

Climate Change as a three part ethical problem: reply to Jamieson and Gardiner.

Ewan Kingston

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Abstract: Dale Jamieson has claimed that conventional human-directed ethical concepts are an inadequate means for accurately understanding our duty to respond to climate change. Furthermore, he suggests that a responsibility to respect nature can instead provide the appropriate framework with which to understand such a duty. Stephen Gardiner has responded by claiming that climate change *is* a clear case of ethical responsibility, but the failure of institutions to respond to it creates a (not unprecedented) political problem. In assessing the debate between Gardiner and Jamieson, I develop an analysis which shows a three-part structure to the problem of climate change, in which the problem Gardiner identifies is only one of three sub-problems of climate change. This analysis highlights difficulties with Jamieson's argument that the duty of respect for nature is necessary for a full understanding of climate ethics, and suggests how a human-directed approach based on the three-part analysis can avoid Jamieson's charge of inadequacy.

Keywords: climate change · responsibility · Jamieson · revision · nature · Gardiner

Introduction

There is widespread disagreement about the nature of our duty to respond to climate change. More specifically, among those who accept that significant anthropogenic climate change is occurring, there is a range of views on the demandingness of the appropriate collective response.¹ Some suggest programs which require little sacrifice (Gingrich and Maple 2007: 70; Lomborg 2007), whereas others suggest our species should cease propagating completely (Voluntary Human Extinction Movement 2013). We also see a wide range of individual responses. Some eschew air travel and car ownership and voluntarily join "carbon rationing action groups" that impose penalties on members who do not sufficiently reduce their carbon footprints (Seyfang 2007). At the other end of the scale, some believe that their ethical responsibility to act on climate change can be discharged by minor acts such as fitting energy efficient light bulbs or by recycling, or they believe they have no *individual* responsibility for climate change at all. Still others believe that even though anthropogenic climate change is occurring, this does not generate any ethical responsibility on anyone. A recent study of undergraduates in the United States found that, among those who believed that human activity is affecting the climate, 23% believe this is not an "ethical or moral issue"².

Aside from the variation in perceived urgency, there is a different kind of variation among those who agree that we have a duty to respond to climate change: apparent disagreement about what I will call the *orientation* of that duty—who or what it primarily targets. It is commonly said, for instance, that climate change engages our responsibility to future people. Barack Obama, for instance, claims that "the failure [to respond to the threat of climate change] would betray our children and future generations" (Obama 2013: para. 16). But it is also sometimes said that our duty to respond to climate change is primarily a duty towards nature. For example, Evo Morales, President of Bolivia, has addressed the most prominent summit on climate change to date by saying "we are here to save mother earth" (Vidal: para. 3).

There are varying ways one might explain all this. That people disagree on the demandingness of our responsibility to act on climate change might simply be a function of the variation in opinions about certain empirical matters: matters such as the severity of climate change under "business as usual" policies, the ease with which we can find effective mitigation and adaptation measures, and the extent to which future

¹ I am assuming that climate change is occurring, and that it is due to human activity. These assumptions are supported by the position of the Intergovernmental Panel on Climate Change (Solomon et al. 2007; IPCC 2013) and the opinion of the vast majority of climate experts (Doran and Kendall-Zimmerman 2009). Those who doubt that significant anthropogenic climate change is occurring could see the following discussion as hypothetical.

² Figure calculated from data provided in a recent study by Ezra Markowitz (2012)

generations will be better off than we are. I doubt, however, such purely empirical differences are the best explanation for the significant variation in views about both the urgency and the orientation of our responsibility to act on climate change. There is a story about ethics to be told here.

Dale Jamieson's article in this journal (Jamieson 2010) attempts to tell such a story. He claims that the ethical problem of climate change lies far from the paradigms of conventional ethical responsibility, and believes that this explains the refusal of some to see climate change as an urgent moral issue. Jamieson also makes a positive suggestion, which I will call the "nature-orientation thesis". He posits that there is an important value that climate change threatens—respect for nature—and that recognising this value of respect for nature is the best way to understand our duty to respond to climate change. Respect for nature, according to Jamieson, "helps to explain why some people are so passionate about this issue" (Jamieson 2010: 440). Jamieson at times presents the even stronger idea that accepting the nature-orientation thesis is *necessary* to understanding our ethical responsibilities with regard to climate change. "Unless a duty of respect for nature is widely recognized and acknowledged, there will be little hope of successfully addressing the problem of climate change" (Jamieson 2010: 443). Thus Jamieson posits a strong connection between the two types of variation described in the paragraphs above. For him, the varying conceptions of the demandingness of our responsibility to act on climate change is *due* to the variation in *orientation* of the responsibility we think climate change engages.³ In effect, Jamieson suggests that, compared to Obama's call that climate change engages our duty to future generations, statements such as Morales' which point to our duty to "mother earth" may be both more powerful and more accurate in this context.

In this article, I briefly outline both Jamieson's critique and the reply to it made by Stephen Gardiner (2011). I then respond to both approaches, arguing that neither one accurately represents the ethical problems posed by climate change. I then propose a distinct way of looking at climate change, one that emphasises three distinct sub-problems that make up "the ethical problem" of climate change. Seeing climate change ethics as the intersection of three related problems substantially weakens the case for both Jamieson's negative and positive claim, and shows us how we can understand climate change through orthodox ethical approaches.

Jamieson's Argument

Jamieson's first step is to analyse what he calls the *practical responsibility* generated by climate change in order to seek its ethical basis in conventional terms. By the term "practical responsibility", Jamieson refers to what we are "responsible for doing" (Jamieson 2010: 432). Practical responsibility, according to Jamieson, can encompass instances of both prudential and ethical responsibility. Under the useful distinction discussed in this journal by Van de Poel, Fahlquist, Doorn, Zwart, and Royakkers (2012) this practical responsibility is similar to their category of forward-looking responsibility, responsibility for "things that have not yet occurred" (Van de Poel et al. 2012).⁴

³ One might wonder if purely empirical means could be used to check the correlation between people's views on nature-orientation and their views on the demandingness or urgency of a duty to respond to climate change. This would indeed be interesting, but there remains the possibility that although many human-oriented folk *believe* a certain understanding of climate change generates a demanding and urgent duty to respond to it, they may be mistaken about this. Jamieson's approach aims to both explain the phenomena of variation in the views of urgency, and show which view about the responsibility to act on climate change has the more solid normative foundation.

