Human Enhancement and the Proper Response to Climate Change

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Abstract: Several philosophers have argued that human enhancements should be considered a potential solution to climate change. In this paper, I consider one such argument offered by S. Matthew Liao, Anders Sandberg, and Rebecca Roache. I argue that, while their argument is plausible, we have an even stronger reason to consider enhancements a potential solution. In particular, enhancements could align our interests with the promotion of a proper response to climate change: if enhancements were in our interest to adopt and also reduced the pernicious effects of climate change, then it would, indirectly, become in our interest to reduce those effects.

Anthropogenic climate change demands our response. The atmospheric concentration of carbon dioxide is now over 400 parts per million, the highest concentration reached in at least the last one million years.[1] It is widely acknowledged that humans are nearly certain to be causing the deleterious changes occurring in the atmosphere. These changes are likely to affect the livelihood and well-being of people throughout the world and into the future by disrupting freshwater and food systems, and by driving low-lying inhabitants from their homes.[2]

Intuitively, climate change seems a moral problem—one that morality should have in its scope, and that moral theories should account for. Though it is not uncontroversial, here I assume that climate change is, in this sense, a moral problem.[3] Even so, I am not concerned with a moral obligation or responsibility with respect to climate change here. Rather, my concern is primarily

[1] Measured at the Mauna Loa Observatory, Hawaii. https://www.co2.earth/co2-past-present-future-article.
[2] https://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml. See working group 2.
[3] For further discussion, see Jamieson 2007 and Sinnott-Armstrong 2005.

practical, and begins with a general question: how should we, practically speaking, respond to climate change?

The answer is, of course, unclear. There are a number of putative solutions, and their forms include (but are not limited to) mitigation, adaptation, abatement, and geoengineering.[4] Too much debate has centered on why we should prefer one form to another. As a starting point, it is clear that whatever solution—or more likely, bundle of solutions—we adopt should be chosen on the basis of effectiveness, cost, risk, and availability, among other, more relevant practical factors. So, *the proper response to climate change* (or the "proper response" for short) will be to adopt the best collection of solutions, regardless of their form, that reduce the pernicious effects of anthropogenic climate change.

S. Matthew Liao, Anders Sandberg, and Rebecca Roache have argued that human enhancement should be considered among our potential solutions to climate change—considered, that is, a potential part of the proper response.[5] Human enhancement is, in general terms, the biomedical modification of human traits and dispositions. Enhancements will usually operate on extant mental or physical processes, and operate within the current human range of these processes. The general aim of enhancement is to place our biological properties at a more optimal level, regardless of whether this entails an increase or decrease in the relevant functions or capacities.[6] Certain enhancements, the trio suggest, could make us better at mitigating the harmful effects of climate change. Given my inclusive definition of a proper response, I agree that enhancements should not be decisively ruled out. However, the argument they provide in support of this is, I think, not the strongest one available.

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[4] For a thorough explanation of this four-part conception of solutions, see Jamieson 2014 (especially chapter 7).
[5] Liao, Sandberg, and Roache 2012.
[6] I borrow this conception of enhancement from Kahane and Savulescu 2015. For a defense of the conception, see Earp, Sandberg, Kahane, and Savulescu 2014. I reproduce it in full below.

The paper proceeds as follows. I first explain why, even before considering which solutions to adopt, climate change is a particularly difficult problem for us to address. In the second section, I analyze the argument made by Liao et al. in favor of considering human enhancement and show it to neglect the fundamental problems discussed in the first section. I then provide, in the third section, a stronger reason to consider human enhancement—namely, that enhancements could indeed address those fundamental problems. To anticipate: I argue that enhancements could align our interests with the promotion of a proper response to climate change. That is, if particular enhancements reduced the pernicious effects of climate change and were also in our interest to adopt, then it would, indirectly, become in our interest to reduce those pernicious effects. Regardless of whether we have a moral obligation or responsibility with respect to climate change, then, human enhancements may be widely adopted with positive results. Where they are accompanied by moral and political progress, enhancements could have an even greater impact. This, I argue, is our strongest reason to consider human enhancements a viable part of the proper response to climate change.

