



# The Influence of Climate Fiction

## An Empirical Survey of Readers

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*Abstract* Climate fiction—literature explicitly focused on climate change—has exploded over the last decade, and is often assumed to have a positive ecopolitical influence by enabling readers to imagine potential climate futures and persuading them of the gravity and urgency of climate change. Does it succeed? And whom does it reach? A qualitative survey of 161 American readers of 19 works of climate fiction finds that these readers are younger, more liberal, and more concerned about climate change than nonreaders of climate fiction. Drawing on concepts from ecocriticism, environmental psychology, and environmental communication, this article suggests that “cli-fi” reminds concerned readers of the severity of climate change while impelling them to imagine environmental futures and consider the impact of climate change on human and nonhuman life. However, the actions that resulted from readers’ heightened consciousness reveal that awareness is only as valuable as the cultural messages about efficacious action that are in circulation. Moreover, the affective responses of many readers suggest that most works of climate fiction are leading readers to associate climate change with intensely negative emotions, which could prove counterproductive to efforts at environmental engagement or persuasion. Based on one of the first studies to empirically examine the reception of environmental literature, this article demonstrates a novel interdisciplinary approach to environmental literature (empirical ecocriticism) and points the way to future research in this vein.

*Keywords* climate fiction, climate change, literature, ecocriticism, environmental futures, empirical ecocriticism

### Introduction

Literature focused on climate change has become a major trend in English-language publishing and reading over the last decade. In the mid-2000s environmentalists and cultural critics could rightly ask why authors (and artists in general) were not more engaged with the subject.<sup>1</sup> A decade later, the catalogue of works centered on anthropogenic climate change was too long to count, and literary criticism had more than

1. McKibben, “What the Warming World Needs Now Is Art.”

kept pace.<sup>2</sup> Part of the explanation for this artistic and scholarly attention lies in the increasingly obvious manifestations of climate change, but an additional stimulus is the hope that these plays, novels, short stories, poems, and children's stories might lead to a wider and deeper climate consciousness and thereby contribute to more progressive environmental policies and politics. While few scholars are so bold as to state in print that a "literary genre" could "save the planet," the ecopolitical value of environmental literature has been a key subtext for the growing interest in climate fiction in (liberal) popular discourse and the academic fields of ecocriticism and environmental humanities.<sup>3</sup>

Given this concern with the potential influence of climate fiction (also known as "cli-fi"<sup>4</sup>) on environmental beliefs and behavior, it is surprising that there have been no systematic attempts to investigate who its readers are and what they make of their reading experiences. In fact, this holds true for environmental literature as a whole: to date, only a single empirical study on the influence of environmental fiction has been conducted.<sup>5</sup> To begin to address this lacuna, I surveyed 161 American readers of climate fiction. Their detailed responses to open-ended questions offers empirical evidence about the readership of climate fiction and the kind of meaning readers make from this growing category of literature.<sup>6</sup> This article considers American readers' psychological, intellectual, emotional, and behavioral responses to recent climate fiction through their own words. I supplement this information with relevant insights from ecocriticism, environmental communication, and environmental psychology. This research charts a path for what I call *empirical ecocriticism*: an empirically grounded, interdisciplinary approach to environmental narrative.

### The Cultural-Political Work of Climate Fiction

Climate fiction might be considered significant for a number of reasons. As ecocritic Antonia Mehnert notes, literature explicitly focused on climate change "gives insight into the ethical and social ramifications of this unparalleled environmental crisis, reflects on current political conditions that impede action on climate change, explores how risk materializes and affects society, and finally plays an active part in shaping our

2. Johns-Putra, "Climate Change in Literature."

3. Holmes, "'Cli-fi': Could a Literary Genre Help Save the Planet?"

4. Blogger Dan Bloom is widely credited with coining the term *cli-fi* in 2011.

5. Małecki, Pawłowski, and Sorokowski, "Literary Fiction Influences Attitudes toward Animal Welfare."

Within the field of environmental communication there have been dozens of studies on the influence of films and documentaries on environmental beliefs, and at least two on nonfiction literature: Mobley, Vagias, and DeWard, "Exploring Additional Determinants of Environmentally Responsible Behavior"; and Hormes et al., "Reading a Book Can Change Your Mind."

6. While climate fiction is sometimes referred to as a genre or subgenre of science fiction, works of climate fiction have been written in almost every genre in existence. It is more precisely described as a trans-generic category of literature (see, e.g., Mehnert, *Climate Change Fictions*, 37; and Schneider-Mayerson, "Climate Change Fiction," 312).

conception of climate change.”<sup>7</sup> In all of these ways, it “serves as a cultural-political attempt and innovative alternative of communicating climate change.”<sup>8</sup> While ecocritics and other scholars are interested in climate fiction for various reasons, implicit in much of the attention to this category is a belief (and perhaps a desire) that it is particularly important due to its “instrumental value.”<sup>9</sup> As climatologist Judith Curry stated in 2013, while “scientists and other people are trying to get their message across about various aspects of the climate change issue . . . fiction is an untapped way of doing this—a way of smuggling some serious topics into the consciousness of readers.”<sup>10</sup> Though some have warned against viewing climate change literature as ecopropaganda, cautioning that “ecocriticism is not the literary critical department of the IPCC [Intergovernmental Panel on Climate Change],” climate fiction’s purported ability to function as a novel and potent form of environmental persuasion<sup>11</sup> is a key element driving the enthusiasm about its emergence.<sup>12</sup> This article asks, does it work?

In its reader-focused orientation, empirical ecocriticism draws on the concerns of reader-response theory, a school of criticism that flourished from the 1970s through the 1990s. Associated with critics such as Stanley Fish and Wolfgang Iser, the reader-response school articulated an extreme antiformalist position, arguing that the *meaning* of a text is constructed (or coconstructed) by its readers. Though reader-response theory has fallen out of favor—in some guides to literary theory, the chapter on reader-response theory has been replaced with a chapter on ecocriticism—this interest in readers has been picked up by scholars in gender studies, queer studies, translation studies, historicism, and cognitive literary studies. While most well-known reader-response critics did not conduct empirical research, their attention to readership has led to the current interest in empirical experiments on the reception of literature and artwork,

7. Mehnert, *Climate Change Fictions*, 4.

8. *Ibid.*, 4. Mehnert is only one of many scholars who have discussed the potential influence of climate visions. Other notable publications include Yusoff and Gabrys, “Climate Change and the Imagination”; Trexler, *Anthropocene Fictions*; and Ghosh, *The Great Derangement*.

9. Siperstein, “Climate Change in Literature and Culture,” 132.

10. Evancie, “So Hot Right Now.”

11. My use of “persuasion” encompasses not only the influence of these visions on beliefs about specific scientific, practical, or political questions, but the effective enablement or facilitation of the imagination of social, cultural, political, and environmental futures.

12. Garrard, “The Unbearable Lightness of Green,” 17. This would be the perspective of most traditional literary critics—that aesthetics and not influence should be the focus of the humanities. While some ecocritics have echoed this view, just as many, if not more, have theorized and advanced claims about the impact of environmental narratives (e.g. Adamson, “Environmental Justice, Cosmopolitics, and Climate Change”; Gaard, “Global Warming Narratives”). As Alexa Weik von Mossner put it, within ecocriticism “there is a certain consensus that emotionally powerful renderings of human-nature relationships. . . can have substantial repercussions in the real world,” though “much of the evidence” for these claims has been “anecdotal and/or phenomenological” (*Affective Ecologies*, 9). Whatever the reader’s perspective on this question, the contention here is that much of the recent cultural, critical, and pedagogical interest in climate change fiction has been related to its potential psychological and ecopolitical influence.

often focused on cognition, affect, and empathy, published primarily in journals such as *Scientific Study of Literature* and *Empirical Studies of the Arts*. Similarly, my interest here is not in the meaning of climate fiction, but the work that these texts accomplish in the world. In keeping with this emphasis, this article addresses the kinds of subjects that many ecocritics have been concerned with, such as the role of genre, affect, and place, as well as the critical questions that many social scientists are engaged with, such as the divergent responses of liberals and conservatives, and the ability of environmental narratives to stimulate real-world conversations and influence behavior.

