The Comparative Culpability of SAI and Ordinary Carbon Emissions*

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In his article "Carbon Emissions, Stratospheric Aerosol Injection, and Unintended Harms," Christopher J. Preston argues for what he calls "a somewhat surprising result," namely that "even if the deployer of [stratospheric aerosol injection] holds an elevated responsibility for the state of any future climate due to the intentional nature of their action, that agent may not be any more morally culpable for the unintended harms that might result than the carbon polluter" (p. 488). This is a claim about the relative culpability of carbon emitters compared against geoengineers deploying a specific version of solar radiation management (SRM). Preston's argument depends on the doctrine of double effect (DDE), which he understands—following Warren Quinn—as assigning reduced culpability to the causing of an unintended bad effect when that bad effect is incidental in pursuing a good end.[1] This contrasts with taking a bad effect as the means to a good end (usually impermissible) or taking the bad effect as the end (always impermissible).

Quinn's contribution to the literature on the DDE was to argue that it is not the distinction between intended and unintended harms that drives it, but rather the distinction between direct and indirect exercises of agency.[2] The latter distinction makes it extremely easy to diagnose a mistake that undermines Preston's argument, although it is clear enough on the former distinction too. Let me explain.

To perform an action and have there be any question about whether that performance is a direct or an indirect exercise of agency, one must be an agent. When an earthquake triggers a tsunami and washes away the homes of people living on the coastline, we do not ask whether the tsunami was a direct or an indirect

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exercise of agency, because it was no exercise of agency at all. Similarly, to perform an action and have there be a question about whether that performance was intentional or unintentional, one must be an agent. We do not ask whether the destruction caused by the tsunami was an intentional or an unintentional action, because there is no agent whose intention we can consider.

For Preston's comparative argument to work, two things must be the case. First, there must be agents to whom we can attribute carbon emissions, and these agents must be pursuing some good end relative to which the bad effects of carbon emissions are a side effect. This might seem like an unimportant point, because of course there are billions and billions of individuals who emit carbon and who are agents. Just bear with me.

Second, there must be agents to whom we can attribute stratospheric aerosol injection (SAI), and these agents must be pursuing some good end relative to which the bad effects of SAI are a side effect. The climate scientists in a position to eventually deploy SAI, or the governments that commission them to do so, will very likely count as agents, so it makes sense to ask how the DDE affects the moral status of those agents' actions. One might have many doubts about the moral status of geoengineering, and Preston himself notes several of them, but he assumes for the sake of argument that the SAI is deployed benevolently, and that it will have good effects that significantly outweigh the bad side effects.[3] I'll endorse those assumptions for the sake of argument, although for the record I do not think that a time will ever come where the good effects of SAI will outweigh the bad. I want to focus instead on the agents of carbon emissions.

Preston is somewhat vague about who these agents are, but he gives some clues in the article. The first comes when he says that "the impacts [of carbon pollution] were the unintended side effects of activities that were directed—at least in large part—at successfully creating morally significant social benefits, such as reductions in poverty and increases in standards of living" (p. 482). So we might then simply identify the agents who reduce poverty or increase living standards using carbon emissions. The only agents in a position to create such morally significant social benefits, at least at scale, are governments. The second clue supports this conclusion. Preston says that to keep the discussion simple, he will assume that the groups deploying SAI are the *same* as the groups emitting carbon (p. 484). Governments are certainly in a good position to commission climate scientists to deploy SAI on their behalf.

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But this reasoning leads to an implausible conclusion about who the carbon-emitting agents are. Do we really think that it is national governments that are the cause of their countries' carbon emissions? We tend to conceive of the climate change challenge as one between states, but that is only because states have the administrative authority to negotiate agreements with one another and impose their terms coercively on their populations. It is not because governments are major carbon emitters.[4] Emissions come from individuals, companies, and corporations.[5] Furthermore, it is not clear to what degree social projects such as reducing poverty actually involve carbon emissions. This might be a good description of policies aimed at development in particular countries such as China or India, but it is hardly a fair characterization of the emissions of such developed countries as the United States and the United Kingdom. In those countries projects to reduce poverty or increase standards of living need not involve greater carbon emissions.