1. Why is little being done?

Before examining solutions, it will be helpful to see why climate change is a particularly difficult problem to address. While there are many contributing factors, my focus in this section will be to discuss only a few. The overarching theme seems to be that climate change differs in important ways from our more everyday problems—those to which we can often apply commonsense moral reasoning to resolve, or at least those that can easily be identified as problems—and thereby fails to demand our proper response. Room is then left for us to remain happily idle when confronted with it.[7]

[7] I employ commonsense and everyday understandings throughout this section in order to illustrate precisely those

I do not mean to imply here that nothing can be done, however. Nor do I mean to argue that an individual responsibility to properly respond to climate change is unintelligible. I mean only to explicate the current state of affairs and thereby illustrate why not enough has yet been done in response. Each of the domains that I consider—economic, moral, and political—does indeed have the resources to encourage a (more) proper response.[8] Rather than deny this, the current section is intended to make clear the obstacles that exist between these resources and their proper adoption. Cogent economic, moral, and political arguments have been made as to why and how we should respond to climate change; below, I discuss why and how these arguments have gone widely unrecognized.

The first difficulty is in economics. On its face, climate change appears to be a problem that is amenable to economic analysis. Since we are uncertain of the future progression and impacts of climate change—uncertain, that is, not of whether the impacts will be damaging, but rather of exactly how damaging they will be—paying at present to minimize future harms may seem the most reasonable response. Indeed, this conclusion has found support in cost-benefit analyses, most notably those of Nicholas Stern and William Nordhaus. Cost-benefit analyses are useful for providing what appear to be unbiased calculations of value and risk, thereby informing us of what is in our economic interests to do. Given the uncertainty surrounding climate change, however, the analyses in this case almost invariably carry with them implicit—and, as they are designed to be mere calculations, unjustified—normative judgments.[9] This has caused much disagreement over how we should proceed, and over what a proper response to climate change entails. A further worry is that

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general understandings that climate change manages to evade.

[8] For a comprehensive overview, see Gardiner 2004. For political and economic arguments, see Bell 2011, Caney 2009 and 2014, Gardiner 2009, and Jamieson 2014 (especially chapters 4 and 7). For moral arguments, see Jamieson 2007, 2009, and 2014 (especially chapters 5 and 6), Nolt 2011, and Pinkert 2015.

[9] For a more thorough discussion of economic considerations, and of Stern and Nordhaus' analyses, see Jamieson 2014 (especially chapter 4).

no economic analysis seems capable of accounting for the many things we value in all of the various ways we value them. The value of, e.g., California's redwoods is surely greater than their contribution to the environment. Weighing everything on the same scale seems to overlook important aspects of our lives and, thus, in this domain, uncontroversial calculations of value are likely illusory.

The second and arguably most troublesome obstacle is in morality. On a commonsense understanding of morality, determining whether I ought to perform some action seems in most cases to depend, at least somewhat, on the outcome my action will bring about in the world. And, it seems, if I cannot control whether some outcome will be brought about, I should not be required to bring that outcome about. Keeping this in mind, here is an example of a clear moral wrong:

> *Jack and Jill*: Jack intentionally steals Jill's bicycle.[10]

Jack directly and intentionally made Jill worse off. Any worthwhile moral theory would judge Jack's action to be wrong. Dale Jamieson offers a similar example that parallels climate change:

> *Jack and Everyone*: Acting independently, Jack and a large number of unacquainted people set in motion a chain of events that prevents a large number of future people who live in another part of the world from ever having bicycles.[11]

In this case it is not clear that anything morally questionable has even occurred. The result is not intentionally brought about, and Jack does not seem to directly make anyone worse off. More

[10] Jamieson 2014, p. 149.
[11] Adapted from Jamieson 2014, p. 150.

generally, Jack cannot control whether the future people are harmed. Similarly, agents producing the harmful effects associated with climate change cannot be said to directly cause harm to others—much less harm them intentionally—and so it is difficult to assign responsibility for the harms produced. Whether the harms are produced is, again, not under any individual person's control.