⁴ Van de Poel et al make a further distinction between "responsibility-as-obligation" and "responsibility-as-virtue." Jamieson's discussion seems to relate best to responsibility-as-obligation: that kind of responsibility where one "has to see to it that a certain desirable state of affairs obtains" (Van de Poel et al. 2012). The state of affairs in question is that climate change is responded to. Van de Poel et al suggest that there is a morally problematic gap for backward looking "responsibility-as-blameworthiness" for climate change. Their conclusion about the kind of forward-looking responsibility Jamieson refers to is much more circumspect than the inadequacy thesis. Van de Poel et al conclude that there may be a gap in forward-looking responsibility-as-obligation *if* there is a gap in allocating the responsibility for

If some of us have practical responsibility to act on climate change, Jamieson asks, is it prudential, moral or political? He maintains that it is a paradigm case of none of these. It is not a case of prudential responsibility, he argues, because the human community is not a unified agent that acts on the basis of rational self-interest, and the benefits and costs of any response to climate change are both highly uncertain and incommensurable. Jamieson's arguments seem forceful in rejecting climate change as a clear case of prudential responsibility. His arguments that climate change does not present a clear case of moral or political responsibility are more controversial and I will explore them in depth.

Moral Responsibility?

According to Jamieson one of the central ways in which an agent acquires moral responsibility is by directly causing identifiable, intentional harm locally. An example of this is an agent "Jack" stealing a bicycle from a victim "Jill", which Jamieson calls "Example 1" (Jamieson 2010: 436). We can imagine a case differing from the paradigm case of Example 1 along one or more relevant dimensions. Jamieson writes:

Consider some further examples. In Example 2, Jack is part of an unacquainted group of strangers, each of which, acting independently, takes one part of Jill's bike, resulting in the bike's disappearance. In Example 3, Jack takes one part from each of a large number of bikes, one of which belongs to Jill. In Example 4, Jack and Jill live on different continents, and the loss of Jill's bike is the consequence of a causal chain that begins with Jack ordering a used bike at a shop. In Example 5, Jack lives many centuries before Jill, and consumes materials that are essential to bike manufacturing; as a result, it will not be possible for Jill to have a bicycle. While it may still seem that moral considerations are at stake in each of these cases, this is less clear than in Example 1, the paradigm case with which we began. The view that morality is involved is weaker still, perhaps disappearing altogether for some people, if we vary the case on all these dimensions at once. Consider Example 6: acting independently, Jack and a large number of unacquainted people set in motion a chain of events that causes a large number of future people who will live in another part of the world from ever having bikes (Jamieson 2010: 436).

Jamieson claims that our sense that Jack has an urgent duty to take remedial action diminishes, and perhaps disappears, as we descend from Examples 1 through 6. Yet, Jamieson argues, it is Example 6 that is most similar to the case of climate change. He concludes that if the problems of climate change do generate urgent duties, these arise from a source other than orthodox morality. His argument does not rule out the possibility of *revising* human-oriented ethics to take account of these difficulties, but Jamieson spends little time exploring this option. Maybe this is because such revision would surely be a very difficult and slow task, and as climate change, *ex hypothesi*, is an urgent problem, it requires a rapid response. Perhaps Jamieson has overestimated the difficulty of revising our ethical concepts to deal with the unusual cases of climate change, but most would agree that in general, large-scale revisions of our ethical concepts do not pose an attractive option.

Political Responsibility?

Jamieson's series of Examples 1-6 were meant to raise doubt that we could conceive of climate change as a genuine moral problem between individuals. Jamieson recognises, however, that individual moral responsibility for direct harms does not exhaust the types of ethical responsibility. He refers to a different kind of ethical responsibility: "political responsibility" (Jamieson 2010: 438). While Jamieson admits political responsibility plays some role in the ethics of climate change, he argues that the problem of climate change is sufficiently non-paradigmatic that orthodox approaches to delineating political responsibility will be

climate change that is *morally problematic* due to the specific fairness requirements of responsibility-as-obligation.

However, they emphasise that these fairness requirements are themselves dependent on whether we take a merit-based, rights-based or consequentialist approach to responsibility-as-obligation. Drawing these distinctions among different approaches to responsibility is fruitful in general, but to assess Jamieson's argument on its own terms, I use a more fundamental concept of responsibility than the fine distinctions that Van de Poel et al. draw.

inadequate to generate our duties to respond to climate change. His conclusion is that “the problems that climate change presents us with stray from the paradigm of global justice” (Jamieson 2010: 439) and thus the claim that climate change involves a strong instance of political responsibility must be revisionary.

Jamieson provides no definition for either “political responsibility” or “global justice”, but rather an example of a paradigm problem of global justice, presumably one that results in clear political responsibility. Such a paradigm problem is “a country unjustly invading another country” (Jamieson 2010: 439). Jamieson admits that the case for political responsibility “seems even stronger” when we consider the plight of particular countries that will suffer the most, and gain the least from climate change: low lying tropical countries, for example (Jamieson 2010: 438).

Yet, Jamieson argues, while some countries may be clear losers from climate change, this differs from paradigm problems of global justice in “several important respects” (Jamieson 2010: 439). One respect Jamieson explicitly mentions is the geographically and politically dispersed nature of the perpetrators and victims of climate change: “[s]ince the atmosphere does not attend to national boundaries and a molecule of carbon has the same effect on climate wherever it is emitted, climate change is largely caused by rich people, wherever they live, and is suffered by poor people, wherever they live” (Jamieson 2010: 439). He cites the high numbers (in absolute terms) of car owners in relatively poor countries such as India and China, and the disproportionate suffering of the poor in rich countries (such as occurred in the USA during Hurricane Katrina) as examples. Jamieson notes that the groups of perpetrators and of victims of climate change cross national boundaries, are vague and ill-defined, and perhaps are not collectives in any significant sense at all. This, according to Jamieson, makes the claim that climate change clearly engages political responsibility hard to justify.

What I will call Jamieson’s “inadequacy thesis” is the view that climate change strays from the paradigms of political and moral responsibility to such an extent that the reasons which underlie our obligations cannot be presented in human-oriented terms without providing a revisionary analysis. Climate change is not a conventional political problem, according to Jamieson, primarily because the persons that are most responsible for climate change are scattered around the globe and belong to different political units. Climate change is not a conventional moral problem because it differs significantly from the paradigm case of direct, intentional local harm. After arguing for the inadequacy thesis Jamieson turns to the positive claim that our responsibility to act on climate change is more clearly grounded by a duty of respect for nature. I will critically examine the inadequacy thesis later in this piece, but it is to Jamieson’s positive claim that I now turn also.

Nature-orientation

There are two parts to the argument for what I have been calling Jamieson’s “nature-orientation thesis”⁵. First, we need to accept that we actually *have* a duty of respect for nature. Jamieson recognises this is a formidable task and only “tentatively explore[s]” this ground (Jamieson 2010: 442). I will not reproduce this exploration and will merely accept, for the sake of argument, that we have such a duty. The second step is to show that human-induced climate change violates such a duty. The brief argument Jamieson gives here is that global greenhouse gas emissions form a prime example of humankind’s general disrespect of planetary systems. “Anthropogenic climate change violates the duty of respect for nature because it is a central expression of the human domination of nature” (Jamieson 2010: 441).