To make sense of reader responses, I utilize concepts from ecocriticism, environmental communication, and cognitive psychology. In particular, I apply *construal level theory*, which argues that psychological distance influences “how people represent mental objects and what information they consider when making judgments and decisions.”<sup>13</sup> Conceptions that are psychologically proximate in any of four major dimensions—temporal (immediate vs. distant), spatial (near vs. far), social (familiar vs. unfamiliar), and hypothetical (likely vs. unlikely)—lead to more low-level construals, which are detailed and specific, whereas high-level construals are abstract. Low-level construals of the consequences of climate change have been found to lead to higher levels of concern and stronger intentions to engage in behaviors to mitigate climate change.<sup>14</sup>

### Methodology

Readers were recruited through Amazon’s Mechanical Turk (AMT), an online crowdsourcing service that has become popular with social scientists. It has been shown to yield high-quality data and to be as representative as other commonly used sampling methods.<sup>15</sup> The recruitment posting specified that respondents had to have read one of nineteen specific works of fiction. To ensure that the inclusion criterion was met, respondents were asked to describe in their own words the plot of the novel they had selected for the survey. Portions of the answer to this and other questions were searched via Google to ensure that respondents had not copied and pasted descriptions from online sources. Those that had done so were eliminated from the data set. Respondents were asked a number of common demographic questions as well as seven open-ended questions (see appendix).<sup>16</sup>

This article examines the responses of the 161 respondents who were based in the United States. At the same time as this survey was conducted, a random sample of 205

13. Brügger, Morton, and Dessai, “Proximising,” 125.

14. For high levels of concern, see Spence, Poortinga, and Pidgeon, “The Psychological Distance of Climate Change.” For stronger intentions, see Jones, Hine, and Marks, “The Future Is Now.”

15. See Kees et al., “An Analysis of Data Quality,” for high-quality data yield; and Berinsky, Huber, and S. Lenz, “Evaluating Online Labor Markets for Experimental Research,” for comparison with other commonly used sampling methods.

16. These questions were selected after analyzing the results of a pilot study of twenty subjects.

US-based AMT users were asked the same demographic questions. The random sample allows us to compare the demographic composition of climate fiction readers recruited through AMT to the population of AMT users at that time. The works of fiction included the most popular and acclaimed cli-fi novels in the United States over the last two decades (table 1). Selection was based on three factors: the works most often cited in articles on climate fiction in magazines and websites, the number of reviews on the book review–aggregating website Goodreads, and recommendations from scholars and critics of environmental literature. This survey focused primarily on novels, which have gained the most attention from Anglophone ecocritics and are consistently found to be the most popular form of literature in the United States.<sup>17</sup>

There are clear limitations to this methodology. First, since the information is self-reported, there is the potential for biases to influence reader responses. Self-reported reader experiences are valuable as one measure of the impact that an emerging body of literature is having on its readers and might prove useful to authors, teachers, literary critics, and scholars of literature and environmental communication. However, it must be acknowledged that any reading experience might have effects of which readers are not aware, and that readers can be mistaken about their own experiences. Second, the sample size is relatively small. Third, some social scientists have argued against the use of AMT for generalizable results, though it is considered to be at least as representative as other commonly used sampling techniques, such as using student populations.<sup>18</sup> Despite these limitations, this methodology offers rich detail and exploratory results, which might be confirmed or rejected by subsequent empirical research.

### The Readership of Climate Fiction

Who reads climate fiction? This is a consequential question. While literary criticism often implies the existence of an average reader who interprets a text or genre in a way that is consistent with the analysis of a professional reader and critic, empirical research shows that readers often experience literature very differently. This experience might be influenced by demographic and socioeconomic factors, such as age, race, gender, sexuality, and education,<sup>19</sup> but it might also be shaped by factors such as familiarity with specific narrative forms, taste, or life experiences that create a strong identification with a focal character or resonance with a major theme.<sup>20</sup> For some works and genres, political beliefs, ecological identities, and strong attitudes about relevant subjects are also salient.<sup>21</sup> To speak with any confidence about how climate fiction is influencing its readers, it is useful to know who they are.

17. National Endowment for the Arts, “A Decade of Arts Engagement,” 71.

18. Chandler and Shapiro, “Conducting Clinical Research Using Crowdsourced Convenience Samples.”

19. See, for example, Radway, *Reading the Romance*; and Griswold, *Bearing Witness*.

20. See Gerrig, “Individual Differences in Readers’ Narrative Experiences.”

21. See Schneider-Mayerson, *Peak Oil*, 110–28.

Table 1. The works of fiction surveyed, along with their temporal setting, primary geographical settings, Goodreads ratings, and readership among surveyed cli-fi readers

<i>Work of Fiction (Author, Date of Publication)</i>	<i>Temporal Setting(s)</i>	<i>Primary Geographical Setting(s)</i>	<i>Goodreads Ratings*</i>	<i>Read by X Percentage of Respondents</i>
<i>Flight Behavior</i> (Kingsolver, 2012)	Present	Tennessee (USA)	65,765	24.2
<i>The Windup Girl</i> (Bacigalupi, 2009)	Distant Future	Bangkok (Thailand)	50,203	19.3
<i>Solar</i> (McEwan, 2010)	Present	UK, New Mexico (USA)	20,088	14.9
<i>A Friend of the Earth</i> (Boyle, 2000)	Past/Near Future	Southern California, Pacific Northwest (USA)	2,649	10.6
<i>The Healer</i> (Tuomainen, 2013)	Near Future	Helsinki (Finland)	1,014	9.9
<i>Forty Signs of Rain</i> (Robinson, 2004)	Present	Washington, DC (USA)	2,908	9.3
<i>The Rapture</i> (Jensen, 2009)	Near Future	Kent coast (UK)	1,982	9.3
<i>The Carbon Diaries: 2015</i> (Lloyd, 2009)	Near Future	UK	2,140	8.1
<i>The Collapse of Western Civilization: A View from the Future</i> (Oreskes and Conway, 2014)	Distant Future	Global	1,069	7.5
<i>The Ice People</i> (Gee, 1998)	Distant Future	UK	284	7.5
<i>Back to the Garden</i> (Hume, 2013)	Distant Future	USA	31	5.6
<i>The Water Knife</i> (Bacigalupi, 2015)	Near Future	Phoenix (USA)	14,439	5.6
<i>Ultimatum</i> (Glass, 2009)	Near Future	USA, China	330	5.6
<i>Odds against Tomorrow</i> (Rich, 2013)	Near Future	New York City (USA)	1,731	5.0
<i>Julian Comstock: A Story of 22<sup>nd</sup>-Century America</i> (Wilson, 2009)	Distant Future	North America	2,680	4.3
<i>Far North</i> (Theroux, 2009)	Distant Future	Siberia (Russia)	3,004	3.7
<i>Heavy Weather</i> (Sterling, 1994)	Near Future	Texas, Oklahoma, Kansas (USA)	2,546	3.7
<i>Not Dark Yet</i> (Ellingsen, 2015)	Near Future	Unspecified	185	3.1
<i>From Here</i> (Kramb, 2012)	Near Future	London (UK)	1	1.9

\*As of August 31, 2017

This study found cli-fi readers to be younger, more liberal, and more concerned about climate change than nonreaders of climate fiction. While the random AMT sample showed that most AMT workers are young, consistent with the findings of other studies,<sup>22</sup> climate fiction readers were much younger. Respondents aged eighteen to thirty-four years (often defined as the millennial generation) made up 38.5 percent of the random sample compared to 62.1 percent of cli-fi readers. Both groups were

22. Levay, Freese, and Druckman, "The Demographic and Political Composition of Mechanical Turk Samples." Survey respondents recruited through AMT are typically referred to as "workers," since they are compensated for their work. This is in line with a recognition of survey work as labor. See Irani and Silberman, "Turkoption." "

significantly younger than the US population—in July 2016 only 23.4 percent of Americans were aged eighteen to thirty-four years.<sup>23</sup> By calculating the ratio of AMT climate fiction readers to AMT respondents and extending that ratio to all US residents, we can extrapolate that at the time of these surveys approximately 37.7 percent of all American cli-fi readers were between eighteen and thirty-four years of age.<sup>24</sup>