The third and final clue comes when Preston gives some examples of those who might deploy SAI, including "a poor nation acting in self-defense, a superrich individual with heroic aspirations, a global body acting on some sort of global consensus, or a small coalition of high-emitting nations" (p. 484). Because he states earlier that the two groups (carbon emitters and SAI deployers) are the same, it follows that who he has in mind as carbon emitters includes poor nations, superrich individuals, global bodies acting on global consensus, and small coalitions of high-emitting nations. Do these fare any better as emitters? To answer yes, we must show not only that it is plausible that they are emitters but also that they are emitters whose emissions are in the service of some good end but have the bad effects of carbon pollution as a side effect.

Here it matters how the bad effects are understood. I am assuming that it is not simply carbon pollution understood merely as a high concentration of CO_2, alongside other greenhouse gases (GHGs), in the atmosphere. Rather, it is the harms to persons, animals, and the environment that are a result of that concentration. But as is familiar to everyone working in climate ethics and many people who are not, the climate change challenge has been difficult to address precisely because it involves a bad effect that "emerges" out of the actions of *many* agents, none of which is certain to cause any bad effect taken in isolation. What matters is the global GHG emissions level, not the emissions of any one individual or even necessarily any one group. A "superrich individual with heroic aspirations" is highly unlikely to emit enough alone to cause any bad effect.[6] Ditto for a "poor nation acting in self-defense." A "global body acting on some sort of global consensus"

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is similar to a government in the respects already discussed, although even less likely to have authority over projects that directly involve carbon emissions. Thus, of all Preston's proposed candidates, the only remotely plausible one is "a small coalition of high-emitting nations." This group could indeed have a high-enough carbon footprint to be a plausible cause of one or more of the harms of climate change.[7]

But notice that as soon as we have an organized group like a coalition that counts as an agent emitting carbon for some good end and having some of the harmful effects of climate change as an unintended side effect, the surprising part of the parallel between carbon emitters and geoengineers falls away. What made the parallel so unintuitive was that we tend not to think the carbon emitter has much, if any, responsibility. The harms connected to climate change emerge out of the uncoordinated actions of billions of people. The parallel remains unintuitive when we understand carbon emitters as unorganized groups, individuals, national governments, poor nations, superrich individuals, or global bodies. In most cases, it will be false that the deployer of SAI is no more culpable than the carbon emitter, because the deployer of SAI will be a candidate for culpability (being a harm-causing agent acting intentionally), whereas the carbon emitter will not be (being either not an agent, not harm-causing, or not acting intentionally). The "no more culpable than" claim rests on a limited and idiosyncratic view of who the carbon emitters are.

In summary, Preston's surprising conclusion rests on a parallel between carbon emitters and SAI deployers. The parallel requires both to be agents. Identifying the carbon emitters creates a dilemma for Preston. Either he takes some big group, such as the whole human population, in which case it causes the harms of climate change *but is not an agent* or, he takes some smaller group, such as a domestic company, in which case it is an agent *but it does not cause the harms of climate change*. In neither case is that group an appropriate candidate for comparison with those who deploy SAI. For that reason, the parallel collapses, and the "surprising" conclusion is one that Preston is not entitled to reach.

NOTES

[1] Warren S. Quinn, "Actions, Intentions, and Consequences: The Doctrine of Double Effect," *Philosophy and Public Affairs* 18, no. 4 (1989), pp. 334–51.

[2] Ibid. See also Alison McIntyre, "Doctrine of Double Effect," *Stanford Encyclopedia of Philosophy* [2004] (2014), plato.stanford.edu/entries/double-effect/; Warren S. Quinn, "Reply to Boyle's Who is Entitled to Double Effect?" *Journal of Medicine and Philosophy* 16, no. 5 (1991), pp. 511–14.

[3] I have expressed doubts about the moral status of geoengineering in Adrian Currie and Holly Lawford-Smith, "Accelerating the Carbon Cycle: The Ethics of Enhanced Weathering," *Biology Letters* 13, no. 4 (2017) [early view].