⁵ Importantly focusing on the *duty* to respect nature rather than claiming an inherent *value* in nature allows Jamieson to skirt the long-standing debate between biocentrists, ecocentrists and anthropocentrists in environmental ethics. While the duty of respect for nature remains “under-theorised” (Jamieson 2010: 443), some of Jamieson’s proffered reasons why a general duty to respect nature should be accepted are clearly anthropocentric, such as the reason of prudence. Thus, in this piece I will refer to an ethical framework which includes respect for nature as a “nature-oriented” approach, rather than a “nature-centred” one or any similar synonym. Rather than advocating for nature becoming the centre of an ethical system, Jamieson suggests we look to nature as one of the appropriate targets of ethical consideration. Much could be said in favour of such an approach but this is not the place to examine the general plausibility of a duty of respect for nature.

The idea that climate change violates our duty of respect for nature does have intuitive force; if we do have a duty to respect nature, radically changing the climate seems *prima facie* to be a serious violation of this. Furthermore under a nature-oriented approach, some of the problematic elements of climate change disappear, most prominently the spatio-temporal distance between the agent and the target of their duty. When we drive gas-guzzlers or leave the air conditioning on it seems fair to say we disrespect nature in an immediate way. Because the natural atmosphere is all around us, the relevant effects of these actions are immediate, and thus respect for nature, one might think, gives us a better ground for urgent responsibility to act on climate change than conventional ethics does. However, Jamieson's application of the nature-orientation thesis to climate change is also clearly motivated by the inadequacy thesis; it is partly because our conventional ethical systems seem to struggle to capture the problem of climate change that we need to look to what Jamieson admits are "under-theorized" concepts such as respect for nature (Jamieson 2010: 443).

Gardiner's Reply

I have outlined Jamieson's provocative and interesting negative claim and the arguments for it, and briefly sketched his positive claim. Before I give my response to these ideas, I wish to summarise the valuable contribution made to the debate by Stephen Gardiner. Gardiner first attempts to shed doubt on Jamieson's claim that climate change does not present us with a paradigm case of moral wrongdoing. He then presents an alternative account to Jamieson's to explain the variance in perceived moral urgency around climate change. I will argue that his criticisms are not thoroughly successful, and as a result, his positive account is incomplete. However, Gardiner's critique points the way to the three-part approach I discuss in the final sections.

At the core of Jamieson's argument, remember, was "Example 6" which Jamieson claims is roughly analogous to the problem of climate change at the level of individual morality:

Example 6: Acting independently, Jack and a large number of unacquainted people set in motion a chain of events that causes a large number of future people who will live in another part of the world from ever having bikes (Jamieson 2010: 436).

This thought experiment attempts to capture the morally relevant elements of climate change but also leave us feeling uncertain that the perpetrator has gained any responsibility at all. Gardiner argues that, while Example 6 may be a case where the perpetrator lacks ethical responsibility for the outcome, it fails to capture the morally relevant elements of the problem of climate change. He counts four important disanalogies between Example 6 and the case of climate change. First, Example 6 involves the removal of a benefit (bicycles), causing future people what could be imagined as a relatively minor disturbance, whereas the effects of greenhouse gas emissions are a more obvious case of harm. Second, the purpose of Jack's action is unspecified (and thus could be highly important), whereas "luxury emissions" (Shue 1993) from the rich are unnecessary for a good life. Third, climate change is causing harm to people close in time and space to the emitters, as evidenced by the growing effects of extreme weather in industrialised regions such as Western Europe and North America. Fourth, the group that Jack is involved with is a group of "unacquainted strangers" who "act independently", whereas Gardiner argues that greenhouse gas emissions show a consistent, cohesive *pattern* of high emitting by the citizens of developed nations despite those nations' general pledges to amend this.

To contrast with Jamieson's thought experiment, Gardiner develops his own thought experiment, which retains many of Jamieson's responsibility-diluting features, but also the responsibility-enhancing features identified above:

George and his Buddies: George and his buddies like to have big firework displays over the river. These shoot burning debris into the air, predominantly over the poorer neighbourhoods on the other side. This has already imposed, and continues increasingly to impose, a serious risk on many people in the area that their houses will catch on fire. George and his buddies are aware of this risk, keep saying that

they will cut back, buy safer fireworks, contribute funds to the fire department in the poorer neighbourhoods, and so on. But they don't. Instead they keep making the displays bigger. They like fireworks. (They could like other things too. But they are used to fireworks). (Gardiner 2011: 47).

Gardiner concludes that George and his Buddies "conveys a sense of moral severity substantially beyond [Example 6]" and that this increase in severity is sufficient for orthodox moral concepts of responsibility to gain some traction (Gardiner 2011: 47). Note that Gardiner could have enhanced that sense of severity by including a corollary in his analogy of the potential for "catastrophic" climate change: climate change on a scale that would destroy human civilisation, or even cause the extinction of all mammals, including humans.⁶

But, as we shall see, important responsibility-diluting features of climate change have also been glossed over in George and his Buddies. Gardiner himself seems sceptical about the power of George and his Buddies to model climate change ethics effectively, for he notes later in his discussion that "there is something to Jamieson's core concern" (Gardiner 2011: 55). But let us postpone any worries we may have about Gardiner's thought experiment in order to turn to Gardiner's own explanation of the variance in perceptions of the demandingness of climate change.

The second part of Gardiner's response involves the identification of what he calls the "grasping problem" (Gardiner 2011: 52). The grasping problem, he suggests, is a political problem which arises because the individual causal contributions to climate change are not, he concedes, easily captured by people's casual or day-to-day moral appraisal. *Contra* Jamieson, however, he proposes that this general state of affairs does not point to a failure of our ethical concepts. He maintains the situation is not deeply radical, and that similar situations have "arisen in the past with many social issues" (Gardiner 2011: 51), such as with slavery, racism and the oppression of women. Gardiner points out that these genuine problems, which tended to escape individual everyday moral appraisal while at their height, are best responded to on an institutional level, (legitimised, he suggests, by the delegation of powers from individuals). Gardiner claims that grasping problems are due to the failure of current political institutions to be effectively responsible for a collective action problem that is not solvable by individual action alone. Given such current institutional failure in the context of liberal democracy where many if not most collective action problems *are* handled (albeit imperfectly) at the institutional level, it is little wonder, Gardiner claims, that there is confusion about the demandingness of climate change duties on individuals. The solution Gardiner suggests, rather than revising our ethical concepts to incorporate respect for nature, is for the citizenry to deliberately re-assign political responsibility for climate change to current political institutions or to push for reform of those institutions so that they can deal with the collective action problem climate change presents.