While Jack's action does not by itself bring about a worse outcome, the same action performed by many people does. That is to say, leading high-emitting lifestyles is only problematic when it's common practice. And of course, given that it is indeed now common practice, no single person can bring about a better outcome by lowering their emissions. It seems, then, that no person alone can lessen the harms brought on by climate change, no person alone has brought them about, and it is thus exceedingly difficult to conclude that we are individually responsible for them.

The third issue to address is in politics. One natural response to the preceding discussion is that, although our ability as individuals to bring about change appears limited, perhaps a larger scale will reveal larger responsibilities. Note, for example, that ten countries are responsible for producing at least eighty percent of the world's carbon emissions.[12] It may therefore seem clear that, at the very least, those ten countries have a responsibility to aid the people most affected by their emissions. But there are a number of reasons why things aren't this simple. First, emissions do not leave a causal trail that we can follow, much less one that recognizes particular countries. As Jamieson puts it, "since 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" (2014, p. 197). Second, it is unclear precisely whose emissions are whose. China, for example, accounts for the world's highest rate of fossil fuel emissions at 28%.[13] But surely at least some of China's emissions are a product of

[12] http://www.npr.org/2009/12/11/121240453/climate-change-trends-carbon-emissions-giants.
[13] http://www3.epa.gov/climatechange/ghgemissions/global.html.

processes that will ultimately benefit those in other countries, such as America. It is, then, much the same problem in politics as in morality. Although countries' political groups may have greater power than individuals to bring about change, they nonetheless face many of the same causal problems—and, so, have many of the same excuses. What's more, given the lack of furor over climate change at the individual level, politicians are all the less likely to make the matter a priority during their transient terms or throughout their ever-changing careers. After all, there's always another election to be won.

The final and perhaps most conspicuous reason climate change is a difficult problem to address is that it is in our own, narrow interest to lead high-emitting lifestyles. If lowering our emissions benefitted us more than keeping our emissions high, we would lower them. And if we were offered a reduction in emissions with no change to our lifestyle, we would accept. This suggests that, while we recognize the harmful effects of climate change, we are not willing to sacrifice our lifestyle to prevent them. Simply put, because it is not in our interest to properly respond to climate change, we don't. It's clear why people feel justified in continuing along business-as-usual. Each problem provides another reason for individual agents to privilege their own interests.

In any case, the changes we have already made to the environment are practically permanent, and given the current trend, anthropogenic climate change may have truly destructive effects in the future. In the following section I consider various solutions to climate change, though in particular one proposed by S. Matthew Liao, Anders Sandberg, and Rebecca Roache: human enhancement.

2. Is human enhancement a solution?

A great number of solutions to climate change have been proposed. The debate over which solutions to adopt has made it easy to become overwhelmed by vocabulary, as definitions may vary

with proposals.[14] Moreover, there are a number of ways to categorize solutions. The approach adopted by Liao, Sandberg, and Roache is to place solutions into one of three categories: behavioral, market, and geoengineering. As the trio define the first two: *behavioral solutions* are relatively simple habits we can adopt in our everyday lives such as driving less, carpooling, eating less red meat, and recycling more. *Market solutions*, by contrast, are economic incentives we could adopt such as carbon taxes that benefit those harmed by high emissions, cap and trade policies that ensure an upper limit to emissions while allowing intemperate countries to pay for the "unused" emissions of those going under their cap, and other methods of encouraging greener research and techniques.[15] Finally, we can understand *geoengineering* in general terms as the deliberate manipulation of the environment to counteract anthropogenic climate change.[16]

While behavioral and market solutions each have promise, each type of solution individually seems to fall well short of ensuring what is needed. Behavioral solutions are attractive in their ease and simplicity, but merely driving less or recycling more is unlikely to bring about large-scale changes. Market solutions, as Liao et al. point out, may present individuals or companies with financial reasons to reduce their emissions, but, as history informs us—from the first international agreement at the Rio Earth Summit in 1992 to today—very little practical response has actually been realized.[17] With no reason to believe any significant change is forthcoming, market solutions also seem to fall short of ensuring a proper response.