These readers were also significantly more liberal than US residents in general. Of the random AMT sample, 29.5 percent identified as “conservative” or “very conservative” compared to only 17.1 percent of climate fiction readers. Conversely, 50.1 percent of readers identified as “liberal” or “very liberal” compared to 39.5 percent of the random group. (In 2016, only 25 percent of Americans identified themselves as “liberal” or “very liberal.”<sup>25</sup>) This suggests that climate fiction is not merely preaching to the liberal choir. However, cli-fi readers are also strong believers in climate change. Of climate fiction readers, 72.3 percent were concerned about climate change either “a great deal” or “a fair amount” compared to only 57.4 percent of the random AMT sample. Since approximately 64 percent of Americans expressed this level of concern at this time, we can assert that in September 2016, 80.6 percent of Americans who had read a work of climate fiction were concerned “a great deal” or “a fair amount.”<sup>26</sup> While it is possible that these readers were more concerned as a result of reading a cli-fi novel, their political orientation suggests that we should not be surprised if readers were *already* more concerned before picking up these books, and therefore more inclined to do so. Most cli-fi novels announce their subject—and therefore their assumptions about the existence, causation, and significance of climate change—in their synopses, which are visible on back covers and Amazon pages. As such, it seems unlikely that these works would function as Trojan horses for message smuggling.

For ecocritics and environmentalists who hope that climate fiction might convert conservative climate deniers, these results might be disappointing. They suggest that at the time of these surveys only 1.6 percent of American cli-fi readers were “very conservative” (compared to 9 percent of US residents) and only 12.1 percent were “not at all” worried about climate change (compared to 19 percent of US residents).<sup>27</sup> However, a more nuanced analysis of the kind of “cultural-political” work that climate fiction performs leads to a more sanguine conclusion. If we consider Americans according to the

23. US Census Bureau, “Estimates of U.S. Population by Age and Sex.”

24. This assumes that given two different age groups, AMT workers and the general population have the same relative probability of reading climate fiction. For example, that if among AMT workers a 30-year-old is twice as likely to read cli-fi as a 40-year-old, a 30-year-old in the general population is also twice as likely to have read cli-fi as a 40-year-old. This assumption of relative probability also applies to the other two extrapolations in this section.

25. Saad, “US Conservatives Outnumber Liberals.”

26. Saad, “Global Warning Concern at Three-Decade High in US.” Since my surveys were conducted in September 2016, this number averages the results of a Gallup poll conducted March 2–6, 2016, with a poll conducted March 1–5, 2017.

27. As I document later in this article, most of these readers were openly skeptical about the value and influence of these novels as environmental literature.

“six Americas” identified by Maibach, Roser-Renouf, and Leiserowitz in their research on climate attitudes—the “Alarmed,” “Concerned,” “Cautious,” “Disengaged,” “Doubtful,” and “Dismissive”—we might measure the short-term ecopolitical influence of environmental literature by its ability to nudge its audience in a slightly more progressive direction.<sup>28</sup> “Concerned” readers might join the ranks of the “Alarmed,” who are much more likely to take individual, consumer, and political action. As I demonstrate below, there is evidence that this is occurring.

### What Do They Read?

For a work of fiction to have influence it needs to reach readers, and thus information about readership is valuable.<sup>29</sup> As a result of the proprietary nature of book sales data, there is little information available about the popularity of different works of environmental literature.<sup>30</sup> Critical assessments of which novels are most “important” or “significant” may not reflect their actual readership. In this case, however, there seems to be a correlation between scholarly attention and general popularity.<sup>31</sup>

With the notable exception of Paolo Bacigalupi’s *The Windup Girl* these results show that the most popular (and thus potentially influential) novels were those written by established authors whose reputations guaranteed a wide readership.<sup>32</sup> This conclusion was supported by a survey question asking respondents how they came to read the book they selected: for example, twelve of the fourteen readers who chose to answer questions about Barbara Kingsolver’s *Flight Behavior* purchased it partially because they had read (and presumably enjoyed) Kingsolver’s previous books.<sup>33</sup> Works by

28. Maibach, Roser-Renouf, and Leiserowitz, “Global Warming’s Six Americas 2009.”

29. Literature might also be considered influential in less direct ways, of course—if it has a powerful impact on a small number of popular or influential authors, critics, or economic and political elites. (Consider, for example, the legacy of Ayn Rand’s fiction.) That kind of influence goes beyond the purview of this study, though it presents an interesting opportunity for further research.

30. Table 1 includes the number of Goodreads ratings, which might be taken as a very rough proxy of popularity, though there are currently no peer-reviewed studies measuring the validity of the relationship between Goodreads ratings and sales. *Flight Behavior*, the most-rated book in this study, had over 65,000 reviews in August 2017, five years after its publication. According to Goodreads lists, there were 1,270 books with at least 80,000 reviews. However, this information is presented with two significant caveats. First, Goodreads includes all books ever published, including classic novels and children’s books, many of which were published decades ago. Second, its user population is rumored to be primarily American and skews young, which privileges young adult fiction. Cormac McCarthy’s *The Road* and Margaret Atwood’s *Oryx and Crake*, which some ecocritics consider to be climate fiction, have more ratings than *Flight Behavior*, with over 557,000 and 167,000, respectively.

31. *Solar*, *Forty Signs of Rain*, *The Windup Girl*, *Flight Behavior*, and *A Friend of the Earth* are the most-cited of the works surveyed, with at least 109, 81, 71, 59, and 54 scholarly citations, respectively (via Google Scholar, August 31, 2017).

32. Bacigalupi, *The Windup Girl*.

33. Kingsolver, *Flight Behavior*; Rich, *Odds Against Tomorrow*.

Table 2. How respondents came to read the book of climate fiction they selected for survey response

"How did you come to read this book? Please select all that apply."	Percentage of Respondents
"It was recommended to me"	44.1
"I enjoy books like this"	35.4
"I've read other books by this author"	27.3
"I read a positive review"	26.7
"As part of a reading group"	6.2
"It was assigned for a class"	2.5
"Other"	3.1

less-established authors that have been widely reviewed by Anglophone critics, such as Nathaniel Rich's *Odds against Tomorrow* and Marcel Theroux's *Far North*, were read by fewer respondents, and thus might be said to have had significantly less influence on American readers at the time of this survey.<sup>34</sup>

Despite the sway of literary reputation, table 2 reveals that critical acclaim and positive reader experiences also play an important role in the spread of climate fiction. Of respondents, 44.1 percent read the selected work as a result of a personal recommendation, while 26.7 percent had read a positive review. Only 2.5 percent of respondents read a work of climate fiction because it was assigned for a class. Since much of the public discussion of climate fiction has situated its impact within the classroom, this is a surprising result.<sup>35</sup> It suggests that evaluating reception from this context is not reliable because classroom reading experiences constitute a small minority of total reading experiences. As such, anecdotal claims about impact that rely on academic reading experiences should be viewed with some skepticism.<sup>36</sup>

### The Influence of Climate Fiction

Evaluating the influence of "climate fiction" on its readers is a hazardous enterprise, since this category includes a range of styles and genres. These nineteen works include the following genres (at least): realist literature, young adult fiction, noir, thriller, satire, postapocalyptic fiction, science fiction, speculative fiction, and weird fiction. They are set in the recent past, the present, the near future, and the distant future. Their authors offer conflicting perspectives on the responsibility for climate change, its likely consequences, and the recommended responses. Nonetheless, these works of

34. Theroux, *Far North*.

35. See, for example, Pérez-Peña, "College Classes Use Arts to Brace for Climate Change"; and Ullrich, "Climate Fiction."

36. More broadly, classroom reading experiences are not considered generalizable because they occur within the context of a sustained and directed learning experience. As Suzanne Keen notes, claims emerging from the classroom tend to "conflate reading, discussion, role-taking activities, writing tasks and teaching" (*Empathy and the Novel*, xi). Additionally, instructors are susceptible to confirmation bias.

contemporary fiction are distinct from all others in their explicit focus on climate change and their affirmation that it constitutes a grave threat to human societies and nonhuman life, in the present as well as the future.<sup>37</sup> While the responses to each of these works was unique, a number of themes emerged.

