispel public uncertainty about this consensus by fixing journalistic "balance". Far from requiring more scientific research, it is time for no more uncertainty from major media outlets. Something to keep in mind is that "clear communication will not inexorably lead to a more informed public and therefore into salient policies, yet it is a step in the right direction that can make a difference" (Oreskes and Conway 2010a, 687).

Role of scientists and educators

Because the "study of climate change is necessarily interdisciplinary, crossing boundaries between (at least) science, economics, law, and international relations," it is therefore "tempting to assume that climate change is essentially an issue for others to resolve" (Gardiner 2004, 556). Where communication about climate change in the media leaves off, scientists and educators must take over. In the recent decades, scientists as advocates have become less vocal, as the professional standard requires objectivity and rigid adherence to peer review (McBean and Hengeveld 2000, Maibach, Myers, and Leiserowitz 2014). A clear example is Carl Sagan, a NASA astrophysicist that became famous for his television program on space and earth science, *Cosmos.* When working on a groundbreaking collaborative report on global warming in the 1980s, he proactively wrote an opinion piece for mass media publication. It circulated before the peer review process was complete (Oreskes and Conway 2010b). While this was seen as improper in the academic community, the intent was for the good of the public. Another example is James Hansen's congressional testimony in 1989, where he

presented in the clear linkages between human activity and increased greenhouse gases in the atmosphere (McKibben 1989, Gore 1992, 2006). While this action was not specifically in the spirit of advocating, Hansen's testimony is touted as the catalyst for increased attention and action on global warming in the years to follow. Additionally, Hansen has since become a major advocate for aggressive government intervention to address climate change.

The idea of scientists as advocates is not unprecedented: "in the nineteenth and early twentieth centuries it was much more common for scientists to write books aimed at the educated public; this tradition could be revived," (Oreskes and Conway 2010a, 687, Leiserowitz and Fernandez 2007). In his numerous appeals, Gore has specifically called for scientists to be more vocal about their findings and consequences beyond their field. He explains the importance of his own intellectual journey in reaching where he is today as an advocate. Scientists on the cutting edge of global warming research have been his teachers and have encouraged him to share his message on climate change mitigation. Gore speaks of his connections to influential scientists like Dr. Revelle, a man on the forefront of measuring temperature fluctuations as a function of CO_2 and the rising trend. He is also close with Lonnie Thompson, a scientist famous for his work on ice coring mountain glaciers. Additionally he mentions his friendship with Carl Sagan, the popular science icon and TV host. In associating himself with scientists that are closely linked to climate science, Gore underlines the importance of both having scientists reach out to the educated public, and the necessity of having educators play a role in interpreting climate change for students. Like the media, educators act as the middleman between the public and scientific research in learning situations. "Since

few students have direct access to scientists, this underlines the important role of the educator within formal institutions of learning in communicating the science of climate change" (McBean and Hengeveld 2000, 19). Beyond the simple ability of the Internet to proffer litanies of information about climate change and its consequences, educators have the power to inform and shape public opinion.

Scientists and educators have a moral obligation to do more to address climate challenges, such as "more proactive dialogue with a lay audience, more interaction with students, and a concerted effort to present information using cognitive processes" (McBean and Hengeveld 2000, 23). Initiative from climate change communicators is a crucial part of this idea, because "climate change is deeply, profoundly a human story that needs teachers, mentors, [and] communicators" (Anderegg 2010, 32).

Avoid doomsday language and allow for conservative optimism

Already, in 1989, McKibben was speaking in hindsight about lasting impacts of climate change. For example, he claims that "if all the all the liberals and all the conservatives in all the countries of the world had gotten together a decade ago and done all the most dramatic things they could think of, it wouldn't have been enough to present terrible, terrible changes" (McKibben 1989, 121). McKibben uses a lot of heavy language, speaking in the extremes: "and the changes—many of them, at least—are irrevocable. They are not possibilities. They cannot be wished away and they cannot be legislated away. To prevent them, we would have had to clean up our collective act many decades ago" (McKibben 1989, 49). Twenty-one years later when McKibben published *Eaarth*, the premise was the same. The old Earth is gone, and we now live in

a new post-Holocene[4] Eaarth. He is not hopeful that we, as a society, can move away from fossil fuels in short order. "It's not going to happen fast enough to ward off enormous change. I don't think the growth paradigms can rise to the occasion; *I think the system has met its match.* We no longer possess the margin we'd require for another huge leap forward, certainly not fast enough to preserve the planet we used to live on" (McKibben 2010, 52)[5]. Presenting the current situation as the product of irrevocable changes is reductionism. While it is true that we are on much the same path as we were in 1989, many factors to the climate change equation have changed, though not enough. Many of the authors use strong language that threatens extreme consequences as tool to grab the readers' attention or to impart the gravity of the global crisis.

However, highlighting the gravity of our doomsday-esque situation is not always the most effective strategy for inspiring and empowering individuals and communities, particularly when there is no clear path to salvation. Fear can be an excellent motivator, but without an escape route it can lead to limited cognition and denial, eventually becoming a psychological barrier to climate action (Gifford 2011, 291). On the other hand, there is much to be said for acknowledging our current climate situation in combination with a message conservative optimism. Gore's message in *An Inconvenient Truth,* while focused on bringing "the planetary emergency" to the forefront of public awareness, ends on an optimistic note. Namely, he believes that "political will is a renewable resource," and when asked, "are we, as Americans, capable of doing great things, even though they might be difficult?" answers, "well, the record indicates that we have this capacity" (Gore 2006, 278, 290). What others may

[4] The Holocene is the epoch in geologic time quantified as nearly 12,000 years ago through the present.
[5] McKibben's original emphasis preserved

shape as a crisis, Gore sees as an opportunity. The climate crisis is a generational mission driven by a compelling moral purpose, creating a unifying cause for Americans. Klein, too, offers a fiercely optimistic point of view. She contends “the greatest barrier to humanity rising to meet the climate crisis is not that it is too late or that we don’t know what to do. There is just enough time…” (Klein 2014, 460). Her interviews and stories with Blockadia movements already in progress are inspiring—they serve to show that climate action is not only possible—it is happening in force around North America and worldwide.

It is important for authors to find a healthy mix of concern and optimism for the future. By re-envisioning the future world in which we succeeded in mitigating the worst impacts of climate change, the author gives the reader a future beyond just imminent death and destruction from climate-related disasters (Leiserowitz and Fernandez 2007). To avoid alienating or depressing readers, authors should seek to frame their solutions as opportunities rather than as the only alternative to societal collapse or certain death. For the most part the authors in this study succeed in this mediation.

In short, the most influential thing communicators can do is change how we communicate about climate change. “This kind of language use is a science,” and it can be used “honestly or harmfully” (Lakoff 2004, 23). It is crucial to reclaim words and connotations, and then incorporate them into media publications that reflect an accurate portrayal of the scientific consensus on anthropogenic climate change. With the help of scientists, educators, and expert communicators, changing the narrative is possible: from one of scientific uncertainty and end-times scenarios to one of optimism that

humanity has the capacity to correct the global climate problem despite the overwhelming odds against.