Given the inadequacy of each of these types of solution, the authors claim, we turn to geoengineering. But, of course, any deliberate manipulation of the environment seems to present an

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[14] For a particularly careful and clear discussion and categorization of solutions, see Jamieson 2014.
[15] For further discussion of greener research and solutions, see Jamieson 2014 (especially chapter 7).
[16] For further discussion and examples of geoengineering, see Jamieson 2014. I borrow this conception of geoengineering from Jamieson 2014, p. 204-5. As it happens, Jamieson takes issue with this conception, but I set this complication aside.
[17] For further discussion of these international agreements, see Jamieson 2014 (especially chapter 2).

inherent and extreme risk. So, they suggest, we should consider a less risky option: "human engineering." As they define it, human engineering is the "biomedical modification of humans to make them better at mitigating climate change" (Liao et al. 2012, p. 207). In other words, it is human enhancement with a specified aim. The argument, then, is that since we are only considering geoengineering because market and behavioral solutions are inadequate, and human engineering is less risky than geoengineering, human engineering should be considered a viable option.

It is worth pausing to reflect on the first of these claims. The trio write: "If behavioral and market solutions were by themselves sufficient to mitigate climate change, it would not be necessary to take geoengineering seriously" (Liao et al. 2012, p. 211). The plausibility of this claim depends on how it is understood. It will seem entirely plausible, as I see it, provided we take it to refer only to those behavioral and market solutions we are *currently willing* to adopt—and not, instead, to all those that we could *possibly* adopt. That's because, if the trio's claim were that, even if we implemented every possible behavioral and market solution, this would still not be sufficient to mitigate climate change, the claim would seem clearly false. Hence, so long as it is the first of these readings that the trio intended, the claim should, I think, be accepted.

Now it seems plain enough that it is, in fact, this first reading that the authors had in mind when making their claim. But the contrast between the two readings here brings out what I take to be an important point. In particular: the problem here does not ultimately consist in some failing of the potential solutions; rather, it consists in our unwillingness to adopt the solutions that would otherwise be sufficient to mitigate climate change. That is, we are only seriously considering geoengineering because we are unwilling to adopt a set of behavioral and market solutions whose adoption would constitute a proper response to climate change. Ultimately, then, the problem that Liao et al. are pointing to is not a problem with the solutions, but is instead a problem with us.

But regardless of whether they've properly identified the ultimate source of our motivation

to consider geoengineering, I do not disagree with the trio's central point. Given how I have defined the proper response to climate change, all potential solutions should be considered. I do not provide an argument for this because I take it to be clear that the form a solution takes should not decisively rule it out of consideration.[18] So I believe, with Liao et al., that we should consider human enhancement a potential solution to climate change. I merely disagree with how they reach this conclusion, and believe they thereby fail to provide the strongest argument in favor of considering enhancement. As I see it, the most important point is that enhancements could align our interests with the promotion of a proper response to climate change. That is, if enhancements were in our interest to adopt and also reduced the pernicious effects of climate change, then it would, indirectly, become in our interest to reduce those pernicious effects. In this way, enhancements may be able to address the root of the problem—which, as we have seen, is our unwillingness to properly respond to climate change—and thus may be more than just another type of solution that is on the table.

In sum, Liao and his colleagues suggest that we are considering the riskiest option, geoengineering, because our other options are insufficient. The trio then argue that we should consider enhancements because they are less risky than geoengineering—less risky, that is, than the riskiest option. This is plausible, but there's a stronger point to be made. Once it is noticed that we are ultimately considering geoengineering because, along with the other obstacles explained in section 1, it is not in our narrow interest to properly respond to climate change, a stronger reason to consider enhancements becomes clear. Specifically, enhancements could align our interests with the promotion of a proper response to climate change. I turn to this argument now.

3. Enhancements and the proper response

Climate change represents an unprecedented difficulty. Its harmful effects evade conventional moral

[18] For a comprehensive discussion of why no conclusive argument against enhancement is cogent, see Buchanan 2011.

evaluation, and it presents several puzzles to individual morality where a single one would likely have restricted our response. We each lack control over whether the harmful effects are produced, our already limited altruistic motivations wane over increased time and space, and our emissions do not adhere to political boundaries. More generally, we have not evolved in a way that is conducive to a proper response, and with us has gone our moral system. As Jamieson puts it: "Evolution did not design us to solve or even to recognize this kind of problem" (2014, p. 102).