Most readers attested to the value of cli-fi as a tool for enabling the imagination of potential climate futures. An IT administrator from Tennessee reported that reading Naomi Oreskes and Erik M. Conway's *The Collapse of Western Civilization*—a short faux history written in the distant future by a Chinese historian explaining how Western civilization collapsed in the twenty-first century—was a powerful experience for him.<sup>38</sup> He was previously cognizant of the science of climate change, but said that it “was more theoretical before. Now, while fiction, the book has made me more aware of what our planet could become.”<sup>39</sup> He subsequently shared the book with his wife and son, among others. For a middle-aged teacher from North Carolina who was already worried “a fair amount” about climate change, reading *Flight Behavior* was not a transformative experience but did help her imagine a possible future. She picked up the novel after reading previous works by Kingsolver and found that the book “aroused environmental concerns,” particularly about species extinction. “I don’t think the book really changed my opinion of climate change, since I already considered it to be a serious issue,” she wrote, “but it did give me a concrete example of the potential consequences.”<sup>40</sup>

Visual metaphors for the significance of climate fiction were frequently invoked in readers’ descriptions, as if potential futures, once colorless and hazy, were now vivid and clear. A technician from Florida said that Matthew Glass’s *Ultimatum*,<sup>41</sup> a diplomatic thriller describing explosive climate negotiations between China and the United States in the early 2030s, “brings [climate change] into focus as a real-life, tangible effect as a result of our real-life, tangible ignorance.”<sup>42</sup> The experience of a database manager from Michigan was typical. She had read T. C. Boyle’s *A Friend of the Earth* years before answering the survey but recalled it in rich detail.<sup>43</sup> While half of the novel is set in the 1990s, when the protagonist, Ty Tierwater, was an active radical environmentalist, the sections set in an apocalyptic 2025 seemed to affect her the most. She wrote that “since the book was based on a future period, it kind of was an eye opener when it came to

37. This differentiates these novels from antienvironmental works that feature climate change, such as Michael Crichton’s *State of Fear*.

38. Oreskes and Conway, *The Collapse of Western Civilization*.

39. Male, 45–54, Tennessee, moderate. Respondents are identified by their sex, age range, location (US state), and political identity (out of the following options: “very conservative,” “conservative,” “moderate,” “liberal,” “very liberal,” and “no opinion”). These indicators are used in the footnotes to identify each unique reader and provide some basic information. In footnote 95 I discuss the rationale for using these categories, and their limitations.

40. Female, 55–64, North Carolina, liberal.

41. Glass, *Ultimatum*.

42. Male, 25–34, Florida, liberal.

43. Boyle, *Friend of the Earth*.

realizing the severity and intensity of climate change.”<sup>44</sup> This sense of one’s eyes being opened was experienced by a number of other readers, including a liberal nurse from Arkansas. She had read Saci Lloyd’s *The Carbon Diaries: 2015*, a young adult novel focused on the social and cultural consequences of climate change in a near-future England characterized by strict carbon rationing and extreme political upheaval.<sup>45</sup> She recalled the author’s depiction of weird weather and amplified “natural” disasters, and noted that the book “allowed me to visualize the ramifications of climate change on us as humans.”<sup>46</sup> This visualization is an example of a shift in construal level: what was once abstract and vague (and therefore a high-level construal that is psychologically distant) becomes more concrete and detailed (a low-level, psychologically proximate construal).<sup>47</sup>

Even for readers who had not previously struggled to imagine climate futures, these works could be memorable and impactful. A clerk from Ohio read *The Windup Girl*, a “biopunk” science fiction novel set in a drowning twenty-third century Bangkok, one of the few surviving megacities in the world. She found it to be “riveting,” “fascinating,” and “enthraling,” like “watching a really good movie.” Since she had been “paying attention to the issue and watching out for the warnings of runaway climate change for many years,” it “just had the effect on me of reinforcing what I already thought about climate change” and “deepening my imagination.”<sup>48</sup> The sense of imagination as something that had once been shallow and superficial but now has an extended depth was paralleled by a nurse from Florida.<sup>49</sup> He read *Ultimatum* and noted that “the way that the author was able to explain the sights and visions of the devastation of global warming and how he was able to pinpoint specific aspects made me quite intrigued.” For him, the experience was powerful: “how people were living in higher grounds” and “how we had lost parts of the world to rising water levels and the ignorance of the community at large were strong images that I recall, even six years since reading this book.”<sup>50</sup> Indeed, when asked to recall specific moments in these works, many readers described images such as the swell of monarch butterflies in *Flight Behavior*. These comments support cognitive psychologists’ claims that vivid imagery leads to more narrative engagement and recall.<sup>51</sup>

44. Female, 35–44, Michigan, very liberal.

45. Lloyd, *The Carbon Diaries*.

46. Female, 25–34, Arkansas, liberal.

47. Scholars of ecomedia might argue that the very nature of film tends to lead to low-level construals. On the similarities and differences in the cognitive reception of literary and cinematic narratives, see Weik von Mossner, *Affective Ecologies*, 19–73.

48. Female, 35–44, Ohio, very liberal.

49. Scholars of American environmental literature, ecomedia, and environmental history will note that future visions have stimulated or extended Americans’ environmental imaginations for many decades. As Yusoff and Gabrys summarize, “The arts and humanities play an important role in thinking through our representations of environmental change and give tangible form to the imagination of different worlds outside of the constraints of the given present” (“Climate Change and the Imagination,” 518).

50. Male, 45–54, Florida, liberal.

51. Starr, “Theorizing Imagery, Aesthetics, and Doubly Directed States.”

While the possibility of social desirability bias can never be discounted, it should be noted that not all readers found these works of fiction to be meaningful or influential. Some liberal and moderate readers who were already concerned about climate change denied that literature could have any influence on their views. A writer from Minnesota argued that Paolo Bacigalupi's *The Water Knife* "did not influence [him] in any way," since he "already believed many of the things in this book to be possible."<sup>52</sup> A Washingtonian said that Kim Stanley Robinson's *Forty Signs of Rain* "didn't really change my mind more than say, [the films] *2012*, or *The Day After Tomorrow*.<sup>53</sup> It just kind of gave me a feeling of 'that would suck, but it'll probably never happen,'" while a Catholic accountant from New Jersey argued that she doesn't "use fiction to shape my view of the world. I think anything in the realm of fiction is over the top and very rarely based on anything real."<sup>54</sup>

Nevertheless, climate fiction did not just help some readers picture potential futures but focused their gaze on subjects that had previously been unknown. For many this was accomplished through these works' very setting in the distant future. As a Californian summarized in her discussion of Antti Tuomainen's *The Healer*,<sup>55</sup> "It made me think in the future."<sup>56</sup> Given that many works of climate fiction are set decades or centuries in the future but explicitly draw connections to our actions in the present, it is not surprising that some readers reported reconfiguring their temporal perception of environmental processes or becoming aware of the "slow violence" of climate change for the first time.<sup>57</sup> Maggie Gee's *The Ice People*, set in the UK in the late twenty-first century as the world enters a new ice age, had that impact on a conservative judicial clerk from Tennessee.<sup>58</sup> Though he cautioned that the book "wasn't really that exciting," it made him "think on a much deeper level." He reported, "*The Ice People* made me feel like there is a lot more going on even though it doesn't seem like it. Like they say that the oceans are getting warmer each year by a degree. That doesn't sound like a lot to someone else, but say in ten years or so that's ten more degrees warmer that [sic] it would be. . . . That has to be bad for the sea life."<sup>59</sup> By placing their stories in the distant future, authors are able to illuminate what is otherwise invisible: the gradual socioecological changes that occur too slowly for human perception. As a Pennsylvania man noted of

52. Male, 25–34, Minnesota, liberal.

53. Robinson, *Forty Signs of Rain*.

54. Male, 25–34, Washington, very liberal; male, 18–24, New Jersey, liberal.

55. Tuomainen, *The Healer*.

56. Female, 25–34, California, very liberal.

57. Nixon, *Slow Violence*. As Nixon observed, climate change poses a formidable representational challenge, since the origin of its slow violence (the production of greenhouse gases, the destruction of carbon sinks) is decoupled from its accretive consequences (which occur decades or centuries later). On the conflict between modern human and climatic (or geologic) temporalities, see Pahl et al., "Perceptions of Time in Relation to Climate Change."