[4] See also Richard Heede, "Tracing Anthropogenic Carbon Dioxide and Methane Emissions to Fossil Fuel and Cement Producers, 1854–2010," *Climatic Change* 122, no. 1–2 (2014), pp. 229–41. Heede traces nearly two-thirds of historical emissions of carbon dioxide and methane to just ninety corporate entities. Most of these corporate entities are investor owned, but some are state or nation-state owned. Still, that is not the same as the emissions being produced by the state or nation-state itself, because the corporation will be a collective agent in its own right. The division of responsibility would depend on the exact nature of the relationship between the two (absolute control, editorial control, mere advising, etc.).

[5] Working out the causation of greenhouse gases is actually far from straightforward. First, we get different answers depending on whether we use a theory of causation as production or a theory of counterfactual causation. Take car emissions, for example. The production theory implicates drivers (end-consumers), while the counterfactual theory implicates car manufacturers (without which the drivers could not have driven). Second, the complete causal explanation of any specific emissions may include many agents. For example, when an individual drives a car she is the one who has decided to drive and thereby to burn fossil fuels; but many others were involved in producing the car parts, building and shipping the car, selling the car, and likewise in sourcing, refining, and transporting the fossil fuels. A web of many different individuals and collectives contributes to global emissions. Governments are part of this web to the extent that they own some of the public facilities that produce emissions, such as national rail and electricity companies, and to the extent that they make policy that constrains the actions of others in the web, such as decisions about investment in public transport infrastructure or subsidies for clean energy enterprises. This complicates the causal picture, but it still does not make governments major emitters (and if they are only minor emitters, it is not clear why they should be singled out in the way Preston does). See also Dominic Roser and Luke Tomlinson, "Trade Policies and Climate Change: Border Carbon Adjustments as a Tool for a Just Global Climate Regime," *Ancilla Iuris, Special Issue: International Law and Ethics* (2014), pp. 223–45, particularly section V; and Karl Steininger et al., "Justice and Cost Effectiveness of Consumption-Based Versus Production-Based Approaches in the Case of Unilateral Climate Policies," *Global Environmental Change* 24 (2014), pp. 75–87, particularly section II. I am grateful to Anton Eriksson and Dominic Roser for discussion on this point.

[6] The DDE is meant to cover cases of known, or highly probable, incidental effects (for examples, see McIntyre [2014]). In Philippa Foot's classic discussion, DDE provides a way to vindicate flipping the switch in the Trolley Problem when this is done with the intention of saving the five and is known to have the effect of killing the one (See Philippa Foot, "The Problem of Abortion and the Doctrine of Double Effect," *Oxford Review* 5 (1967), pp. 5–15). It would take a separate discussion to determine whether one has some culpability (reduced or otherwise) or no culpability at all for the merely possible effects of one's actions. That is a matter of the ethics of risking harm, rather than the ethics of causing harm as a side effect, a means, or an end. The implication of any individual and most groups in the harms of climate change is a matter of low—sometimes *extremely* low—probabilities, and for that reason I take it to be outside the scope of the DDE.

[7] On the distinction between macro-level and micro-level harms, which is useful in attempting to link specific agents to specific harms, see Holly Lawford-Smith, "Difference-Making and Individuals' Climate-Related Obligations," in Clare Hayward and Dominic Roser, eds., *Climate Justice in a Non-Ideal World* (New York: Oxford University Press, 2016), pp. 64–82.

Abstract: In his article "Carbon Emissions, Stratospheric Aerosol Injection, and Unintended Harms," Christopher J. Preston compares the culpability of carbon emitters versus that of geoengineers deploying stratospheric aerosol injection (SAI). This comparison relies on a parallel between carbon emitters and SAI deployers that requires both to be agents. However, both are not. While the harms of geoengineering will be caused by culpable agents acting intentionally, the harms connected to climate change emerge out of the uncoordinated actions of billions of people. Taken as a large group, carbon emitters cause harm but do not constitute an agent. Taken individually, carbon emitters are agents but do not cause the harms of climate change. As a result, the parallel collapses, and Preston's "surprising" conclusion is one that he is not entitled to reach.

Keywords: climate engineering, solar radiation management, stratospheric aerosol injection, carbon emissions, unintended harms, doctrine of double effect, culpability, agency