Best idea 2: Addressing individualism

One of the primary causes of the prevailing climate change inaction is that the issue is framed as a problem of individual proportions. Often publications will cite the world's population as a causal factor of the climate problem (Friedman 2008). While it is a contributing factor, it is not the sheer number of individuals that contribute to increased CO_2 emissions, as if the mere existence of an individual breathing in oxygen and exhaling carbon dioxide were part of the problem. It is in fact the number of individuals using and buying greenhouse gas-producing goods and services, but not at the fault of individuals. It is in the inherent lifestyle of an increasing proportion of the global population, because of the choices provided within economic markets

The individualization of responsibility, a term coined by Maniates in his article charmingly subtitled "Plant a Tree, Buy a Bike, Save the World?", is a prevalent phenomenon in American society. Maniates criticizes the individualization of responsibility as a primary causal factor the perpetuation of systems that contribute to climate change. It contributes to a set of harmful norms that perpetuate environmental degradation (Leiserowitz and Fernandez 2007), and prevents collaboration and community organization. Maniates identifies individualization as the root of political apathy related to climate change:

> "When responsibility is individualized, there is little room to ponder institutions, the nature and exercise of political power, or ways of collectively changing the distribution of power and influence in society" (Maniates 2001).

And yet the proportion of individual responsibility for climate change is far less than that of the industries who produce economic goods and services. Reminiscent of the Smokey Bear campaign featuring the slogan, “Only YOU can prevent forest fires,” a common message now seems to be “only YOU can fix the climate crisis.” And the suggested mitigation actions, while important for individuals to adopt, often have a negligible effect on aggregate emissions (Maniates 2001).

An example of individualized responsibility has to do with individual car ownership and its role in contributing to climate change. A reductionist view of the automobile industry’s pollution points to individual car owners driving too far, too much, or driving gas-guzzling vehicles. However, by “thinking institutionally,” (Maniates 2001) something many individuals are not empowered to do, it becomes apparent that these individual choices related to car ownership are heavily shaped by preexisting conditions. The investment into infrastructure like the U.S. highway systems are a huge sunk cost, and were designed with individualism in mind: for single-family vehicles, paid for by tax dollars, limiting individuals’ transportation choices. Corporate Average Fuel Economy (CAFE) standards also enforce fuel efficiency mandates to an extent, but they are disappointingly lower than they have been in the past, thanks in part to several presidential terms of backwards progress (McKibben 2010, Gore 2006). Beyond just the lack of consumer choice, it is important to consider that the transportation sector emits fewer units of greenhouse gases per year than the manufacturing industry and the energy production sector, by far. It is important to adjust this framework of individualized responsibility because it is disempowering to

individuals and ignores the actual scale of emission problems, thereby precluding larger scale action.

The idea that individuals are responsible for the causes and thereby for the solutions to climate change can be disempowering. While individuals may take one of several of the suggested actions, there are many psychological and institutional barriers to climate action. One barrier to taking action is concern for one's social image, called social risk and social comparison. This problem stems from a need to be compliant with social norms, and also an interest in one's financial well being. This concern brings up questions like "why should I change if they won't change?" especially if there is perceived inequity among peers, and can span individuals, businesses, economic sectors and nations (Gifford 2011). Another barrier is behavioral momentum. Especially in a case with sunk costs, behavior momentum can make change a difficult thing fiscally or physically. Outside of institutional causes, it can be mentally difficult to make long-lasting changes to behavior without considerable motivation or stimulus. Perhaps the most common barrier to permanent behavioral change is tokenism. This goes along with behavioral momentum and occurs when individuals make small, surface level changes—"some climate-related behaviors are easier to adopt than others but have little or no impact on greenhouse gas emissions" (Gifford 2011, 296). Many other such psychological barriers that preclude individuals from taking climate action exist as well, and are extremely prevalent in our culture.

Rejecting individualization

A common theme among the texts in this study is that they each attempt to break down the individualist framework around climate change action. Most address climate

change as a larger scale issue and condemn the individual dimension. McKibben's *The End of Nature* mourns the advent of hyper-individualism.

> "We can no longer imagine that we are a part of something larger than ourselves—that is what all this boils down to. We used to be." (McKibben 1989, 71-2).

Unlike past environmental issues, the takeover of the modern individualistic culture created a focus on individual success and ownership (attributed to the Reagan era (Maniates 2001)), which can be harmful in situations where the economic or political burden is placed on the individual.

A paradigm shift on mitigation and adaptation to climate change needs to happen on a large scale. There is no need to believe that some larger power reigns over us, just that there is an urgent need to act, not only as individuals but as global citizens: "for any program to be a success, we must act not only as individuals and as nations but as a community of nations" (McKibben 1989, 123). Klein also addresses the individualization of responsibility and its ironic relationship to the actual contributors.

> "This perception of fairness—that one set of rules that applies to players big and small—has been entirely missing from out collective responses to climate change thus far. For decades, regular people have been asked to turn off their lights, put on sweaters, and pay premium prices for nontoxic cleaning products and renewable energy—and then watched as the biggest polluters have been allowed to expand their emissions without penalty" (Klein 2014, 116).

Herein lies the inherent inequality of responsibility. Individuals trying to make the right choices within existing markets and institutions allow the institutions to carry on as usual, with no accountability for the actual extent of their contribution to the climate problem.

A scalar problem

Individual actions can be empowering to an individual, until the point at which the individual becomes disillusioned with the actions through various psychological barriers. This type of action would help mitigation efforts considerably if every single person had the psychological and financial capacity to make many lifestyle changes on something of a revolutionary scale. Instead of simply reducing responsibility for climate solutions down to the individual level, it is more productive to address the problems on a variety of larger scales.

> "To address global climate change, we will need action at all levels of society, from individual choices to international agreements, from industry's technological solutions to government policy. Each and every one of us can be part of the climate solution" (Anderegg 2010, 32).

Klein's main argument is that action and change should happen on multiple levels. The good news is that it already occurring on the sub-national level. Since international treaties and emissions targets in the past 30 years addressing climate change have been disappointingly impotent, movements demanding action have taken many large steps on small scales. Examples span from small-town communities to First Nations and indigenous communities, city or state governments, all the way up to international interactions with multinational companies. Each of these stories and interviews is a highlight of our collective successes and failures, and each is targeted toward combatting an extractivist[6], capitalist, or colonial[7] mentality. The strength of these

[6] Extractivist and extractivism refer to seeking to extract resources from the earth at a higher than sustainable rate.

[7] Colonialism is characterized by one territory acquiring and exploiting another, often with unequal relationships between colonists and the indigenous population.

examples, both current and historical, communicates optimism that small-scale political action can make changes to large economic and political systems.

There is a tradition of thinking locally in American environmentalism. In particular, various Not In My Backyard or NIMBY movements gained a lot of ground in the 1980s. These were families and communities working against pollution at superfund sites, landfills, and waste storage sites in defense of their homes and children. Like these past community movements, some current movements are aiming to do the same. Klein in particular is a champion for the grassroots narrative.

The most recent example is the battle against the Keystone XL pipeline that began in 2010 and continues to the present. Because of the intensely destructive nature of both the oil extraction from the Alberta tar sands and the future carbon release from burning this dirty fuel, a number of communities rose up to protest this pipeline. The extraction site would degrade environmental quality in the air and water, putting local residents at risk. The pipeline itself would run thousands of miles through the heart of Canada and the United States, disrupting wildlife habitats and running the risk of spillage anywhere along its length (Klein 2014). A large contingent of First Nations (indigenous) communities as well as local residents gathered in protest at various sites near the Alberta tar sands extraction sites. As more attention came to the protests, the actions gained traction at the national level. Despite Congress passing the Keystone XL pipeline bill in February 2015, President Obama vetoed it, citing that the economic benefits of such a pipeline did not justify the safety concerns (Liptak 2015).