I have outlined both Jamieson's and Gardiner's positions, and sketched the arguments that lead to them. I now wish draw attention to the various disanalogies in the examples both authors use to model the moral challenge climate change poses to individuals, examples which inform the rest of their analyses. Finding a more accurate

⁶Worst-case scenarios have reinforcing feedbacks (such as the release of methane from melting permafrost or the seafloor, the drying and burning of rainforests, or reduction in the shininess of the earth due to melting ice) pushing the world into "runaway" climate change where these natural warming factors add to the effect of anthropogenic greenhouse gases (Hansen et al. 2007) and cause global temperatures to rise by even more than the IPCC's upper bound of 6.4°C by 210 (Parry et al. 2007: 70). Because of the possibility of such feedbacks, catastrophic climate change causing warming of 10°C or even up to 20°C cannot be ruled out (Weitzman 2009). A temperature rise above 10°C would probably result in the melting of Antarctica (Weitzman 2009) which would raise sea levels by 70 metres (Poore et al. 2000). A temperature rise above 12°C would render the regions that are home to most of the world's people uninhabitable due to mammalian inability to tolerate wet-bulb temperatures (temperatures adjusted for the cooling effect of evaporation) above 35 degrees (Sherwood and Huber 2010).

way to model the ethical challenge of climate change will shed light on both authors' positive claims: Jamieson's nature-orientation thesis and Gardiner's account of "the grasping problem".

Assessing the Inadequacy Thesis

Gardiner and Jamieson agree that climate change presents a demanding and urgent ethical issue, but disagree about whether the moral problem of climate change can be described using conventional ethical concepts. Much rests on Jamieson's Example 6, for Gardiner's criticism of it forms an important part of both his argument against Jamieson and his argument that the variance in perceived urgency is due to the "grasping problem". Let us return to Example 6 once again, which involves an agent, acting as part of a group, contributing to a harm to distant others via a long causal chain. The objections Gardiner raises with Example 6 are real. Example 6 lacks the element of harm caused nearby in time and space, but more importantly downplays the level of connection among the harmers, the depth and seriousness of the harm, and is silent on the value of the benefits gained by the harmful activity.

But it is also clear that Gardiner's alternative—George and his Buddies—goes too far; it also involves serious disanalogies with climate change. Judging high greenhouse gas emissions to be generally unnecessary or frivolous, like fireworks are, is misleading. Unlike fireworks, greenhouse gas emissions are a by-product of technological processes involved in almost every sector of society. Many heavy emitters today have built a way of life around practices that cause high emissions, rather using them as a purely optional amusement such as fireworks. Second, the victims in Gardiner's thought experiment are purely victims, whereas many of those threatened by climate change are significant emitters themselves. Third, George and his Buddies contains no time lag.⁷ At best, Gardiner's case portrays the kind of responsibility that is generated by some emissions: that portion of emissions by a clearly privileged group which are for frivolous purposes and cause harm locally. This portion of the total greenhouse gas emissions is small, and the scope of the moral responsibility that ensues from it is unlikely to be on the scale of moral responsibility which Jamieson and Gardiner want to address.

The selective omission of various features in both thought experiments might leave one wondering if a thought experiment could be constructed which contained all the morally relevant features of climate change. How would that look? Perhaps we might be tempted to begin with the fireworks example, but alter the disanalogous features we identified above. People are harmed not mainly by fires, say, but by the incremental toxic debris from the fireworks that accumulate over many generations. There is a possibility that, at some point, the debris will reach a tipping point that will kill everybody in the city and leave it uninhabitable. Much of the fallout was created in the past, before anyone knew of the dangers. Now, let us say, fireworks have become a core part of life, and their use is involved with people's plans to travel, build residences and undergo all manner of businesses. People on the other side of the river also let off fireworks, although to a lesser extent, and for a higher proportion of pragmatic purposes rather than amusement, although frivolous displays are not unheard of...

The problem with thought experiments like this is that their resolution is too high; they are simply too close to climate change to generate any novel insight. Perhaps any model that tries to include all the relevant features will be able to do no more than generate the same intuitions we had about climate change to begin with. So if thought experiments that are meant to model all the relevant features of climate change fail to tell us anything new, what tools can we use to assess the inadequacy thesis? I suggest clarifying what it is that is making it difficult to determine the moral obligation for climate change.

⁷ Gardiner is well aware of this omission and explains it by stating that the time lag should make no difference: someone who places a time bomb under an elementary school is clearly culpable whether the detonation is set for 100 seconds or 100 years. But if the time lag were morally irrelevant, its inclusion in the case of *George and his Buddies* should make no difference, whereas it might be thought to dilute responsibility when added to that case. Furthermore this difference in its ability to remove perceived responsibility between the case of the time bomb under the school and the case of *George and his Buddies* could be explained by an interaction effect between lack of intention and time lag, as we discuss later.

Features and sub-problems

Here is a list of some complicating features of the problem of climate change, which Jamieson highlights with Example 6:

- 1) Spatio-temporal distance between most of the harmers and the harmed (*victims mostly remote*).
- 2) A complex causal chain between the contributions and the final effects (*complex causal chain*).
- 3) Lack of a particular intention to harm (*no harmful intention*).
- 4) There is no single distinct actor (or group) that is causing the harm (*no single agent*).
- 5) The agents that are causing the harm are from a wide range of political communities, backgrounds and current circumstances (*agents not grouped*).
- 6) Actions by a single actor may be futile: It is unlikely that actors are able to affect the outcome by abstaining from the harmful activity (*isolated action ineffective*).

Because we are interested in the complicating features of the problem of climate change, not just Jamieson's Example 6, we can add two further features to the list.

- 7) The harm is uncertain: it is unclear who will be harmed, to what extent (*uncertain effects*).
- 8) A significant part of the harm that will be caused can be traced back to actions taken by some actors who are no longer alive, and many who were under conditions of excusable ignorance (i.e. they could not have been expected to know) of the effects of their action (*partly historical cause*).

At this point it's worth noting that none of these features in isolation are sufficient to make the problem of allocating moral responsibility for climate change highly irregular. Against *victims mostly remote*, it's commonly held that we have a responsibility not to harm others without good reason, even if they are far away from us, (Pogge 2006) or far off in the future. Booby trapping a time capsule is wrong, despite the fact it may not be opened for hundreds of years (Bell 2011). As for *complex causal chain*, if this does apply to climate change⁸, it need not mean that the sense of moral responsibility placed on the perpetrator be watered down. Take the example, from John Nolt, of someone making sexist or racist comments (2011). In this case, the potential victims of bigoted speech are those who would be harmed through the complex causal mechanisms of the fostering of prejudicial attitudes in oneself and others. These attitudes in turn affect people's actions which can cause tangible harm. Bigoted talk increases the possibility that a distant individual will be harmed through a complex causal chain, involving the actions of other agents. But the complexity of the causal chain does not eliminate the wrongness of the bigoted speech. *No harmful intention* is certainly present in the climate change case—our daily activities that produce greenhouse gases are not usually intended to cause harm through climate change. But once again, on its own, this need not be a particular problem. Even supporters of the principle of double effect (who claim we should treat intended or direct effects very differently from unintended or indirect but foreseen effects), do not see that principle as categorically removing responsibility for harm caused. Rather a strict condition of proportionality applies, which means that the good from the activity must be sufficient to outweigh the harmful side effects (Quinn 1989; Walzer 2000). Likewise, *uncertain effects* does not threaten to dilute the urgency or paradigm nature of any particular moral issue, when treated in isolation. Murdering two people if a coin flip comes up tails is about as bad as murdering one person. *No single agent*, *agents not grouped* and *partly historical cause* need not make the problem of climate change morally irregular, either. That a problem cannot neatly be laid at the feet of any particular actor or group does not usually mean we throw up our hands and cease moral analysis. As David Miller points out (Miller 2001). Finally, *isolated action ineffective*, on its own,