58. Gee, *The Ice People*.

59. Male, 25–34, Tennessee, very conservative.

*The Windup Girl*, it “gave me a more thorough picture of what a nightmarish future might look like. It doesn’t have to be an apocalyptic future to be terrifying. It can be a slow loss of survival tools, basic needs, life, food and water.”<sup>60</sup> For this reader, the possibility of a gradual decline of ecological conditions or quality of life was rendered sensible through a futuristic science fiction novel. In this way, climate fiction helped readers overcome the *temporal distance* that usually leads us to high-level (abstract) construals of the distant future.

As is evident in the above response, these works pushed some readers to consider, often for the first time, some of the likely consequences of climate change that tend to be underrepresented in media accounts, such as the plight of “sea life.” For example, many readers of *Flight Behavior* found its unexpected focus on invertebrates to be memorable. A liberal lawyer recalled the “scene where the butterflies, which were rapidly dying, were clinging to the trees in huge numbers, so many that it looked like the trees were orange, and there was a sound in the background which the main character, Delarobia, thought sounded like something falling. It was butterflies falling as they died but there were so many you couldn’t notice right away.” She noted that the book made her consider the consequences of climate change on less-charismatic animals: “Of course when thinking about climate change most people understand the implications of rising ocean levels and more extreme weather but we don’t often think about the deeper implications and how certain animals and insects are affected and how something that seems like it wouldn’t be important actually is.”<sup>61</sup> Similarly, a customer service worker from Colorado commented that the environmental consciousness cultivated by *Flight Behavior* was unusual for her, since she is generally “pretty involved in my immediate household concerns, to the exclusion of all else. . . . [*Flight Behavior*] made me more conscience [sic] of the environment, an expanding of consciousness,” which surprised her: “I am probably one of the last people that would normally say something like that.”<sup>62</sup> A freelance writer from West Virginia reached a similar conclusion, noting that “[*Flight Behavior*] made me realize that every single thing is affected by climate change. Things like butterflies that we may not notice or care about. It made me want to appreciate what we have so much more.” This reader’s reflection is telling. Like most respondents, she wrote that *Flight Behavior* “made her” concerned about climate change—whereas some readers used more passive terms, such as “allowed”—suggesting that the book exerted a possibly unwelcome force by expanding her circle of concern and empathy, eventually leaving her “sad and in awe.” Even so, we might note that its impact seemed to be limited: the novel did not actually lead to a renewed appreciation of “things like butterflies,” but merely led her to “want to appreciate” them.<sup>63</sup>

60. Male, 35–44, Pennsylvania, liberal.

61. Female, 25–34, North Dakota, liberal.

62. Female, 35–44, Colorado, moderate.

63. Female, 25–34, West Virginia, liberal. My emphasis.

A newfound awareness of our reliance on and embeddedness in fragile ecosystems led many readers to consider the likely impact of climate change on human societies and the fragility of global civilization itself. Some described being surprised by the social, cultural, and political repercussions of climate change—not the scientific facts of drought, sea level rise, and species extinction, but their potential impacts on everyday life and the “structure of feeling” of a near future in which climate change is an undeniable, palpable presence. A young freelancer wrote of Clara Hume’s *Back to the Garden*,<sup>64</sup> a lyrical tour of a postapocalyptic but resilient North America, “The characters in this book really made me see how climate change could affect me on a far more personal level—one in relation to my family and friends—which I had never really pondered before.”<sup>65</sup> By explicitly framing familiar experiences such as anxiety, depression, loss, grief, and regret as related to climate change, these novels provided many readers with a vivid sense of the granular and quotidian impacts of unimaginably large-scale changes. These impacts included a heightened consciousness of environmental injustice—the inequitable distribution of risk, vulnerability, and exposure based on race, class, gender, nationality, and other factors. Before reading *The Ice People*, a public health administrator from Virginia wrote, “I thought about climate change as primarily an environmental issue, but after reading this book, I began to see that it has so many other dimensions that I had not considered. Changes in climate have the potential to change the very fabric of society.” In particular, these ruptures might include “power dynamics between the genders, between people of different classes, and from different areas of the world.”<sup>66</sup> Her conclusion and the statements of other readers suggest that climate fiction might be an effective vehicle for cultivating an empathetic awareness of climate injustice, by diminishing the *social distance* between privileged readers and victims of climate change in the Global South and elsewhere, although this was not the primary focus of any of these works.<sup>67</sup>

### Realistic Futures

Most readers understood works of climate fiction set in the future to be cautionary tales, not prophecies. They summarized their messages as most authors, critics, and scholars do—as warnings about possible futures. *The Healer* led a Pennsylvania man to “think about the possibilities if these issues are not mitigated,” while a tech support worker from Arizona claimed that it “reinforced how important preventing the melt down of the polar ice caps really is and how once trees and other aspects of the environment

64. Hume, *Back to the Garden*.

65. Female, 25–34, Texas, conservative.

66. Female, 25–34, Virginia, very liberal.

67. A potential exception might be *The Windup Girl*. One of its focal characters, an android slave who gains a violent liberation, could be seen as a representative of marginalized groups who are considered less “human,” and whose lives are therefore seen as less valuable. See Murphy, *Persuasive Aesthetic Ecocritical Praxis*, 69–79.

are destroyed how bleak and horrible things could be. The book made me want to do something proactive to prevent that.”<sup>68</sup> Similarly, a California accountant claimed that “[*The Carbon Diaries: 2015*] helped me to imagine a concrete picture of what life would be like if we as a globe do not deal with climate change.”<sup>69</sup> As these conditional statements indicate, most readers saw these works as purposeful thought experiments: if we do not change, very bad things will happen. For others, the very clarity of these visions made them seem more likely. Another reader of *The Carbon Diaries: 2015*, a conservative librarian from Connecticut, noted that the act of “reading about possible real-life events made it seem more concrete and more possible.”<sup>70</sup> This formulation suggests that its converse is also true: potential futures will seem less possible if they are more difficult to picture. This is an illustration of the *simulation heuristic*, a psychological principle that asserts that people tend to determine the likelihood of an event based on their ability to imagine its occurrence.<sup>71</sup>

Indeed, numerous readers used the words *real* or *realistic* to describe novels set in the distant future. A conservative man in New York noted that “[*The Carbon Diaries: 2015*] made me look at what is happening in a realistic way that instilled fear into me.” Though he “found it crazy how the book entailed a switch from modern day life as we know it” to a carbon-regulated future, it was convincing because he “could actually see the governments regulating things like this.”<sup>72</sup> That is, the book’s political logic rang true, and this verisimilitude increased his assessment of its probability. For many readers, narratives were deemed “realistic” if they could empathize with specific textual elements. As Suzanne Keen has noted, among the narrative features seen as particularly conducive to generating empathetic responses are “vivid use of setting” and techniques that enable “character identification.”<sup>73</sup> Though character identification was common in these responses, a personal connection to setting (place) was also mentioned frequently. For example, an IT worker from Florida wrote that “*Ultimatum* talks about Miami being washed into the sea which hits close to home because while I don’t live in Miami now, I’m from the South Florida area.” He added, “All books that I read open my eyes. They make you feel more aware of the *reality of the world*.”<sup>74</sup> This reader draws from the familiarity of the novels’ location a claim about its ability to depict—significantly, through feeling—the “reality” of a future world. We might conclude from this and other comments that the geographical setting of climate fiction matters a great deal, because it can capitalize on spatial proximity or potentially decrease *spatial distance*. Readers may

68. Male, 25–34, Pennsylvania, liberal; male, 25–34, Arizona, moderate. My emphasis.

69. Male, 25–34, California, very liberal. My emphasis.

70. Female, 35–44, Connecticut, conservative.

71. Kahneman and Tversky, “The Simulation Heuristic.”

72. Male, 25–34, New York, conservative.

73. Keen, *Empathy and the Novel*, 93.

74. Male, 25–34, Florida, liberal. My emphasis.

be more likely to find diegetic events believable or “realistic” if they identify with the work’s setting, which speaks to the value of regionally specific ecofiction.<sup>75</sup>