On a larger scale, there is a consideration for regional independence and autonomy. Considering decentralizing major industries like food and fuel has merit to

it—particularly when considering that decentralized resources are less vulnerable to climate disasters. McKibben cites historical U.S. federalism as the ultimate precedent for creating more autonomous regions. While it may not be possible for all states, it is arguably viable for some places like Vermont or Oregon, where population density is relatively low, natural resources are still relatively abundant, and the possibility for localized industry exists (McKibben 2010). It is important to communicate in a way that shows readers there are options for collaborative action, not just individual action.

National and international scale

The importance of national and international governmental collaboration cannot be stressed enough. On the whole, however, large-scale governance has not been successful at addressing climate change for a number of reasons. As climate change is a global problem, it is crucial that it be addressed on every scale in every country (Kolbert 2006). The most effective way would be requiring draconian emissions reductions for every nation, starting immediately. Barring this drastic and unlikely agreement, however, continued international collaboration is essential, even if it is not the most effective.

Outside of the scope of governance, individuals have an opportunity for international collaboration too. The advent of the Internet has allowed for new and unique forms of sharing, networking, educating, and learning that is unrestricted by distance or cultural difference (McBean and Hengeveld 2000). This is an excellent opportunity to organize, as McKibben discovered in his establishment of 350.org. The organization and website are designed to enable grassroots organizations globally. The global network extends now to 188 countries (McKibben 2010).

Despite the relative inaction and lack of success on the national scale, using strategic language and analogies for a nation-focused message has potential.

Communicating through historical analogies

The case for the national government's role is perhaps the strongest within the examined texts. National governance on climate change has potential to be the most uniformly effective. Gore, as a politician, leads the charge for national legislative action, with a clear edge of frustration for the continued inaction that he battled throughout his tenure as a senator. For some, it is a moral imperative that the U.S. government take on stricter intervention policies and mandate emissions reductions (Klein 2014, Gore 2006). As four of the five authors are American, there is a particular air of American exceptionalism[8] and isolationism as well. With all the ingredients for political change, communicators simply need to catalyze the political will. An engaging way to do this is by combining the first two best ideas—to promote a scalar argument with strategic language. Within the texts are a series of historical analogies that provide a useful framing, using hindsight and common experience to encourage reversing national resistance to change, and perhaps inspiring global leadership. Lakoff confirms the strength of analogies in political discourse, stating "the metaphor is dormant, there in our brains, waiting to be awakened" (Lakoff 2004, 54).

There has been considerable resistance to nationwide behavioral change in the U.S.'s recent past. Some of the more notable examples include seatbelt and tobacco usage. Millions continued using tobacco and smoking cigarettes, even after it was

[8] American exceptionalism can be defined as a very specific form of nationalism and a belief that the U.S. has a moral high ground based on historical development, personal freedoms, etc.

shown to be harmful (Oreskes and Conway 2010a, b). What is now common sense, like wearing a seatbelt, was once not common practice. Using an analogy like this leads readers to realize that recognizing harmful behaviors and adopting new ones is a process that takes time—these things are clearer in hindsight. This analogy also reminds readers that science and technology are always improving, often for the betterment of human health.

The most striking analogy serves as a call to action: “at first, even the truth about Hitler was inconvenient. Many in the west hoped the danger would simply go away. They ignored clear warnings and compromised with evil, and waited, hoping for the best,” (Gore 2006, 11). While this image is shocking, that is entirely the point. Just considering for a moment that Gore opted to use Adolf Hitler as an image analogous to the specter of the climate crisis—and every connotation that goes along with him—should cement in the reader’s mind that waiting for the danger to go away is not an option. The powerful image implies that national leaders cannot afford to delay any longer because climate change is a threat because of the potential ramifications for all of humankind.

In order to reframe this moral imperative into an achievable goal, it is also useful to employ historical analogies to successful American leadership. While several authors identify WWII as an example of successful U.S. leadership (Gore 2006, Kolbert 2006), a more relevant and recent example is the Montreal Protocol. In the 1980s, after it was discovered that there was a growing hole in the ozone layer over Antarctica, and that the culprit was the notorious CFCs, the UN went into conference and signed a treaty to phase out the chemicals (Oreskes and Conway 2010b). The parallels here are

clear—a global environmental crisis is identified and its cause is human action. With U.S. support and ratification, the phase out is considered a success, as the effects are slowly returning to normal. Unfortunately U.S. support and ratification are not a reality yet for the climate change problem. Despite strong U.S. support in the UN for the Kyoto Protocol and its emissions reductions (Gore 2006), it remains un-ratified by the U.S. Senate. The U.S. is alone among all the nations that attended the Kyoto Conference except Australia. This is extremely disappointing in the case for U.S. leadership. Climate change is simply too delayed in time and space to be comparable to the ozone hole problem and its prompt resolution (Kolbert 2006). Yet there is still hope that U.S. national leadership may pull through, better late than never.

Another analogy is the historical precedence in the U.S. for peaceful revolution. For example, the peaceful passage of leadership from one president to the next, as well as the passage of bills into law that radically change national policy has been happening for the last 240 years. In Gore's words, change in the U.S. is a long time coming, but the tipping point just requires a signature.

A final historical analogy, and a highly prescriptive one, is the call for a national project. The U.S. has had extremely productive and innovative periods in the past. Notably, the national highway project put hundreds of thousands of Americans to work and created a huge and integrated transportation system (McKibben 2010). Another important example is the conservation ethic and propaganda during WWII. Fuel conservation, planting gardens, and non-traditional workers were encouraged to support the war effort. This time is remembered as one of the most productive and most united eras of U.S. history (Friedman 2008). The metaphor of the nation as a family is a strong

one (Lakoff 2004). With the motivation behind a national project for climate change mitigation, the full force of political will and resources would be directed towards addressing problematic behaviors and institutions on a national scale.

Political and social spheres linked to the economic sphere

The emphasis on nation and community within the texts indicates that the era of social individualization is outdated. The authors aim to empower their readers by going beyond what an individual can do to stop climate change and into the realm of what groups of people can be empowered to do. Klein offers that seizing the political will and running with it is the most crucial element (Klein 2014). After all, "political will is a renewable resource," if only it can be harnessed (Gore 2006, 278).

However, in addressing individualization in terms of political and activist empowerment, it is also necessary to discuss individuals as consumers and the systems within which they are economically constrained. The intertwined nature of political and economic power makes individualization closely connected to neoliberal economic policies, as addressed in the next section.

Best idea 3: Rejecting neoliberal economic policies

The early 20th century revival of economic liberalism has caused redoubling in free enterprise, deregulation, privatization, and new to the scene, economic globalization. This set of economic policies, now known as neoliberal economics, has come to be nearly worldwide in the last thirty-six years (Martinez and Garcia 1996). Ignoring social and environmental externalities to centralized global markets, dissolving public goods and instead focusing on individual responsibility, and decreased

government regulation in economic markets and public expenditures all characterize these policies. This way of operating is extremely problematic regarding climate change because, “although environmental problems are the product of the demand for and supply of energy and other goods and services, the dominant response to date has been to assume that demand will grow and to focus instead on reducing the amount of environmental harm per unit supplied” (Kysar and Vandenbergh 2008, 10825).