⁸Many of the causal pathways involved in climate change are made up of only a few steps. States might decide whether or not to apply restrictions to greenhouse gas emissions and large corporations whether to concentrate investments in clean or dirty energy. Individuals might choose to take or refrain from actions with a large carbon footprint such as building a house or taking a job that requires commuting daily. By acts of these kinds, such parties can be causally linked to climate change relatively directly through the associated increase in greenhouse gas emissions.

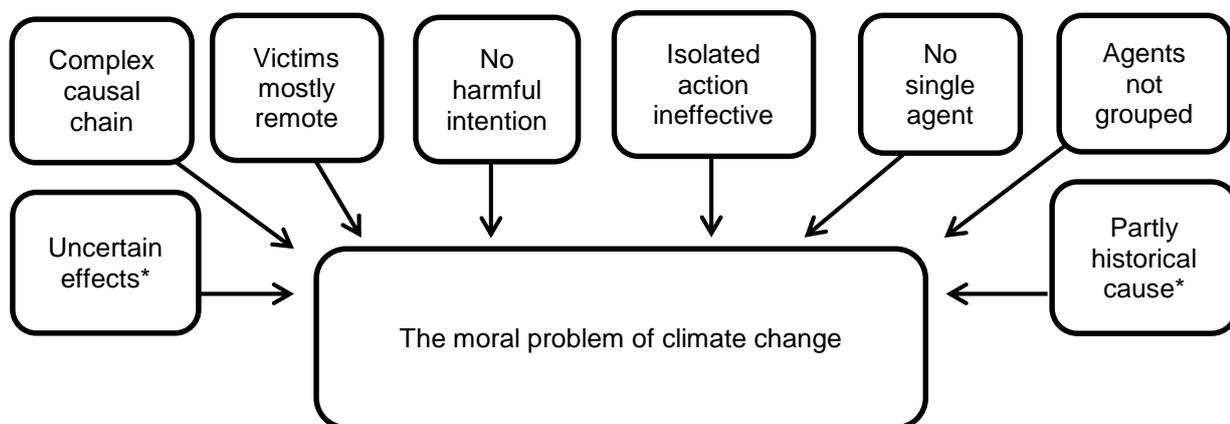
is emblematic of a thorny collective action problem, but need not call for any particularly revisionary ethical tools.

We have identified eight features of the problem of climate change, none of which in isolation obviously make the problem of climate change significantly non-paradigmatic. Jamieson's argument seems to be that in combination these features are sufficient to make such responsibility problematic or unclear. It might seem unusual that features which alone may make no difference to moral responsibility do so when assessed in concert, but on some views of how reasons function (e.g. Dancy 2004) this might well be plausible. A charitable reading of Jamieson would be that these features have an effect in combination that renders the problem of climate change significantly non-paradigm.

What is important to see at this point is that four of the features above—*victims mostly remote, complex causal chain, no harmful intention, and uncertain effect*—are relevant to a particular ethical question. This question considers to what extent the whole group is responsible to remedy certain harms. The features *no single agent, agents not grouped, and partly historical cause* are quite different. These features act on a distinct problem from the one we considered above. Whereas the combined effect of the previous four features mentioned may make it difficult to determine what level of responsibility a collective has to remedy the problem, these three make it difficult to determine the relative responsibilities *within* the collective to remedy the problem, *assuming* it has some responsibility to remedy it. Finally there is *isolated action ineffective*: the likely futility of un-coordinated action. We are faced with the question of what responsibility remains on individuals (or particular political units) when the collective they belong to is (rather spectacularly, in the case of the global community) failing to meet its obligations.

Separating these complicating features into three groups brings our attention to the trio of sub-problems that make up "the problem" of climate change.⁹ Compare Jamieson's way of combining the complicating features of climate change with the model I am advocating, in Figures 1a and 1b. Whereas Jamieson portrays the features as adhering to one moral problem of climate change, my approach elucidates the way in which these features (which render problems distinctly non-paradigmatic through a combinatory effect) refer to one of three distinct sub-problems. Dividing the problem of climate change into three sub-problems provides not only a way to deliberate about our responsibilities to remedy climate change, but also a chance to see, *contra* Jamieson, how we may be faced with reasons to respond urgently to climate change which are completely human-oriented.

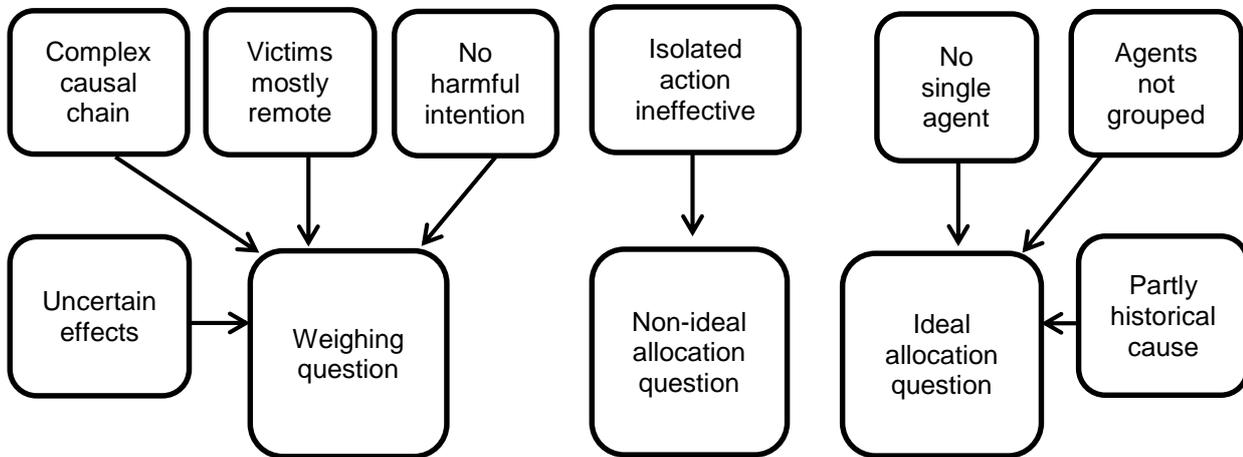
Fig. 1a. Jamieson's portrayal of the moral problem of climate change and its complicating features.