Happily, though, the problem itself reveals a potential solution. The process of evolution provides us with the tools we need for surviving, while it has no care for those we find conducive to flourishing. As Frances Kamm puts the point: "The human and the good are distinct conceptual categories" (2005, p. 9n5). I take the proper goal of human enhancement to be that of aligning human capabilities with that which we rightly value—aligning them, that is, with what we find conducive to flourishing.[19] This view has been argued for, more formally, as

> *The Welfarist Approach to Enhancement*: "Enhancement" should be defined to mean any change in the biology or psychology of a person which increases the chances of leading a good life in the given set of circumstances. (Earp, Sandberg, Kahane, and Savulescu 2014, p. 2)

On this view, enhancements are meant to fill the gap between the capacities that happen to have been naturally selected, and those we find conducive to human flourishing. My suggestion is that our evolutionary shortcomings with respect to climate change may also be addressed by way of this process.

If it were in our interest to adopt the particular enhancements that also reduced the

[19] See Buchanan 2011, ch. 4. Buchanan explains that the process of evolution has not considered what we value, and argues that what we rightly value should override the consideration of what is natural.

pernicious effects of climate change, then the enhancements would align our interests with reducing those effects. Enhancements could possibly aid our moral and political inaction as well. I will consider each of these points in turn.

3.1 Current interest and interest altering enhancements

At present, it seems clearly to be in our interest to continue our profligate, high-emitting lifestyles. After all, so long as I'm benefitting from my increased emissions, and these emissions are not directly harming anyone else, I have no clear reason to stop emitting at such high rates.

Notice that there are two ways enhancements could impact our interests and thereby promote a proper response to climate change: our current interests could tell in favor of adopting enhancements that would (happen to) promote a proper response, or enhancements could alter our current interests to tell in favor of promoting a proper response. That is, enhancements could, merely by being introduced, align our interests with the promotion of a proper response, or they could, by being adopted, alter our interests to align with the promotion of a proper response. Call the first type *current interest enhancements*, and the second *interest altering enhancements*. I will consider each, in reverse order, using examples offered by Liao et al. of what the two types of enhancement might look like.

3.1.1 Interest altering enhancements

Consider first interest altering enhancements. One such enhancement, proposed by Liao and his colleagues, is a pharmacological meat intolerance. The damaging effect meat production has on the environment is well known, but it may be even worse than is commonly realized. The authors note that livestock farming may be responsible for at least 51% of global greenhouse emissions.[20] By

[20] See Goodland and Anhang 2009.

triggering our immune system to react poorly to the proteins in certain meats, the trio suggest, we could establish an intolerance to the specific meats that have the worst effects. This triggering could be done via the use of "meat patches—similar to nicotine patches," which could be both mild and effective (Liao et al. 2012, p. 208). Thus, if I were to apply one of these patches, I would no longer desire, and would perhaps even dislike, the particular meats that have the most harmful effects on the environment. And, it seems, if the use of these patches became widespread, they could have an appreciable influence on production of the meats yielding the worst effects. Accordingly, this enhancement would alter our interests, and it would do so in a way that ostensibly promoted a proper response to climate change.

But be that as it may, it seems that the potential contribution enhancements of this sort could make to such a response is at this point quite limited. After all, meat patches are unlikely to be adopted by those who are indifferent toward the effect of livestock farming on the environment. Indeed, as Liao et al. recognize, this enhancement is only likely to be helpful for people who want to abstain from eating these meats but lack the willpower to do so. This means that anyone who adopts meat patches will, in effect, already have an interest in altering their interests. And this means, more generally, that enhancements of this sort, provided they are not forced upon people, will ultimately just collapse into enhancements we already have an interest in adopting—that is, they will collapse into current interest enhancements.