McKibben and Klein in particular criticize the current state of the globalized world as the product of the long western development trajectory and historical colonialism. The causal factors between neoliberal policy and anthropogenic climate change are clear. With little regard for social and environmental wellness, and government deregulation, there is nothing to prevent continued growth in major industries and sectors that are the primary contributors to climate change.

This dominant economic ideology has many individuals “[seeking] to maximize [one’s own] narrow advantage, while simultaneously severing so many of us from the broader community where pooled skills are capable of solving problems big and small” (Klein 2014, 460). Neoliberal policies come full circle back to individual focus. This creates a straw man because it has people thinking that they are fighting the abstract specter “human nature” or “tragedy of the commons.” The most basic assumption of both “modern economic theory and foreign policy” is that “it is irrational to go against your self interest, and therefore a normal person, who is rational, reasons on the basis of self interest” (Lakoff 2004, 18). Economic self-interest is shortsighted, however, and does not account for the costs or benefits of the future, nor does it account for things in the public good or public trust (Wood 2014).

The flaw to individualism is that “we can no longer imagine that we are part of something larger than ourselves—that is what all this boils down to,” (McKibben 1989, 71). And individualization of responsibility takes that social separation a step further by creating a false perception of individual control. Believing that the free, unregulated market will correct itself misses the fact that industries and firms do not cover the true cost of carbon release and environmental degradation. Holding to that assumption places the burden of environmental responsibility squarely on the shoulders of individuals, when in fact the vast majority of responsibility belongs to industrial manufacturers and energy producers. Without intervention into markets and industries, businesses and consumers may continue on a business as usual route.

Consumer sovereignty in a demand driven market

When a perfect market relies on the “invisible hand” and free enterprise, the real power comes from consumer choice, and the course of the market is determined by demand. In real markets however, taking into account scarce resources, government regulation, and irrational human choices, the situations are much more complicated. In the rhetoric surrounding the empowering nature of consumer choice there are fallacious arguments; in all actuality, consumerism is not the way to address environmental problems. This messaging aims to empower individuals to change the world through buying “green”, often falling into all the categories of problems with individualization addressed in the previous section. Friedman unapologetically condemns easy individualistic fixes like those that show up in magazines or online as part of the “green hallucination,” not the “green revolution.” Maniates offers a criticism of this marketing rhetoric:

> "They paint a picture of smart appliances, and happy citizens. How do we get to this future? Not through bold political leadership or citizen-based debate within enabling democratic institutions, but rather via consumer choice: informed, decentralized, apolitical, individualized" (Maniates 2001, 41).

A more effective tactic is empowering individuals to think as citizens before consumers. Where individuals can only make lifestyle changes based on demand consumers are entrenched in the infrastructure of subsidized costs, and have a "choice", there is little to no ability to change the economic momentum. There is especially a lack of perceived ability to change the way things are on an institutional level. With the public sphere being so denigrated by neoliberal capitalism, individuals often slip into a mentality of, "why should I make myself worse off than someone else who is unwilling to change lifestyles, particularly if it won't make a difference?" (Gifford 2011).

Because of this slippery slope, individual consumers cannot be left the choice and responsibility of "voting with their dollar" and saving the planet. Consumer sovereignty is one thing, but what the market provides is another. Were the market entirely demand-driven, the global economy might be in a different situation today. Instead, the markets for environmentally friendly goods are fabricated and do not reflect the extent of options that exist. The neoliberal notion that "the invisible hand" will correct for things like negative market externalities and maximize both consumer and producer surplus is naiveté (Klein 2014). This problematic norm relates back to the conversation on climate change, because "our current public discourse is focused on the shortest of short term values" and therefore results in Americans "avoiding the most important issues and postponing the really difficult choices" (Gore 1992, 11).

Climate change skeptics and generally apathetic individuals also embody why "invisible hand" economics simply will not work to correct environmental problems. As long as individuals or groups are willing to turn a blind eye for whatever reason, there won't be any market push in a new direction. McKibben offers a unique narrative on the relationship between human beings and fossil fuels. He paints a macabre picture of humanity, pointing out that "over the last century a human life has become a machine for burning petroleum," and that humans could now be mistaken for beings dependent on fossil fuels to live (McKibben 1989, 123). He further scorns the gross affection that our society seems to have for fossil fuels. "If an alien landed in the United States on some voyage of exploration, he might well report back to headquarters that we were bipedal devices for combusting fossil fuels" (McKibben 2010, 28).

On the grounds of dispelling the trend of individualization and shifting economic policy to address the serious climate problem, communicators must reject the idea of business as usual neoliberal economics. Believing that the unregulated demand-driven market economy will fix climate change is nothing short of naïve and creates a false sense of complacency with individual action.

Intertwined politics and economics

Two hundred years of unbridled growth has led to the current industrial system, the "size and complexity" of which "makes even the most obvious and immediate changes physically difficult" (McKibben 1989, 121). The industrial system is so intertwined with American day-to-day life, McKibben says, that it is "psychologically all encompassing." Heavy criticisms for the co-dependent nature of government spending and the economy are important in recognizing the institutional flaws. The

concept that an industry is “too big to fail” is frightening; when an enormous industry threatens collapse, is its national government expected to keep it afloat? When the norm is that government subsidies uphold economic sectors like the automobile industry and large banks, there is very little resilience against disasters. This makes the case for decentralization.

Pros and cons to decentralization

It is important then to suggest not only attacking the problem at the root—globalization and large corporations—but also decentralizing, regionalizing and localizing the main causes of greenhouse gas emissions. Among these are energy production, transportation, agricultural uses, and other large scale centralized forms of fossil fuel consumption. “Many small things breed a kind of stability; a few big things endanger it,” (McKibben 2010, 108). A disaster—whether fiscal, natural, or otherwise—will have less impact if there are more plentiful and smaller institutions to cope with it. To use McKibben’s example, a small bank collapsing can be corrected if there are other small banks to pick up the slack. A crop loss on a small farm is far less devastating than a crop loss on an enormous industrial farm. A focus on the idea of spreading out the burden in all aspects of society, besides simply making a region or nation more resilient to change, has the co-benefit of bringing income and jobs to local areas.

What, then, is holding industries back from making necessary changes? They scorn the idea of confronting sunk costs and development inertia. The fact that development and investment take a long time to realize benefits mean that in order to begin mitigation, “everyone must sacrifice” and “someone has to eat the cost.” The

fossil fuel industry is the embodiment of "too big to fail". This is the key problem in the economic system that we live in, where everything is too big and centralized to be sacrificed, even if it would be for the better. In regard to costs, in Klein's words, the "Right is right". The investment involved in uprooting current infrastructure—both government-owned and industry-owned—is considerable, hence the general unwillingness of profit-seeking industries to make unmandated changes.

Growth or conservation?

The question then becomes one of growth or conservation. If unbridled capitalism is the culprit, what is the best way out? The option involving decentralization, killing economic growth, and potentially stagnating the economy is uncertain. But so too is the route of growth, technological optimism, and continuation along the same path.