⁹ The following account of the three sub-problems is my own, but it has similarities to ideas outlined, but not elaborated on, by Gardiner himself in other work (Gardiner 2004). The weighing and ideal allocation questions are often independently posed in discussions of climate ethics (Caney 2009a, 2009b; Page 2011). The non-ideal question is posed less often, although David Miller (2001) and Gardiner (2006) articulates it clearly in the case of climate change. Sinnott-Armstrong (2010) also refers to it.

Note: * indicates relevant complicating features not present in Jamieson's "Example 6"

Fig 1b. The three sub-problems of climate change in relation to the complicating features.



The first sub-problem I call the *definition* question, since it regards the extent of our collective burden to respond to climate change. That is to say, how much does the global community, as the collective contributing and currently able to respond to climate change, need to do to create a morally adequate outcome? The temporally and spatially remote victims, as well as the lack of intention to harm, and the somewhat complex causal chain, make this a difficult question to answer, not least because different ethical theories will propose different answers to questions about the possibility of 'discounting' harm to future people, or rule the lack of intention more or less important. Compounding this difficulty is the uncertainty regarding the extent of the harms, which in turn depends on technical considerations we raised earlier in this article: how serious the effects of climate change will be, how easy the tasks of mitigation and adaptation will be, and the wealth level of future generations. But importantly, we at least in a much more familiar ethical landscape when we assess the definition question than when we try to view the problem of climate change as a whole.

Once we have a sense of the size of the burden of responding to climate change we need to allocate, we face the second sub-problem: how should responsibility to bear that burden of responding to climate change should ideally be apportioned?¹⁰ As well as the features that point to a dispersed group of emitters among which it is not clear where remedial responsibility lies, this problem is also complicated by *partly historical cause*, for the burden created by the legacy of emissions created under ignorance, by people who are now dead, is especially difficult to allocate (Caney 2010a; Schüssler 2011). Once again, these features combine to make the question difficult to answer, but not intractable; the literature on the burden-sharing problem from a human-oriented viewpoint is testament to this (for a recent review, see Darrell Moellendorf 2012). Finally there is the more practically-oriented problem of what agents should do in the case of a failure of collective action. That is to say, given a background of mistrust, opportunism, and broken pledges in the international effort to mitigate climate change, how should individual countries, cities, corporations and humans act in a non-ideal world to try to ensure that the burden is met. This question is perhaps under-represented in the philosophical literature on

¹⁰ See Moellendorf (2009) for an example of the plausible norms for burden sharing changing when different overall targets for emissions reductions are set.

climate change, although Miller (2008) provides reflective analysis¹¹ and Scott Barrett (2003) provides an especially constructive account that may satisfy pessimists about the collective action problem.

The three questions interact in an interesting way. How demanding an answer we provide to the definition question can affect how willing we are to tolerate non-committal answers to the other two questions. If our collective burden to prevent climate change is large and stringent, then the difficulties of delineating a clear group to bear that burden, and what should be done in cases of non-compliance, seem more academic—after all *someone* must bear this important burden. Whereas if our collective burden itself happened to be rather minor, then the difficulties of ideal and non-ideal allocation loom larger; the dialectic equivalent of a shoulder shrug as a response to the three-part problem might be more defensible.

With this three-part framework in place, we can examine the thought experiments that concerned us earlier. We mentioned one of the flaws of Example 6 was that the harm at the end of the chain was too minimal; it involved the loss of resources (bikes), not a situation where people's vital interests are threatened. Now we can describe this flaw, not just as downplaying one feature of the climate problem (as all thought experiments must do to some extent) but, more seriously, as presenting an overly dismissive answer to the definition question. Conversely, Gardiner's example, George and his Buddies, pushes our intuition on the definition question the other way. By making the activities that are linked to greenhouse gases frivolous, like fireworks, and removing the spatio-temporal distance between cause and harm, he suggests the answer to the definition question is extremely demanding.

Gardiner also downplays the difficulty of the second sub-problem, that of ideal allocation. By making the group who use fireworks clearly delineated from those harmed (they are on different sides of the river) he removes the second question of how responsibility to bear the burden should be apportioned among those who have contributed. But if we accept that there are a very diverse group of current emitters, (and an irregular part of the burden caused by historical emissions) this question becomes difficult. But George and his Buddies simply removes these difficulties, effectively removing another of the three sub-problems of climate change. Little wonder then, that George and his Buddies suggests a rather too easy answer to the overall question of responsibility for climate change, and the only problem left for Gardiner is what he calls "the grasping problem" (the question of non-ideal allocation): how to respond when one's own efforts will be insufficient to remedy the problem, and others face incentives to shirk responsibility. Now we have a general answer to why the thought experiments of Gardiner and Jamieson are unsatisfactory: by emphasising or downplaying certain features of the problem of climate change, they skew our responses to whole sub-problems, suggesting answers to the question of responsibility allocation that are too extreme.

Tackling the three-part problem

First, we can note that while the moral problem of climate change taken as a whole is unprecedented, dividing it into three may help us find precedents, not for the problem of climate change, but for the sub-problems which make it up. In Gardiner's excellent discussion of what I call the non-ideal allocation question he points out that this problem has arisen numerous times before, in the context of various social movements such as those opposing slavery or advocating women's rights. (Gardiner 2011: 52) Likewise the definition sub-problem occurs in other contexts, such as consideration of decisions to use nuclear energy. In this case we have the same elements that press upon the definition question in the climate change context. The proponents of nuclear energy do not intend to harm the potential victims of contamination from nuclear waste, who are often spatio-temporally distant from the beneficiaries of nuclear energy and connected by a causal chain similar to that in

¹¹ Interestingly, Jamieson himself deals with what I call the non-ideal problem in detail in relation to the question of how utilitarians should respond to the wider "environmental crisis" (Jamieson 2007). For Jamieson though, the solution for utilitarians lies in their cultivation and promotion of green virtues, one of which, "humility", is explicitly nature-oriented.

the case of climate change. There is also uncertainty around the likelihood of such contamination, and a legacy of waste from previous generations. The ideal allocation question might seem harder to find corollaries for, given the unusual situation of a significant burden that could be spread in a great variety of ways across virtually everyone on earth. But precedents exist here too, as is often noted, with the burden of sustaining the protective layer of ozone around the earth assigned by the Montreal Protocol¹².

I am not suggesting we unthinkingly translate arguments, or positions, from the other instances of each of the questions, in order to make the problem of climate change tractable. Finding such examples, however, can give us hope that the sub-problems that make up the problem of climate change can be analysed with familiar tools, and hopefully insights, from similar problems in the past.