This brings out an important point about the relationship between enhancements and the proper response to climate change. Since it is not in our narrow interest to properly respond to climate change, it seems unlikely that enhancements with the exclusive aim of promoting a proper response will be adopted by anyone who doesn't already have an interest in that proper response. And if the only people who adopt the enhancements are those who already have an interest in a proper response, it is unlikely that the enhancements will make much of a difference with respect to

that response. Put differently, if the set of people who care is too small, it will not help to focus on the people in the set. Enlarging the set will require reaching people who don't already care. Consequently, the enhancements that are most likely to aid us in our attempt to properly respond to climate change are those that are already in our interest to adopt. More precisely, they're those that are already in the interest of people who are not interested in such a proper response to adopt.

This point is easy to miss if the debate over potential solutions is framed in a way that ignores the ultimate source of the problem. Liao and his colleagues offer a number of potential human engineering solutions which are well worth considering, but some of which would only prove as useful as our current interest in properly responding to climate change will allow. Since the problem at present is precisely that there is a lack of interest in a proper response, the latter enhancements seem unlikely to play a significant role in that response. This is the case, at least, so long as these enhancements are not independently desirable.

3.1.2 Current interest enhancements

Another solution Liao et al. propose is making human beings smaller. They write, "Human ecological footprints are partly correlated with our size… other things being equal, the larger one is, the more food and energy one requires" (Liao et al. 2012, p. 208). It may be obvious that larger people require more food, but increased size also leads to less obvious increases in consumption of resources such as clothing and fuel. Hence if humans were smaller, we would consume less, and so the authors suggest that one possible solution is, in particular, making humans shorter. They offer a number of ways this could be done, including preimplantation genetic diagnosis, and hormone treatments to inhibit growth. But while reducing height could of course also reduce our current emissions, it seems clear that this is not an independently desirable enhancement. People do not

generally want to be shorter; if anything, they want to be taller. Accordingly, an enhancement that makes humans shorter seems unlikely to be widely adopted. But it does hint at a possible enhancement that is independently desired.

While people generally do not want to reduce their height, many desire to reduce their weight.[21] Reducing weight would presumably have similar effects on the environment as a reduction in height and, importantly, would have the advantage of being independently desirable. An enhancement capable of reducing our weight would therefore seem to be just the type of enhancement we're after: one that even those who are not interested in a proper response to climate change may have an interest in adopting.

Given a lack of stable food sources throughout our evolutionary history, we have evolved such that foods providing more energy taste better than those providing less. In their discussion of this evolutionary proclivity and the enhancements that could alter it, Nick Bostrom and Anders Sandberg write, "If high-calorie foods are scarce and food availability highly variable, it is optimal for an individual to crave high-calorie foods and to store lots of energy in fat deposits as insurance against lean times" (2009, p. 390). While there is no biomedical technology capable of it at present, the duo suggest that performing gene therapy to alter our inclination toward high-calorie and high-fat foods is entirely possible. As we have seen with meat patches, targeted aversions to certain foods—in this case, high-fat foods—could allow for a widespread reduction in our weight and, thus, our carbon emissions.

This is a clear, though seemingly somewhat tenuous, example of a current interest enhancement. It seems tenuous because its effect on our response is indirect. But because concern over a proper response is not currently widespread, it is unlikely that any enhancement with the sole intention and effect of properly responding to climate change will be widely adopted. The reason

[21] Liao et al. acknowledge this as a less controversial example.

enhancements have such potential—right now—as solutions to climate change is precisely that they could provide us with a widely adopted *indirect* interest in a proper response.

In sum, we have not evolved in a way that is conducive to a proper response. We have also, in many cases, not evolved in a way that is conducive to our own flourishing. If we can align the biomedical technologies that fix the latter problem with those that fix the former, then our own interests will come to promote a proper response. That is, if we can find human enhancements that are in our own interest to adopt and that also reduce the pernicious effects of climate change, then it will, indirectly, come to be in our own interest to reduce those pernicious effects. Any enhancement with both of these features has the potential to be an important part of the proper response to climate change.