Considering the vast complexity of the global economy, there is likely a considerably long turnaround time for its behavioral momentum. Because of this inherent vastness, there is considerably advocacy for a green growth spurt. This idea rejects recalibration of the economy, saying the "modern world is a growth machine that no one can turn off" (Friedman 2008). Despite his attention to a conservation ethic, Friedman stands firmly behind a growth-based solution and is a clear proponent of technosalvation[9], though he imparts upon his readers that our current political and economic systems are constraining the collective ability to respond to climate change.

[9] Technosalvation and techno-optimism refer to a belief that both technology and human ingenuity can keep pace with the impacts and hazards relating to climate change. It has been cited as a barrier to climate action (Gifford 2011, Leiserowitz and Fernandez 2007).

He insists upon replacing one economic system with another, more efficient and "green" system, at once describing his proposal as a project and as a revolution.

McKibben professes his support for a techno-fix to climate change if a feasible one existed, but claims that techno-fixes and continued consumption are usually just a cop out solution. Technology-based solutions are a consequence of further centralization, which McKibben specifically identifies as a societal construct that perpetuates drivers of climate change. Unlike most of the other authors, Kolbert comes right out and says that humans as a species are slaves to climate fluctuation. While this is reductionist and determinist, she follows up with a discussion of geoengineering tactics that might allow us to rise above the fluctuations of the climate cycle and "fix" the Earth with innovation.

Friedman seems to beg the question, with idealism and innovation, there's nothing we can't do, right? He offers a future in which we can have our cake and eat it too. He suggests that, "we don't know how many millions of barrels of oil or kilowatts of energy we could save just by thinking more how we live rather than shrinking more of how we live" (Friedman 2008, 194). Growth within the scope of a green revolution that would either allow humans to stop using fossil fuels or to overreach the laws of nature and employ supra-human techniques to forestall climate change or its impacts is supported by several authors as an option.

While it is true that growth is the only paradigm most living Americans have ever known, we always have the option of cutting back and conserving energy and resources instead of investing and innovating our way through the problem. The Carter administration was the only presidency in recent memory that was interested in slowing

economic growth. Since then, especially in light of economic recession, the "policy for a long time has been running deficits, infusing the economy with money in hopes it would kick start it, to "put us on a pathway to growth"[–President Obama]" (McKibben 2010, 49). Growing the economy while decreasing environmental impact, all the while still employing neoliberal policies is nearly impossible.

Upholding a conservation ethic brings up yet another question though. While aspiring to end all drilling and coal mining in order to "keep it in the ground" is an admirable moral fight, it is also just as important to fill the void left by fossil fuels, if for no other reason that continuing to serve people's economic needs. Klein pushes for blocking legislative and corporate action, physical sites, and pipelines construction that might enable further pumping of greenhouse gases into the atmosphere. But inherent with blocking action and development means stagnating—with stagnation there is no momentum for either conservation or growth. What current activism for conservation lacks is a concrete idea for what comes next after a "Blockadia" movement. Simply stopping negative progress is not enough; it is also necessary to enunciate how a conservation ethic can be useful in changing behavioral norms.

Finding a middle ground

Identifying a middle ground between growth and conservation is crucial for an effective message. The middle ground could potentially be a national scale end goal for a collective behavior shift. While growth, investment, and innovation are the more attractive options, it is hard to say what separates true belief in human ingenuity from blind faith in prevailing worldviews and institutions. Therefore it may be difficult to identify what is a departure from the norm and what is just business as usual. An

accessible message should allow for both growth and conservation, leaving both options wide open as solutions to our global problem, for we must communicate that "tinkering at the margins of production processes and purchasing behavior will not get society on an ecologically and social sustainable path" (Conca, Princen, and Maniates 2001, 2).

Best idea 4: Appealing to humanity

A strong message among the books in this study is framed as an appeal to humanity rather than to fear. While this is a tactic addressed toward the individual, it can contribute to a common set of motivations for collective awareness and effort. These appeals can be targeted internally to oneself and loved ones, or externally to others around the world as concern for human lives, non-human species, and for nature as an entity. Depending on the audience, this strategy can be shaped differently, but the most important component is shaping climate change as a moral issue. There are quite a few ethical implications for climate change, given the global scope, the disproportionate burden of impacts and responsibility, and the varying vulnerability to impacts around the world.

Personal or internal appeal

A personal appeal forces the reader to reflect internally upon their values and commitments. This type of thinking is easier to contemplate when individuals no longer feel the burden of environmental responsibility (Maniates 2001), as addressed previously. Personal or societal disconnection from nature is an issue that plagues modernity. It is a spiritual and physical separation from the natural world that can be seen in day-to-day life through manufactured environments like temperature control and

decreased interaction with natural objects, as well as the perceived ability to alter the Earth, like through geoengineering. Already, in 1989, McKibben claimed that "we live in a postnatural world" (McKibben 1989, 51). The modern way of living, as beings that burn fossil fuels and are a force of nature, is a severely disjointed from the past. Humans have historically and pre-historically relied closely on ecosystems, agriculture, and natural systems to sustain civilization (Kolbert 2006).

To some extent, the religious and spiritual connection to nature can be used as an appeal too. Whether dominion over nature or stewardship of nature, the common theme is that human kind is responsible for their collective impact on nature. In examining the human relationship to nature as both a spiritual being and a consumer, McKibben highlights the dichotomous ideals that Americans have for nature. In expecting nature to be a permanent fixture while also consuming natural resources as though they were unlimited, humans demand far too much and sacrifice far too little.

Because of an inherent bias toward maximizing present benefits, a common attitude to have is discounting future generations (Gifford 2011). Climate change presents an "incentive problem: the bad effects of current emissions are likely to fall, or fall disproportionately on future generations, whereas the benefits of emissions accrue largely to the present" (Gardiner 2006, 404). Yet when addressing the future, authors are likely to address future generations with affection, concern, and reverence. Particular concern is for children and grandchildren of the reader, for that is considerably closer to one's heart, more so even than the consequences in one's own lifetime (Gore 2006). The strength of the intergenerational argument makes it the one

most often used when imploring that people should preserve the world, yet there are others at risk of climate change impacts around the world right now.

Concern for others: humans, non-human species, and nature

Some of the most effective appeals to humanity do not need to include people at all. Often a concern for nature as a thing with inherent value can be convincing. As mentioned, by detaching physical and spiritual human lives from nature, as an entity it is deconstructed into individual parts based on utility for human consumption. This includes both static and living parts—some of the most striking images are those of flagship animal species like polar bears and turtles, as well as natural images like forests and glaciers. Losing elements of nature that we as modern humans have known throughout the Holocene signals a fundamental disruption in the human construction we call "nature" (McKibben 1989). The simplified, reductionist version of this message is that, for nature, plants and animals, it is humans' fault that they are in peril; they will continue to die off unless we change our ways.

In a sense, the message is the same for humans as a species too. In regard to impacts like sea level rise, storms of higher frequency and intensity, and rising global temperature, everyone and everything on Earth is in the same boat. Though the field is not entirely level—vulnerability and resilience varies—this is a collective sentence. Gore employs this appeal as he punctuates his message with stories from Hurricane Katrina and its aftereffects. He asks that readers look at the suffering of fellow humans—and fellow Americans—and dares them to say that they can continue with business as usual if these are the consequences.