With regard to the application of ethical theories to the three-part problem, I suggest that particular ethical frameworks will find a particular sub-problem out of the three difficult (though not unsolvable), and the remaining problems easy, for different reasons. For example, consequentialists, accustomed to considering interests impartially across space and time, and with less emphasis on actors' intentions, will probably take a strong position on the sub-problem of definition. (Note this would still not be as strong as the position suggested by George and his Buddies, for the spatio-temporal distance makes a difference to the level of uncertainty about outcomes, at least). They will also tend to have a distinct answer to the ideal allocation sub-problem, as the ideal distribution of responsibility for most consequentialists is simple in principle at least: that which is most likely to bring about the best overall outcome. It is the non-ideal sub-problem that seems to be most difficult for consequentialists, for it is not obvious where responsibility lies when individual action on climate change may not produce good consequences due to the lack of a collective response. On the other hand those that base their ethical analysis on concepts of rights face a different situation. They may have an equally firm, although probably quite different approach to the ideal allocation sub-problem. And unlike consequentialists, they can easily justify the importance of individual action (whether political or life-style based) even when others are not contributing, because the real possibility that their action may have no effect need not dominate their thinking. However rights-based thinkers might typically have difficulty answering the definition question, for they must reckon with a non-intentional harm to future people whose very existence may depend on those harmful acts.

If our ethical theories, consistently applied, can reduce Jamieson's multi-faceted overall problem of responsibility for climate change to a more precise sub-problem (the particular sub-problem being dependent on which ethical theory one subscribes to) then the three-part analysis has done some work. Specifically, it will have removed from the picture some of the responsibility-diluting features Jamieson has highlighted. Further, once the important sub-problem for each theory is brought into focus, there is the potential for strong attributions of responsibility to be made. For example, I proposed the non-ideal sub-problem is the dominant one for consequentialists. However it has been argued that consequentialists who care about *expected* outcomes should care about the effects of their own actions, even if they seem to not make any difference (Kagan 2011). The definition question might be the hardest for rights-based theorists to cope with, but Simon Caney has plausibly suggested that rights-based theorists should have a clear and demanding answer to the definition question, based on the way climate change creates a situation in which future people's negative rights will be violated (Caney 2010b). Separating the problem of climate change into three sub-problems may enable clear and demanding answers to the question of allocation of responsibility to be made more visible for each of the various ethical theories. The delicacy and difficulty of this process may explain some of the variance in attributions of urgency about climate change described at the start of this paper.

Assessing Nature-orientation

¹² Although see Barrett(2003) for an argument that the Montreal Protocol is a poor model for burden-sharing in the case of climate change, due to the lack of enforceability of a similar agreement on greenhouse gases.

We can also use the three-part analysis to assess Jamieson's positive, nature-orientation thesis, which is that the duty of respect for nature does a better job at explaining why we have an urgent responsibility to act on climate change than conventional morality does. Recall that the nature-orientation thesis was motivated by the idea that climate change constitutes a paradigm case of human domination of nature. The sub-problem that this idea seems to engage is the definition question. Applying a norm of respect for nature, according to Jamieson, leads to a strong answer to the definition question: our collective responsibility to remedy climate change arises because changing the climate constitutes an arrogant domination of nature. And, it seems, any non-trivial changing of the climate would count as such domination. Yet even if climate change is unambiguously domination, an important element to the definition question remains. Given the goods that can be produced by activities that cause emissions of greenhouse gases, to what level do our global greenhouse gas emissions need to be reduced to in order to satisfy our overall ethical requirements? It seems wrong to say humanity has a responsibility to emit *no* greenhouse gases, or only the greenhouse gases produced by bodily functions. The definition question remains difficult for the nature-oriented approach. It might even be more difficult under a nature-oriented approach than for a human-oriented approach, as the concerns which are being compared are human-centred values of development and quality of life against the duty not to dominate nature. These two types of concern are less commensurable than the weighing of benefits, say, to humans across the globe and across generations.

Yet even if we accept one of the ideas implicit in Jamieson's argument, that respect for nature directly leads to an especially demanding answer to the definition question, this does not automatically translate to an urgent responsibility on any particular actor to respond to climate change. Even if humankind collectively should respond to climate change urgently, perhaps until their collective action does not constitute domination, we are still left with the question as to what *relative* levels of interference with nature are permitted. For example, an upper-middle income earner in a developing country and a low-income earner in a developed one, say, might create roughly equal contributions to global greenhouse gas emissions. Whether their responsibility comes from their duties to other humans or from their duty to respect nature it is equally unclear what their respective levels of relative responsibility are. Should they both bear the same level of responsibility for reducing their greenhouse gas emissions? This is an instance of the sub-problem of apportioning ideal responsibility. Faced by this sub-problem, the nature-oriented and human-oriented approaches share the same obstacles: the historical burden of past emissions, and the lack of distinct groups of actors causing the problem.

The question of apportioning responsibility in a non-ideal world is also similar for both the nature-oriented and the human-oriented approaches. Assuming we have a duty of respect for nature, it is being thoroughly violated. Should this make the responsibility on those few who are willing to reform their behaviour more demanding, less demanding or remove it completely? Once again, it is climate change as a highly formidable collective action problem which looms large, for the nature-oriented approach as much as for the human-oriented approach.

On a more speculative note, I am tempted to suggest that the three-part model also explains why it is more likely that nature-oriented folk might be among the most obvious proponents of strong action to remedy climate change. Rather than, as Jamieson suggests, nature-orientation directly helps to "explain why some people are so passionate about this issue" (Jamieson 2010: 440), any correlation between nature-orientation and recognition of climate change responsibility could be due to the strong conclusions many nature-oriented folk have arrived at regarding general versions of the other two sub-problems. As well as holding that our duty to respond to climate change is highly stringent, many nature-oriented activists happen to also subscribe to political positions that can attribute responsibility in a particularly clear and demanding way among the members of the global collective. They also may be those who maintain that, in this non-ideal world marked by non-compliance, inaction, even if probably futile, is still not morally permissible. Their answers to the three sub-problems when posed generally about international affairs are what allow their relatively easy attributions of responsibility, not their nature-orientation.

Notice too, that there is a kind of nature-orientation that leads *away* from responsibility for climate change. I have often heard the sentiment that we have no responsibility to act on climate change because, through it, Nature will look after her own interests and rid herself of this parasitic human civilisation. It would be fair to say that this is a firmly nature-oriented approach which shows a deep sense of respect for the non-human. At the same time, through its dismissive answer to the definition question it fails to allocate responsibility for climate change.