For many readers, the “reality” of these climate futures led them to see the present in a new light. Some of these lessons were relatively narrow, such as the experience of a student from Arizona who read *The Water Knife*, a thriller set in a near-future Southwest where drought leads to mass migration, violence, and social collapse as individual states compete for dwindling freshwater and close their borders. He noted, “[*The Water Knife*] made me think about Phoenix more particularly rather than ‘global warming,’ which is so much more big and abstract.” As a result, the “lesson” he took away from the book was that “Phoenix especially needs to really get on rationing its water and curtailing its expansion before things become apocalyptic.”<sup>76</sup> For others, climate fiction led to a more general awareness of the severity of ongoing climate change. A California professor noted that “it was awful to see just how much damage climate change can inflict on the world and how much it can change people’s lives. It made me see the news a little bit more seriously.”<sup>77</sup> Most climate fiction novels set in the future contain passages in which narrators or protagonists speak to the present-day reader by reflecting on the errors of their past, but works that deliberately connected possible futures to specific contemporary activities were more likely to encourage such shifts in apperception and perspective. A financial analyst from Missouri noted that Naomi Oreskes and Erik Conway’s *The Collapse of Western Civilization*—which contains lucid analysis of topics such as neo-liberalism and the relationship between the “carbon combustion complex” and climate inaction—“made [him] feel concerned” because he “could see several parallels between what happened in the story and what is happening in real life today.”<sup>78</sup> An educator from Arizona had a similar response to Oreskes and Conway’s future history. He reported that after reading it, “I had to take a hard look at our current policies and attitudes toward climate change. I find myself still answering these questions each day as I watch the news or listen to politicians speak about the dangers of inaction. . . . I’m left wondering if we are in fact living in the same history as described by the historian from the future.”<sup>79</sup>

75. Ecocritics might note that this claim seems contrary to recent trends in the field. Specifically, Ursula Heise’s influential *Sense of Place and Sense of Planet* (2008) challenged the value of American ecocriticism’s traditional privileging of locally and regionally based literature, arguing that it failed to reflect the extent of globalization and hindered the development of a sense of “eco-cosmopolitanism.” However, as Lynch, Glotfelty, and Armbruster note, Heise “does not advocate abandoning a sense of place,” but “warns that we must add a greater degree of global awareness to local and bioregional understandings than has typically been done, especially in the United States” (“Introduction,” 9). Moreover, as Patrick Devine-Wright summarizes (“Think global, act local?”), social scientists have found that most people still form powerful and lasting attachments to place, at a multitude of scales.

76. Male, 25–34, Arizona, liberal.

77. Male, 25–34, California, liberal.

78. Male, 25–34, Missouri, moderate.

79. Male, 45–54, Tennessee, moderate.

### Emotional Responses

Feeling is an integral aspect of most reading experiences,<sup>80</sup> and many cli-fi readers had dramatic emotional responses to these works of fiction. In describing them, respondents used terms like “doomsday scenario” (*The Healer*); “bleak” (*The Collapse of Western Civilization* and *The Windup Girl*); “dystopian” (*Julian Comstock* and *Back to the Garden*); and “foreboding” (*A Friend of the Earth*). It should come as no surprise, then, that the majority of emotional responses were dramatically negative. In response to a specific question on affect—“How did this book make you feel?”—only 26 percent of the responses could be classified as remotely positive.<sup>81</sup> Most of these seemed to have been elicited through identification with sympathetic and resilient characters, especially for readers of *Back to the Garden*, *The Carbon Diaries: 2015*, and *Flight Behavior*. A typical response came from an Oregon homemaker: “I found [*Flight Behavior*] inspiring overall, although somewhat disconcerting. The topic of global warming, no matter how important, is a little stressful. All in all, though, I found the story of Dellarobia”—the novel’s Appalachian protagonist who conducts research with a visiting scientist, learns about climate change and species extinction, leaves a bad marriage, and decides to attend college—“to be really encouraging.”<sup>82</sup>

While positive emotions tended to refer to a pleasant if vague orientation toward the future (e.g., “inspiring”), negative emotions were often intense, immediate, and self-directed. Readers reported that *A Friend of the Earth* left them feeling “helpless,” “incredibly sad,” and “guilty.” *The Carbon Diaries: 2015* made some respondents “scared and nervous” and “sad and disheartened,” and *The Healer* made them feel “depressed” and “unsafe.” Most emotionally forceful was *The Collapse of Western Civilization*, which left readers “helpless and angry,” “intrigued, scared, and angry,” and “uneasy, dark, and quite depressed.” While apocalyptic media often stimulate anxiety,<sup>83</sup> the magnitude of some of these responses may be due to the prolonged engagement that reading a novel requires.<sup>84</sup> News stories take minutes to digest and films generally run for less than two hours, but most readers spend many hours immersed in the story world of a novel. Though these responses clearly reflect engaging storytelling, it is worth questioning whether they make for effective environmental persuasion.

If we situate these novels within recent research in environmental psychology, these affective responses present an obstacle to successful persuasion and mobilization. The vast majority of explicit climate fiction employs the “disaster” frame, which is the way we often imagine and discuss climate change—one study found that 80 percent

80. Hogan, *What Literature Teaches Us about Emotion*, 22.

81. Responses to this question were double-coded for positive or negative terms describing the reader’s emotional response. If these descriptions contained both positive and negative terms (such as “stressful” and “inspiring”), they were counted in both categories.

82. Female, 25–34, Oregon, very liberal.

83. Lowe, “Does Tomorrow Ever Come?”

84. Keen, *Empathy and the Novel*, 92.

of climate change stories in major newspapers from six countries utilized this frame.<sup>85</sup> As psychologist Per Espen Stoknes summarizes, “When climate change is framed as an encroaching disaster that can only be addressed by loss, cost, and sacrifice, it creates a wish to avoid the topic.” Especially given the lack of simple and effective behavioral responses, a sense of “helplessness grows and the fear message backfires.”<sup>86</sup> Instead of taking action, audiences resolve the cognitive dissonance by ignoring or avoiding the subject. From the emotions these readers described, it is clear that their affective responses were not only negative but demobilizing. While some negative emotions (such as anger) can be fuel for personal or political action, others (such as guilt, shame, helplessness, and sadness) are much less likely to lead to active responses.<sup>87</sup>

This tendency for the disaster frame to elicit feelings of helplessness was evident in some readers’ responses. The liberal technician from Florida said that reading *Ultimatum* “makes me fearful for the future” and “pessimistic. Thinking in terms of: ‘Well, if that is inevitably going to happen, then maybe we’re the type of species that deserves it.’”<sup>88</sup> A manager from New York noted that *Odds Against Tomorrow*, which describes the destruction of parts of New York City by a dramatic flood, was particularly powerful since she “lived through 9/11 and Superstorm Sandy.” As a result it was a “compelling read,” but it “made me feel that climate change is not only real but such a big problem, we may not be able to solve it.”<sup>89</sup> This lesson is counterintuitive: the psychological tendency to avoid stories that deliver negative emotions means that well-intentioned authors who vividly depict the catastrophic consequences of climate change may actually be hindering their goal of heightening environmental consciousness. In place of doom, psychologists suggest that climate communications be framed positively. Positive frames might include “insurance against risk,” “health and well-being,” “preparedness and resilience,” “values and a common cause,” and “opportunities for innovation and job growth.”<sup>90</sup> These are not the dominant themes in the nascent canon of American climate fiction, though a number of these works—especially *Flight Behavior* and *Back to the Garden*—were interpreted by readers as containing messages related to “preparedness and resilience.”<sup>91</sup>

85. Painter, *Climate Change in the Media*. James Painter surveyed selected newspapers in Australia, France, India, Norway, the UK, and the United States from January 2010 to September 2012. Other negative frames include “destruction,” “uncertainty,” “costs,” “high price,” and “loss and sacrifice” (Stoknes, *What We Think About*, 110).

86. Stoknes, *What We Think About*, 82. See also Smith and Leiserowitz, “The Role of Emotion in Global Warming Policy Support and Opposition”; and Marshall, “Climate Change Fiction Will Reinforce Existing Views.” For a contrary (if speculative) perspective on the utility of apocalyptic visions, see Yusoff and Gabrys, “Climate Change and the Imagination,” 520–22.