Issues stemming from or exacerbated by global climate change beyond developed countries are often overlooked in the works in this study. Concerns for global poverty, food and water security, and climate vulnerability are generally glossed over. World food security is tangentially discussed within agriculture and food production, particularly how it will become nearly impossible to grow food—or even inhabit—certain latitudes and locations. There are mentions of worldwide climate change impacts, but usually only in the context of how comparatively rich, resilient, or fortunate the U.S. or the developed world is. Bluntly put, "we don't pay much attention to poor people, so it can astonish us to read stories of just how hard life has become" (McKibben 2010, 35). And yet the issue of global poverty is tied up in the very same issues—political disenfranchisement, and economic sectors such as agriculture, energy production, and fossil fuels—as those faced in the developed world and examined in these works. "Climate change exacerbates global inequalities, as those most affected are least responsible for causing it," and there is therefore no way to ignore such injustice in good conscience (McDowell and Hess 2012, 342). The global inequity is a margin growing wider with each new pipeline project or coal-fired power plant. Yet it seems that few of the authors in this study want to get caught up in being an environmental or distributional justice advocate.

This Changes Everything is the one work in this study that goes beyond examining just the U.S. as both a perpetrator and victim of climate change. Her work extends into the realm of environmental justice. Several of her examples of Blockadia include First Nations and indigenous groups advocating for their rights and against fossil fuel extraction on their land. More apparent is her distaste for American

exceptionalism and political isolationism that manifests itself in international relations. She heavily criticizes the prevailing assumptions of the rich and fortunate—the 1%--by asking that they recognize their relative privilege in the world. It seems to her that they are delusional, holding to (exaggerated) assumptions like, "since people who scare Americans are unlucky enough to live in poor, hot places, climate change will cook them, leaving the United States to rise like a phoenix from the flames of global warming" (Klein 2014). While this is overly dramatic and refers to political enemies, in a sense the U.S.'s foreign policy has been acting in a self righteous way. As one of two nations that did not ratify the Kyoto protocol, and the only one that has since refused to agree to mandatory emissions caps, the U.S. seems to be in a state of denial about its role in the problem. And this inaction perpetuates harmful consequences, particularly on groups who may be disenfranchised or vulnerable to climate change.

Why is it so challenging to talk about environmental justice?

The environmental justice message is usually not geared toward an assumed audience of "global north" or readers from developed countries. The texts in this study certain bias toward western science and developed countries in some of the research presented, simply because of the targeted audiences. Kolbert in particular is guilty of this. Her stories and interviews are from various places like Alaska, Greenland, Iceland, Great Britain, the Netherlands, Vermont, and research institutions throughout North America. The list is underwhelming in diversity. It represents the global north and the west, where residents are, for the most part, relatively well off, and conditions are as yet relatively unperturbed by the climate catastrophe. For being a human-caused problem, and having consequences for the entire globe, the human aspect is often disregarded.

The omission of any discussion on environmental justice or global poverty comes from the neoliberal assumption that a rising tide lifts all boats. Despite his original concept of "global flattening," (Friedman 2005) Friedman does not discuss colonialism, American intervention, or climate justice at all. This omission, combined with being a techno-optimism, creates a sense that Friedman may be something of a social Darwinist, particularly when he implies that Americans are at the top of the geopolitical pecking order.

Environmental justice is a difficult subject to address because it brings up questions of financial responsibility, status quo bias, and moral imperatives.

> "The climate problem interacts in some unfortunate ways with the present global power structure. For one thing, the responsibility for historical and current emissions lies predominantly with the richer, more powerful nations, and the poor nations are badly situated to hold them accountable" (Gardiner 2006, 402).

I think it is for these reasons that most authors do not try to grapple with the subject—they simply do not want to be too controversial. This omission is their loss, however. Far from creating guilt or disempowerment over global injustice, people are more likely to connect to the climate problem when it is given a face or a voice. One of the most challenging aspects of activating meaningful climate change awareness is that climate change causes and effects are so spatially and temporally dislocated. By showing that impacts are here and now for more vulnerable areas, the issue's perceived urgency is more compelling.

A moral issue

Despite overlooking the concept of environmental justice as an opportunity to unite people, the authors are unanimous in saying that climate change is much more

than a political and economic issue. “Some [philosophers] have even gone so far as to suggest that successfully addressing climate change will require a fundamental paradigm shift in ethics” (Gardiner 2004, 556). The implicit message is that global inequities should be righted in time with the development of a species-wide ethic (Gore 1992, 2), but the first concern is to address the perpetuating problem in developed nations. The current leaders in emissions “should take the lead role in bearing the costs of climate change” (Gardiner 2004, 579). However, this assertion is directly contrary to the capitalist beliefs that many of the current leaders in emissions hold. Self-interest and moral responsibility combat one another, aggravated by the substantially deferred causes and effects of climate change. Assigning blame for this global problem is not in any country’s self interest, and for an individual is unconceivable, at least at this moment in time. Communicators leave hints toward accepting moral and financial responsibility in the texts: “my hope is that those who read the book and see the film will begin to feel, as I have for a long time, that global warming is not just about science and that is not just a political issue. It is really a moral issue” (Gore 2006, 10). But generally, most avoid assigning responsibility more specifically than “we as humans” for fear of being labeled controversial. The academic literature goes further, stating “climate change is fundamentally an ethical issue. As such, it should be of serious concern to both moral philosophers and humanity at large” (Gardiner 2004, 556). Communicators should capitalize on this morality framework so as to appeal to the values of the current generation, because the morality of the climate problem really comes down to common sense:

> "If we do not think that our own actions are open to moral assessment, or that various interests (our own, those of our kin and country, those of distant people, future people, animals and nature) matter, then it is hard to see why climate change (or much else) poses a problem" (Gardiner 2006, 398).

Best idea 5: No silver bullet

The explanation of this theme is best summed up by a quote from the mayor of Burlington, Vermont.

> "It would be so much easier if we could say, 'Well, if we approved this one project or this action, the problem would be solved…But there's no one thing we can do. There's no *ten* things we can do. There's hundreds and hundreds of things that we need to do" (Kolbert 2006, 178).

Even in a city that has rallied together as a community to retrofit buildings, improve public transportation, and mitigate emissions in a variety of other ways, there is still an understanding that one person, one thing, one city, is not enough. Issues of selective attention and single action complacency are manifesting even in the most conscious spheres (Gardiner 2006, Gifford 2011, Weber 2006). Because climate change is such a complex issue, spanning disciplines and professions, as well as time and space, it is challenging to grasp as a problem in perpetuity. All the evidence in this study, in scientific and sociological studies, in polling and in communication studies, cannot encompass the entirety of the issues surrounding global climate change. There are so many behavioral and physical drivers, each with its own multi-tiered subset of abstract and concrete effects that reach into every corner of modern society. As such, there is no possible solution that could come close to addressing the problem—there is no silver bullet.

Instead, there are many points of entry to address causal factors, some of which have been touched on here, and many more besides. The message must therefore be that

despite the lack of easy fixes, the possibility for solutions to the global climate crisis are many. Mitigation is the main focus for now, as the more pressing issue is to decrease contributions to exponentially growing future impacts. Among these mitigation paths there are no wrong answers. Conserving fossil fuels and innovating new ways of avoiding their future use work well in concert—there is no need for mutual exclusion (Friedman 2008, Gore 2006). This section offers some of the authors' solutions to climate change that have not been already examined, as well as what the perceived responsibility for climate change mitigation should be.