Conclusion

The inadequacy thesis was that unrevised human-oriented ethics is incapable of effectively allocating practical responsibility for climate change. But the approach developed above, which treats climate change as three interacting sub-problems, suggests otherwise. Rather than by revising of our ethical concepts, we can find some clarity about the human-oriented demands of climate change by more careful treatment of the three sub-problems. With the three-part analysis of climate change, we also find a different explanation of the variance in urgency with which people are responding to climate change. Jamieson suggests that this variance is largely due to variation in our orientation toward or away from nature. The three-part theory suggests that while those who focus merely on the suite of complicating features may feel a diluted sense of responsibility, breaking climate change into three sub-problems has the potential to lead to much stronger views on the responsibility to act on climate change, even without reference to a duty of respect for nature.

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References

- Barrett, S. (2003). *Environment and Statecraft: The Strategy of Environmental Treaty-Making: The Strategy of Environmental Treaty-Making*. Oxford
Oxford University Press.
- Bell, D. (2011). Does anthropogenic climate change violate human rights? *Critical Review of International Social and Political Philosophy*, 14(2), 99-124.
- Caney, S. (2009a). Climate change and the future: discounting for time, wealth, and risk. *Journal of Social Philosophy*, 40(2), 163-186.
- Caney, S. (2009b). Justice and the distribution of greenhouse gas emissions. *Journal of Global Ethics*, 5(2), 125-146.
- Caney, S. (2010a). Climate change and the duties of the advantaged. *Critical Review of International Social and Political Philosophy*, 13(1), 203-228.
- Caney, S. (2010b). Climate change, human rights, and moral thresholds. In S. G. S. Caney, & D. Jamieson (Ed.), *Climate Ethics: Essential Readings* (pp. 163 - 177). Oxford: Oxford University Press.
- Dancy, J. (2004). *Ethics Without Principles*. Oxford: Oxford University Press.
- Doran, P., & Kendall-Zimmerman, M. (2009). Examining the scientific consensus on climate change. *Eos, Transactions, American Geophysical Union*, 90, 22-23.
- Gardiner, S. (2004). Ethics and Global Climate Change. *Ethics*, 114(3), 555-600.
- Gardiner, S. (2006). A perfect moral storm: climate change, intergenerational ethics and the problem of moral corruption. *Environmental Values*, 15(3), 397-413.
- Gardiner, S. (2011). Is no one responsible for global environmental tragedy? Climate change as a challenge to our ethical concepts. In D. G. Arnold (Ed.), *The Ethics of Global Climate Change*. Cambridge: Cambridge University Press.
- Gingrich, N., & Maple, T. L. (2007). *A Contract with the Earth*: Johns Hopkins University Press.
- Hansen, J., Sato, M., Kharecha, P., Russell, G., Lea, D. W., & Siddall, M. (2007). Climate change and trace gases. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 365(1856), 1925-1954.
- IPCC (2013). Working Group I Contribution to the IPCC Fifth Assessment Report
Climate Change 2013: The Physical Science Basis
Summary for Policymakers http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf.

- Jamieson, D. (2007). When Utilitarians Should Be Virtue Theorists. *Utilitas: A Journal of Utilitarian Studies*, 19(2), 160-183.
- Jamieson, D. (2010). Climate Change, Responsibility, and Justice. *Science and engineering ethics*, 16(3), 431-445.
- Kagan, S. (2011). Do I make a difference? *Philosophy and Public Affairs*, 39(2), 105-141.
- Lomborg, B. (2007). *Cool it*. London: Cyan.
- Markowitz, E. M. (2012). Is climate change an ethical issue? Examining young adults' beliefs about climate and morality. *Climatic Change*, 1-17.
- Miller, D. (2001). Distributing responsibilities. *Journal of Political Philosophy*, 9(4), 453-471.
- Miller, D. (2008). *Global justice and climate change: How should responsibilities be distributed?* Paper presented at the The Tanner Lectures on Human Values,
- Moellendorf, D. (2009). Treaty norms and climate change mitigation. *Ethics & International Affairs*, 23(3), 247-265.
- Moellendorf, D. (2012). Climate change and global justice. *Wiley Interdisciplinary Reviews: Climate Change*.
- Nolt, J. (2011). Greenhouse gas emissions and the domination of posterity. In D. G. Arnold (Ed.), *The Ethics of Global Climate Change*. Cambridge: Cambridge University Press.
- Obama, B. (2013). Obama's Second Inaugural Speech. <http://www.nytimes.com/2013/01/21/us/politics/obamas-second-inaugural-speech.html?pagewanted=all>. Accessed 25 February, 2013.
- Page, E. (2011). Climatic justice and the fair distribution of atmospheric burdens: A conjunctive account. *The Monist*, 94(3), 412-432.
- Parry, M., Canziani, O., Palutikof, J., & Co-authors. (2007). Technical summary. climate change 2007: impacts, adaptation and vulnerability'. In M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden, & C. E. Hanson (Eds.), *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 23-78). Cambridge: Cambridge University Press.
- Pogge, T. (2006). World poverty and human rights. *Ethics & International Affairs*, 19(1), 1-7.
- Poore, R. Z., Williams Jr, R. S., & Tracey, C. (2000). Sea level and climate. *US Geological Survey Factsheet* (pp. 002-000).
- Quinn, W. (1989). Actions, intentions, and consequences: the doctrine of double effect. *Philosophy and Public Affairs*, 18(4), 334-351.
- Schüssler, R. (2011). Climate justice: a question of historic responsibility? *Journal of Global Ethics*, 7(3), 261-278.
- Seyfang, G. (2007). Personal carbon trading: Lessons from complementary currencies. *Centre for Social and Economic Research on the Global Environment, University of East Anglia, Norwich*.
- Sherwood, S. C., & Huber, M. (2010). An adaptability limit to climate change due to heat stress. *Proceedings of the National Academy of Sciences*, 107(21), 9552-9556.
- Shue, H. (1993). Subsistence emissions and luxury emissions. *Law & Policy*, 15, 39-59.
- Sinnott-Armstrong, W. (2010). It's not my fault: global warming and individual moral obligations. In S. Gardiner, S. Caney, & D. Jamieson (Eds.), *Climate Ethics: Essential Readings*. Oxford: Oxford University Press.
- Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K., et al. (2007). *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: IPCC. Cambridge University Press.
- Van de Poel, I., Nihlén Fahlquist, J., Doorn, N., Zwart, S., & Royakkers, L. (2012). The problem of many hands: Climate change as an example. *Science and engineering ethics*, 18(1), 49-67.
- Vidal, J. (2009). Evo Morales stuns Copenhagen with demand to limit temperature rise to 1C. <http://www.guardian.co.uk/environment/2009/dec/16/evo-morales-hugo-chavez>. Accessed 25 February 2013.
- Voluntary Human Extinction Movement (2013). The Voluntary Human Extinction Movement. <http://www.vhemt.org/>. Accessed 25 February 2013.
- Walzer, M. (2000). *Just and unjust wars* (3rd ed.). New York: Basic Books.
- Weitzman, M. L. (2009). On modeling and interpreting the economics of catastrophic climate change. *The Review of Economics and Statistics*, 91(1), 1-19.