87. Flam, “Emotions’ Map: A Research Agenda.”

88. Male, 25–34, Florida, liberal.

89. Female, 45–54, New York, liberal.

90. Stoknes, *What We Think About*, 122.

91. A number of novels not included in this survey might be considered to be robust carriers of these messages, such as Octavia Butler’s *Parable of the Sower* and *Parable of the Talents*; the books that follow

### Divergent Responses: Conservatives and Liberals

While catastrophism can backfire because it leads readers to associate climate change with negative and disempowering feelings, it can also lead climate skeptics to discount common portrayals of undesirable futures. A conservative Missourian who read *The Healer* with her book club said, “The book made me feel skeptical” because it “went over the top with the conditions and I felt a lot of the story was ridiculous.” She added Antti Tuomainen’s noir novel set in a collapsing Europe to the broader pool of climate messages to which she had been exposed, concluding that “this book didn’t change my opinion about climate change, but reinforced my negative opinion of politicians touting the ill effects of climate change.”<sup>92</sup> The responses of most conservatives confirmed what activist and author George Marshall predicted in 2014, that “‘cli-fi’ will reinforce existing views rather than shift them. The unconvinced will see these stories as proof that this issue is a fiction, exaggerated for dramatic effect.”<sup>93</sup> Indeed, when a Christian bank teller from Mississippi stated that she saw “[*Back to the Garden*] as a work of fiction, and not something that is ever likely to happen,” it was because she did not “imagine [that] the Earth’s future looks anything like what was described” in the novel. Other religious climate deniers echoed her perspective. A Catholic man from Vermont who read *Forty Signs of Rain* for a class said that to him, “the book was a joke. Seriously, in the Bible, God promised that he would not flood the Earth and wipe out humanity, again. So, I don’t think we have anything to worry about.”<sup>94</sup>

Other conservatives found convenient ways to relieve their cognitive dissonance by disregarding these literary warnings.<sup>95</sup> A municipal administrator from Pennsylvania “liked the story” of *Flight Behavior* but did not find its message compelling, since “this author is a well-known climate change alarmist. . . . My feeling is that maybe the portrayals [sic] of the imminent danger to the butterfly population was a bit exaggerated because this author is a known climate change advocate.”<sup>96</sup> By referencing Barbara

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*Forty Signs of Rain* in Kim Stanley Robinson’s Science in the Capitol trilogy, *Fifty Degrees Below* and *Sixty Days and Counting*; and Robinson’s recent *New York 2140*.

92. Female, 45–54, Missouri, conservative. Tuomainen, *The Healer*.

93. Marshall, “Climate Change Fiction Will Reinforce Existing Views.”

94. Male, 55–64, Vermont, conservative. Robinson, *Forty Signs of Rain*.

95. I have chosen to use the traditional categories of American politics—“conservative,” “moderate,” and “liberal”—primarily because they allow us to compare this population of readers to the general US population (via commonly used polling questions) and to compare these findings with environmental communications scholarship. I contend that these categories, while quite broad, are also potentially useful—that there are significant differences between self-identified liberals and conservatives. For example, social psychologists (such as Haidt, *The Righteous Mind*) have found that “conservatives” and “liberals” have different moral foundations, which should have a significant impact on the messages and scenarios that climate communicators (including cli-fi authors) advance. That said, there is a danger that these generic categories mask nuanced differences, or even reify them. In further research, empirical ecocritics might investigate whether subtle ideological differences that are obscured by traditional political categories have an influence on reception.

96. Female, 45–54, Pennsylvania, conservative.

Kingsolver's reputation as an environmentally concerned author, she was able to discount the book's well-supported scientific claims. A marketing designer from Arkansas who was "only a little" concerned about climate change reported that *The Water Knife* made her "tense and anxious about the future. The story is a very plausible one. However, since I live in the mid-South I feel like I am not as much at danger" of being affected by water scarcity.<sup>97</sup> Narrowly focusing on the specific environmental issue described in the novel—drought—allowed her to reject its more general climate caution. Nonetheless, a few conservative respondents were moved by their reading experiences. For example, a Washington man found that *The Collapse of Western Civilization* was "such a believable scenario that I hate even discussing this book, as I see the warning signs of everything that it mentions in my daily life."<sup>98</sup>

While it might not convert many conservatives, climate fiction might be more effective in nudging liberals and moderates from the ranks of the "Cautious" to the "Concerned" or the "Concerned" to the "Alarmed." This was true for a number of readers who were already highly concerned about global warming. For some, these novels "reinforced" or "confirmed" what they already believed. A research chemist from Illinois said, "Reading [*The Healer*] really made me think about the world we live in today and how climate change is effecting it." It thereby "confirmed my fears about climate change being a serious issue" and "set in stone my beliefs that something catastrophic can happen in a fairly short time period."<sup>99</sup> In the same vein, a teacher from Louisiana reported, "By painting a bleak future as a direct result of our failure to stop climate change's effects," *The Collapse of Western Civilization* "reinforced my positions." It "strengthened my resolve to do whatever I can to save energy, and to vote for politicians who take our climate crisis seriously."<sup>100</sup> For others, these novels functioned as reminders of an issue that is easily avoided—as a professor in New York observed, "I don't believe [*Flight Behavior*] changed the way I feel about climate issues," but it "brought the concerns closer to the front of my mind."<sup>101</sup> An art teacher from Pennsylvania agreed, noting that *The Windup Girl* "reignited concerns that I had let go idle."<sup>102</sup> For other liberals and moderates, climate fiction simply intensified environmental concerns that were already present. A senior citizen from Virginia wrote, "The earth and the environment have been a topic of concern for me for fifty years, so [*Flight Behavior*] didn't surprise me, but heightened my worry."<sup>103</sup>

97. Female, 35–44, Arkansas, conservative.

98. Male, 25–34, Washington, conservative.

99. Female, 25–34, Illinois, moderate.

100. Male, 25–34, Louisiana, very liberal.

101. Female, 25–34, New York, very liberal.

102. Male, 35–44, Pennsylvania, liberal.

103. Female, 65+, Virginia, moderate.

### Literature in the World: Climate Conversations and Behavioral Responses

What real-world consequences did this “worry” have? While respondents mentioned a number of actions, here I focus on two that were quite common: conversations about climate change and behavioral changes. In both cases, we are reminded that awareness and anxiety do not exist in isolation but are situated within webs of social relationships and popular opinions about appropriate responses to environmental concerns.

Numerous readers drew a direct connection between their reading experiences and subsequent actions. Almost half (48.4 percent) of respondents discussed the book they had read with friends or family, which often occasioned conversations about climate change. For example, a Washington liberal talked about *The Healer* “with a friend at work. We discussed the possibility that we might end up in a dystopic future, like the one described in the book, far sooner than the author supposes.”<sup>104</sup> This is an overlooked function of works of climate fiction—as well as other forms of environmental literature, art, and popular culture—that can serve as cultural objects that provoke dialogue. This is particularly valuable given the “spiral of silence” about climate change, even among the concerned—a 2016 study found that 57 percent of Americans who are “very” or “moderately” interested in global warming “rarely” or “never” discuss it with friends or family.<sup>105</sup> The ability of climate fiction to precipitate rare dialogues was highlighted by the Arizona educator who read *The Collapse of Western Civilization*:

I discussed the book with an older friend, we often talk about politics, history, and current events. He isn't as worried about climate change as I am, but I wouldn't classify him as a climate change denier. We discussed climate change on a micro scale, as the Hollywood image of global catastrophe [sic] is often too ridiculous to rationalize. We discussed the huge losses seen in the barrier reef, and discussed the major environmental impact of deep water horizon on the gulf coast. . . . Maybe these types of discussions are what it will take to finally have a productive discussion.<sup>106</sup>

For this reader and others, climate fiction functioned as one way to approach a subject that is easily ignored. As Manjana Milkoreit has suggested, cli-fi can serve as both an individual literary journey as well as “a shared cognitive-emotional experience that connects readers regardless of various differences,” becoming “an entry point for conversations about the future people want to pursue.”<sup>107</sup> Given the value of interpersonal communication in raising an issue's perceived importance and creating in-group norms,<sup>108</sup> the potential for climate fiction (and environmental media in general) to facilitate such conversations deserves more attention.