Burden of responsibility

The perceived burden of responsibility must shift to be proportionately so as to keep all scales of government and economy accountable. Kolbert suggests that international treaties are meaningless if we can get it right on smaller scales—this is an exciting idea. If top-down regulation is made obsolete by local or regional initiative, the perceived costs and pains associated with transitioning into cleaner entity will evaporate. If the impetus comes from the bottom up, there so much potential for redressing inequity, decentralizing institutions, setting a path for a survivable future. An important theme to communicate here is that grassroots and community organizing is powerful. Klein's Blockadia and McKibben's 350.org are encouraging examples of bottom up change.

In some senses, a social change from the grassroots up may strike most readers as much more allowable than strict policies that resemble commands from on high being handed down. It is more likely too, that our philosophical disconnection from nature will adapt when influenced by changing practices, whereas dramatic policy

changes might be met with resistance. While both the “back to nature” mindset and techno-optimism are not for everyone, they may work differently in different places. The important part is that the efforts are coordinated and executed strategically.

Gore suggests that impetus must come every sphere simultaneously: from grassroots up, from the government down, and from entrepreneurs and progressive businesses. But what a reader comes away with, especially from that last section on what “you” can do, is that *someone* has to care, and now that burden is on “you”. It is likely that, because of the intertwined nature between political will, policy, economics demand, and social awareness, catalyzing change from one sphere will bleed into the others and reach the tipping point.

Bringing ideas together from successful movements and communities to ones own community, spreading awareness, using organizing skills are all parts of it. Finding facilitators to make events and organizations happen is the first step to making places more independently sustainable. It seems essential that we stir up some feelings and revive the “not in my backyard” movement, to begin worrying more about our own backyards as well as others’. This middle ground goes beyond consumer citizenship to something more like local or regional citizenship. Regional focus should be on producing and networking, deceleration from globalization, and decentralizing, as McKibben says. With regional and local focus comes more empowerment to individuals to work outside the system of various levels of government, and even outside traditional market economies. The autonomous house movement and suburban paradise is a thing of the past—it is no longer relevant or sustainable. By localizing, communities become less isolationist and more resilient at the same time.

Whether change takes the form of social revolution, groundbreaking entrepreneurship, morally righteous and miraculous agreement in national policy-making, or long-awaited decisive international mandates, addressing climate change has to start somewhere, and continue fervently and feverishly. Again, there is no silver bullet to confronting the global climate crisis.

Opportunity to rise

Perhaps the most optimistic part of this silver bullet idea is that this problem is an opportunity to rise: "we have even solved a global environmental crisis before" (Gore 2006, 294). The climate crisis and its far-reaching effects make the issue a "generational mission," a "compelling moral purpose," a "unifying cause." It creates "the thrill of being forced by circumstances to put aside the pettiness and conflict that so often stifles the restless human need for transcendence" and provides the most psychologically irresistible challenge, "the opportunity to rise" (Gore 2006, 11). In acknowledging that there is no one thing that can be done, but rather hundreds or thousands of things, individuals and nations can accept that there are many necessary actions and attack them with concerted effort on all scales. Communicating this situation as an opportunity to grow, change, adapt, and encounter economic and social benefits is crucial.

PART IV – Conclusions: Re-envisioning the future in a changed world

The final step in creating an effective message includes using these new frameworks of communication to envision a tangible future. Uniting narratives that question institutions, empower individuals as more than consumers, reject problematic norms, and acknowledge the scope of the problem, communicators may create an accessible and potentially successful narrative. A final key component is to allow readers to envision a collective future. This is necessary because "abstract versus concrete representation of the consequences of possible actions differ in their affective strength and impact" (Weber 2010, 337). This imagined future must be necessarily different from the conditions of today, but it is not necessarily a desolate and destroyed world. Narrating a future world generates an end to the means that communicators should strive to articulate. It may be that current apathy stems from an indistinct future.

> "I am convinced that many people have lost faith in the future, because in virtually every facet of our civilization we are beginning to act as if our future is now so much in doubt that it makes more sense to focus exclusively on our current needs and short term problems" (Gore 1992, 2).

It is therefore important to communicate that there is a future for humankind, and that it depends upon what we do, sooner rather than later, to lessen the impacts.

Importance of imagining a future

Since most the general messages about the future of climate change include either an apocalyptic, unlivable world or an abstract, utopian one in which all has been righted, it is important to identify more unambiguously what the middle ground, realistic world looks like. In order to avoid fatalism, it is necessary to "vividly depict

the kind of world we are for, not just the problems we are against." By changing the end goals there is a clearer path to climate solutions: "re-envision "the good life" and alter the trajectory of ever greater material consumption, "rich lives instead of lives of riches"" (Leiserowitz and Fernandez 2007, 77). While some authors in this study were shortsighted in the futurism aspect, McKibben and Friedman had the audacity to take their visions beyond the realm of solutions and into an imagined future.

McKibben's Eaarth

The entire premise of McKibben's narrative in this work is that as a developed society, humans have moved past the end of nature and into a new and altered Earth, signified by adding an extra 'a'. With this new and untested volatile Eaarth comes a feeling of uncertainty and fatalism. Yet McKibben skillfully identifies a concrete limit, a goal for the world to aim for: 350 parts of CO_2 per million, to keep the global temperature rise to 5ºC or less. People tend to understand ultimatums better than vague futures, so by setting a ppm limit, McKibben defies the abstractions and uncertainties that others tend to end works with. His one action from hundreds is to set and aim for a greenhouse gas concentration limit. He has taken this idea and turned it into a movement that has gained traction worldwide.

Criticisms

First and foremost, putting a number on the whole atmosphere is a somewhat reductionist approach. While it sets a goal to collectively aspire to, it is an oversimplification of the complexities within a natural system. The 350 limit does not allow for thinking institutionally about causal factors, either. Regulations and economic

approaches to date have been ineffective at the international level and inconsequential at the national level. The mindset of limits connotes conservation, sacrifice, and bargaining but fails to address the problems of individualization or neoliberal capitalism. McKibben has made a strong environmental advocacy network from 350, but in terms of envisioning a future, his message is lacking.

Friedman's 20 Energy Climate Era

Similar to McKibben, Friedman offers the concept of a new era, one he calls the Energy Climate Era, or E.C.E. He lists the conjunction of three crises—environmental, fiscal, and population—and the key problems that the crises are intensifying. These crises have pushed us past a tipping point, and Friedman proposes a hypothetical future in which we have corrected the world's major problems.

E.C.E. is the beginning of both an opportunity and a test for America and the rest of the developed world, Friedman says. It is both an acceptance of the fact that humans have done the damage to date and must pay the costs, and the fact that we are now at a crossroads that will determine the extent of the impacts on our future and on generations to come. Change is necessary, he says, "You can optimize individual pieces only up to a point. If you don't scrap the old system and put a new system in place, ultimately everything you do will be constrained" (Friedman 2008, 185). His proposal for a new system details in about 20 pages his vision for 20 years in the future—20 E.C.E. In this future, the reader awakens in their house, now a fully automated and integrated machine that controls energy sinks such as temperature and light in order to optimize usage at the most efficient times. Energy distribution is linked in a giant network where households are buying and selling energy constantly to meet demand.