3.2 Morality

Even if the harms produced by climate change evade conventional moral evaluation, enhancements that alter our moral dispositions could potentially spur our proper response. One such enhancement—subject to much debate in recent bioenhancement literature, even between so-called bioliberals—ostensibly improves our ability to make moral decisions by making us more altruistic.[22] This is accomplished by taking Citalopram, a serotonin re-uptake inhibitor that, it is suggested, increases our altruistic tendencies. The pill—which, it should be noted, is not only already available but also quite widely used—has been shown to make people less selfish in decision-making. It is plausible, Liao et al. suggest, that increased altruism could lead to a greater willingness to work as a group, and thus aid our collective action problem. Increased levels of serotonin could also result in greater sympathy toward the (potential) victims of climate change, stimulating the promotion of

[22] Regarding this debate, see Harris and Chan 2010, Chan and Harris 2011, Harris 2011, and Kahane and Savulescu 2015.

other solutions—including, say, carpooling, recycling more, or adopting meat patches. Each of these effects does indeed seem plausible and, so, if independently desirable, Citalopram would seem a strong candidate for the type of enhancement we're looking for.

Moral enhancements would also, as this example suggests, be likely to have particularly wide knock-on effects. This is because adoption of these enhancements could result in a direct interest in a proper response to climate change, rather than (as with meat patches) a mere interest that happens to align with the promotion of such a response. Thus it seems plausible that a person with enhanced altruistic tendencies would be more likely to (say) carpool, adopt meat patches, or make their children smaller, because they would then have an interest in, specifically, reducing the harmful effects of climate change.

3.3 Politics

Finally, enhancements could help stimulate our desired political changes. This could be accomplished, simply enough, by introducing the aforementioned enhancements. After all, once it is in our own interest to adopt the relevant enhancements, political leaders will become motivated to support their adoption. Climate change is not currently among the concerns of the public, and so politicians generally feel little need to address it. Enhancements could attend to both of these issues. If enhancements were in our interest to adopt and would also reduce the pernicious effects of climate change, then it would be in our interest to reduce those effects. Our interests would then, we would hope, become those of our representatives.

4. Looking forward

I conclude that enhancements could play an important role in our proper response to climate change. In order to do so, we've seen, it is crucial that these enhancements be in our current interest

to adopt. On a welfarist approach, enhancements align our capabilities with those we find conducive to flourishing, and are desirable because the process of evolution has largely ignored this alignment. We have also evolved in a way that is ill disposed to a proper response, and if we can align the enhancements we desire in virtue of the first problem with those conducive to solving the second, then we will desire enhancements that reduce the pernicious effects of climate change. We will thus have an interest in adopting wide-reaching solutions to climate change.

It might be objected that by focusing on our current interests, we are not actually addressing climate change or our proper response to it. We should not adopt merely those solutions that we are interested in adopting, for it is our selfishness and profligacy that have put us in this situation. Notice, however, that this is not an objection to the account provided here; rather, it is an objection to the content of our current interests. As we become more aware of climate change and more people come to care about it, more enhancements will come to be in our (then-current) interest to adopt. And once the obstacles discussed in the first section are surmounted, the enhancements we desire will change alongside our conception of flourishing. The problem now, however, is inaction. So, we should focus on enhancements that we are interested in adopting, that help reduce the harmful effects of climate change, and that will be the most wide-reaching and effective at present.

It is also perhaps worth noting that, as climate change inevitably and rightly comes to rise in widespread relevance, a minimum level of response is likely to become legally and morally required. And, when emissions must be lowered, enhancements are likely to be the preferred solution. In other words, those leading high-emitting lifestyles are going to face certain necessary trade-offs, and enhancements can soften the blow. This could mean adopting meat patches, or another of Liao et al.'s proposed enhancements, in lieu of giving up one's cross-country flights. The point here is that, once we get the ball rolling, more and more enhancements will come to be in our interest to adopt. But, importantly, we still have a reason to adopt them right now. Enhancements can aid us in every

step leading to the proper response. I have argued here that this includes the very first step.

Climate change is a massive, unprecedented problem, and philosophers may be able to point to a legitimate, practical solution. We have a strong reason, right now, to consider human enhancement solutions in a proper response to climate change: namely, that enhancements are intended to fix our evolutionary shortcomings, and lack of interest in climate change is one such shortcoming. While enhancements may not directly provide us with an interest in properly responding to climate change, they can themselves promote a proper response while also being in our interest to adopt. Those that do could prove to be an integral part of the proper response to climate change.

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