104. Female, 25–34, Washington, liberal.

105. Maibach et al., “Is There a Climate ‘Spiral of Silence’ in America?”

106. Male, 25–34, Arizona, liberal.

107. Milkoreit, “The Promise of Climate Fiction,” 180.

108. For raising an issue's perceived importance, see Huff and Tingley, “Who Are These People?” For creating in-group norms, see Cialdini, Reno, and Kallgren, “A Focus Theory of Normative Conduct.”

Though these works of fiction often heightened existing concerns or provoked new ones, numerous responses demonstrate that environmental concerns are only as valuable as common ideas about appropriate responses. For a number of respondents, climate fiction provoked environmental anxieties that were explicitly connected to subsequent changes in behavior, yet many of these new behaviors barely contribute to climate mitigation, collective adaptation, or the pursuit of climate justice. For example, a young woman from Louisiana wrote that “[*The Water Knife*] almost made me feel panicked about the future of water” for the first time. She reported that the novel had a lasting effect on her thinking and behavior: it “really made me think more about the way I use resources—I know this seems like a lame answer but it truly made me start to use less.” She reported adopting other solitary, consumption-based measures—“shopping differently,” “driving or flying less,” and “eating differently (e.g. less meat)”—but did not start “voting based on a candidate’s stance on this issue” or “participating in activist or protest movements around this issue.”<sup>109</sup> Similarly, a teacher from Texas reported, “[*Flight Behavior*] made me reflect on my own values,” partially because “there were some similarities between the main character and myself.” As a result, the book “made me consider my priorities and if there were any changes I wanted to make in my life. It gave me a bit of anxiety about climate change. We started using recyclable shopping bags right after I read this book.”<sup>110</sup> This reader did not report taking any other actions related to climate change. While *Flight Behavior* clearly succeeded in amplifying her climate concerns, her behavioral response had little impact on mitigation, adaptation, or environmental politics.<sup>111</sup> Without greater awareness of the most efficacious ways to act, individually and collectively, readers may respond with what Lorraine Whitmarsh has called an “asymmetry of intentions and impacts.”<sup>112</sup>

Other readers, perhaps echoing the Texas man who admitted that *The Healer* made him feel “unsafe,” began to consider their own survival. For example, the research chemist who was deeply moved by the same novel said, “It made me think about preparations that I can take now in order to survive in a world like that in the future. . . .

109. Female, 18–24, Louisiana, moderate.

110. Female, 25–34, Texas, moderate.

111. See, for example, Wynes and Nicholas, “The Climate Mitigation Gap.”

112. Whitmarsh, “Behavioural Responses to Climate Change.” A second empirical study conducted via AMT in January 2018 asked 86 American readers of Bacigalupi’s *The Water Knife* to rank the “most effective” actions “in response to climate change” from 1 to 11, with 1 being the most effective and 11 the least effective. Recycling was rated as by far the most effective action (with an average ranking of 3.7 out of 11). The rest of the rankings were, in order, “driving less” (5.0); “rewarding companies that are taking steps to reduce global warming” (5.2); “voting based on a candidate’s stance on climate change” (5.7); “eating differently (e.g. less meat)” (5.9); “investing in a socially responsible way” (6.1); “talking to others about climate change” (6.2); “flying less” (6.4); “participating in activist or protest movements around climate change” (6.9); and “having a smaller family” (7.4). These rankings were similar to the control group of 183 Americans (also recruited via AMT in January 2018). Comparing these rankings to the empirical conclusions of Wynes and Nicholas (2017) demonstrates a remarkable “asymmetry of intentions and impacts” indeed.

I talked about it with my close family along with the possibility of something like this happening in real life.”<sup>113</sup> Indeed, concerns about dystopian futures can lead to individualistic “prepping” instead of engaged citizenship or political mobilization.<sup>114</sup> For many of these readers, we see evidence of the continuing individualization of environmental action and the emphasis on “small and easy” actions.<sup>115</sup> If one of climate fiction’s goals is to contribute to more progressive climate policies and politics, it may be only as successful as the dominant cultural messages about meaningful environmental activities that are in circulation. Though we should not expect literature to draw a roadmap for readers, it should be noted that a number of these novels—*The Carbon Diaries: 2015*, *From Here*,<sup>116</sup> *Forty Signs of Rain*, and *The Healer*—do just this by depicting potential political responses in great detail.<sup>117</sup> Given the gulf between environmental awareness and efficacious action, delineating novel and plausibly effective forms of cultural and political action could be an important role for environmental literature, art, and media in the coming years and decades.

### Conclusion

This qualitative survey of American cli-fi readers suggests that literature can be quite effective at enabling or compelling readers to imagine potential futures and consider the fragility of human societies and vulnerable ecosystems. While it may not play a significant role in convincing skeptics and deniers to reconsider their positions (partially because they are less likely to read these works of fiction), it might effectively nudge moderates and remind concerned liberals and leftists of the severity and urgency of anthropogenic climate change. This in itself is ecopolitically significant. As the *availability heuristic* states, people tend to estimate the likelihood of the occurrence of an event “by the ease with which instances or associations come to mind,” and memorable literary visions are likely to lead readers to bring specific climate futures to mind more easily.<sup>118</sup> Whether this heightened concern leads to meaningful changes in behavior or politics is not yet known, but this research suggests that clearer and stronger messaging about appropriate behavioral responses to climate change is urgently needed, as is more empirical research on environmental literature and art. While authors, activists, ecocritics, and environmental humanists have celebrated the growth of climate fiction as a source of affectively potent proenvironmental narratives, this is the first study to test these claims. The lack of empirical attention to environmental literature is

113. Female, 25–34, Illinois, moderate.

114. See Schneider-Mayerson, *Peak Oil*.

115. Maniates, “The Perils of Magical Thinking.”

116. Kramb, *From Here*.

117. Though environmental protest is a central theme in *A Friend of the Earth*, the novel suggests that even radical environmental activism is ineffective in preventing catastrophic climate change. As such, it does not offer the reader a model of action.

118. Tversky and Kahneman, “Availability,” 208.

especially surprising since almost half of all Americans (47 percent) read fiction every year,<sup>119</sup> and climate change is an increasingly present and central topic in contemporary Anglophone literature. While reliable comparative data on fiction reading is not available, research suggests that other nations read much more.<sup>120</sup> Given the growing popularity of climate fiction, ecocritics would do well to apply to climate fiction (and environmental literature in general) the sophisticated methodologies that have been developed to investigate the influence of other forms of environmental media. In particular, research on the reception of different modes or genres of environmental literature would be valuable, as would research that specifies the most effective narrative strategies or techniques for influencing different groups of readers, with attention to the role of psychological, social, cultural, and political factors. This methodology might also be extended to other media that have been neglected by social scientists, such as environmental art and theater, and applied—with the humanist’s attention to detail and nuance—to ecomedia such as film, television, and video games.

The goal of this approach—empirical ecocriticism—is not to displace other modes of criticism but to complement them through methodologies that can ground and refine common claims about readership, influence, and impact. To the extent that many authors, publishers, ecocritics, and environmental humanists hope to contribute to the ongoing struggle to maintain a livable planet, the development of an empirically based, interdisciplinary school of environmental criticism would represent a valuable step forward.

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119. National Endowment for the Arts, “A Decade of Arts Engagement,” 69.

120. See, for example, NOP World, “NOP World Culture Score Index Examines Global Media Habits.”

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#### Appendix: Open-Ended Survey Questions

- Why did you choose to read this book? Please answer in as much detail as possible.
- How would you describe this book? Please answer in as much detail as possible, in your own words, and without consulting any online sources.
- What happens in this book? Please answer in as much detail as possible, in your own words, and without consulting any online sources.
- What lesson or message did you take away from this book, if any? Please answer in as much detail as possible.
- How did this book make you feel? Please answer in as much detail as possible.
- Did you discuss this book with others? If so, who did you talk to, and what did you say?
- What is your current or most recent occupation?