Transportation, too, is overhauled to be fully electric and to maximize efficiency and minimize user costs. Commercial buildings are also automated for energy and cost efficiency. This technological revolution recalls a science fiction utopia with all but the flying cars.

Criticisms

The first question that comes to mind is how did we get to 20 E.C.E.? Did energy companies decide to centralize and streamline? Perhaps one community began doing energy and transportation this way and the idea caught on. Maybe the government mandated efficiency levels that forced energy providers to innovate. The results of the Friedman's ideal techno-revolution are fantastic, but there is no clear path to this future. There is no shortage of visions for a future world where all nations are carbon neutral, meeting everyone's basic needs, and operating flawlessly.

Friedman shows his colors as a firm believer in technosalvation. The scene he describes, despite being a techno-utopia, sounds like the end result of a business as usual path. His scenario assumes and implies that extractive capitalism is still profitable. He also assumes single-family homes in the suburbs can be sustained, and that most people are prepared to allow full government control of utilities and transportation. There is very little to suggest that this idea is at all a revolutionary change from the current trajectory.

The main issue with Friedman's future scenarios is that his idealistic future energy scenarios have everyone living like a future American in a computer- and Internet-based house and city. Yet living like an American was subject he broached earlier in the text as dangerous to resources and emissions levels. The flattening of the

Earth as a global economy is exacerbating the problem of growing demand for increasingly scarce energy and resources. As such, the future scenario that Friedman lays out probably only applies to Americans, Europeans, and other parts of the developed world. The cost of infrastructure for every individual to live the way he described is inconceivably large. And this solution goes nowhere near the problem of environmental justice. If this technology-based utopia is the world with a solved climate crisis, is it just the individuals or countries that could afford to live this way? Is it everyone? Friedman also assumes proximity to electricity, Internet, cities, and other infrastructure. He fails to address food security and other critical elements of climate change concerns.

However, Friedman is the only author to envision a concrete set of ideals for the future. He goes beyond some of the more idealistic harmonious vague visions of sustainability, a net zero carbon world, and a revolution by the power of the people. It is clear that his one proposed line of action, his one thing out of hundreds that we must do is to integrate energy production and transportation sectors so that they are at their most efficient.

Alternative future narratives

In search of other authors who offer a line of vision for our world's climate future, I reached out to all the authors in the study as well as other experts in climate change communication, writing, and climate fiction. My inquiry to them was "What is one thing you would like to implement or see happen in the next 20 years to address global climate change?" While I received only two responses, it was interesting to hear what Paolo Bacigalupi and Ken Eklund had to say.

Bacigalupi, a science fiction and fantasy author, is known best for his celebrated works of climate fiction *The Windup Girl*, *Ship Breaker*, *The Drowned Cities,* and others. He succinctly replied to my message with the desire for an annually escalating tax on carbon. While this is a simplified solution that attempts to strike at the heart of the problem, it does aim to create an economic incentive to steer clear of carbon emissions. Ken Eklund, a game and experience designer, offered a longer explanation about climate change messaging that resonates well with the message of my study.

> "I would like for an accurate, easily graspable story to take root in our dialogues about climate change. I think that inventing this story could revolutionize how we collaboratively thing about it and how we act on it" (Eklund 2015).

I found this answer very similar to my evidence for using metaphors for creating transmissible messages about climate change. Here is the full text of his example:

> "Imagine we are in a big bus, driving at night in the fog. We can't see very far ahead. But some people have a map, and they tell us there's a dropoff ahead. Other people say maybe they can see it coming, through the fog. What do we do? The answer is very simple. The first thing is, almost instinctively, we take our collective foot off the gas pedal" (Eklund 2015).

This analogy lines up well to where we collectively are with climate change. It includes the precautionary principle, saying that uncertainty should inspire us to be more cautious and proactive. It also implies that everyone has at least a small contribution to the problem, with everyone's weight on the collective gas pedal, so to speak. Eklund's example is clear and accurate to the current conditions surrounding climate change. It is also relatable and easy to use. While it does not hit all the aspects of an effective message as laid out in this study, it is certainly a good place to start.

Further study

There are dozens of other works that attempt to address climate change as a political and social problem from both the authors used in this study and others besides. Several options for further reading and study that I aim to read are included in Table 2, though there are many others besides.

Our Choice: A Plan to Solve the Climate Crisis, Al Gore (2009)
Moral Ground: Ethical Action for a Planet in Peril, edited by Kathleen Dean Moore and Michael P. Nielson (2011)
EcoMind: Changing the Way We Think to Create the World We Want, Frances Moore Lappe (2011)
The Future: Six Drivers of Global Change, Al Gore (2013)
The Green Boat: Reviving Ourselves in Our Capsized Culture, Mary Pipher (2013)
The Sixth Extinction, Elizabeth Kolbert (2014) (Pulitzer Prize awarded)

Table 2. Suggested reading for further examination of popular science messaging.

Using the best ideas I have analyzed, communicators have the opportunity to evaluate messages so that they align with the framing and subject areas that are most psychologically and social effective. There is also potential to create messages based on the framework that I have provided. In further study, I would like to look more closely at one of several of these ideas. Ideally, I would also add more ideas and strategies to create an evaluation rubric for climate change messaging and apply it to the current communication in print and television media.

Conclusions

Through accessible climate change books, readers may venture into interdisciplinary discussion on the linkages between the social world and the natural world. This allows the public conversation to move past technical science discussion and into a wider understanding of the other realms that the climate problem touches. By creating narratives in which readers can envision the steps to a future away from business as usual, authors empower their readership to think outside the realms of entrenched institutions and worldviews. Readers are afforded more than stark interpretations of scientific fact. The works in this study, and many others besides, go beyond an exploration of the science and a blunt list of climate change impacts.

In particular, by addressing the problems and highlighting the strongest methods within popular works, the prevailing narratives can move past individualism, consumerism, and exceptionalism. Communicators must dispose of growth paradigms and the inevitable doomsday scenarios to shift towards language more resonant with a conservation ethic. The perceived sense of responsibility must not be limited to the score of individual consumerism.

In this way, Americans can address the distinctly misaligned values between neoliberal economic policies and environmental protections. By addressing and demystifying individualization of responsibility and instead requiring the largest polluters to take action on climate change, we may also attend to environmental justice and those that are most vulnerable. If we can create a repeated message saying that there is no silver bullet for solving climate change, instead, as global citizens, we can identify and enact the numerous ways in which individuals, communities, regions, nations, and a

global community can mitigate contributions to climate change. With a concrete future in mind, the world can move toward a carbon limit that, while higher than it should be, still allows for a livable planet. The key is changing the narrative and focus of communication efforts—and many of the most successful communication strategies are embedded in the books discussed in this study. Journalists, educators, and scientists, who contribute to most communication to the general public, cling too rigidly to the standards of their disciplines and professions. In this current time, where human actions are adding exponentially to the world's collective future, uncertainty and balance have no place. Instead the public needs to see advocacy, activism, motivation, opinions, and altruistic support for climate action. These messages are found in books by the authors Gore, McKibben, Klein, and Friedman. With an issue so all-encompassing in all realms of social, political, and economic life, it is critical that mainstream communication take on the targeted, accessible, and strategic messages found in advocates' books so as to enable public understanding and action for large scale climate change mitigation.

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