Synthese (2024) 203:147
https://doi.org/10.1007/s11229-024-04593-0

ORIGINAL RESEARCH

Expertise, moral subversion, and climate deregulation

Ahmad Elabbar[1]

Received: 10 January 2024 / Accepted: 5 April 2024

Abstract

The weaponizing of scientific expertise to oppose regulation has been extensively studied. However, the relevant studies, belonging to the emerging discipline of *agnotology*, remain focused on the analysis of empirical corruption: of misinformation, doubt mongering, and other practices that cynically deploy expertise to render audiences ignorant of empirical facts. This paper explores the wrongful deployment of expertise beyond empirical corruption. To do so, I develop a broader framework of *morally subversive expertise*, building on recent work in political philosophy (Howard, 2016). Expertise is subversive if it sets up its audience to fail morally, either intentionally or negligently. I distinguish three modes of subversive expertise: *empirical subversion* (the focus of agnotology), *normative subversion* and *motivational subversion*. Drawing on these distinctions, I offer a revisionary account of the Trump Administration's regulatory science as a case study. I show that the Trump Administration's use of expertise to dismantle climate regulation, contra the standard charge, cannot be explained using the resources of agnotology alone: the Administration produced highly reliable climate assessments, detailing the risks of climate change, candidly admitting the harms of its proposed policies, and still successfully deployed these findings to justify massive climate deregulation. The lesson of the analysis is that dismissing the expertise that underpins climate deregulation as empirically corrupt 'anti-science' both obscures its actual role in the politics of climate change and understates its wrongfulness: it misses the breadth of the assault on moral agency that sustains climate injustice.

Keywords Climate change · Climate deregulation · Morally subversive expertise · Agnotology · Trump Administration · Vehicle emissions · Political philosophy of science

✉ Ahmad Elabbar
ae423@cam.ac.uk

[1] Department of History and Philosophy of Science, University of Cambridge, Cambridge, UK

Published online: 30 April 2024

1 Introduction

In recent years, historians, philosophers, and sociologists of science have told a horror story about the co-option of scientific expertise to undermine regulation in the public interest. In cases that range over tobacco consumption, asbestos exposure, the opioid crisis, the epidemic of honeybee deaths, and, perhaps most significantly, climate change, scholars have documented a dizzying array of strategies – perfected by industries under regulation, mobilising lobbyists, consultancy firms, think tanks and government agencies – that weaponize science to undermine the empirical basis for regulation (e.g., Fernandez Pinto, 2017; Franta, 2022; Freudenburg et al., 2008; Holman & Elliott, 2018; Kleinman & Suryanarayanan, 2013; Michaels & Monforton, 2005; Oreskes & Conway, 2010). The documented strategies vary in sophistication, from crude data manipulation and doctoring of graphs (e.g., Oreskes & Conway, 2010, pp. 186–190) to more subtle practices that appear cloaked in scientific norms and conventions, appealing to scepticism, criticism, and stringent evidential standards, but which effectively supress inconvenient knowledge (see Fernandez Pinto, 2017; Kleinman & Suryanarayanan, 2013). Such investigations form a substantial part of the emerging discipline of *agnotology*, dedicated to the study of factual ignorance and its aetiology (Proctor & Schiebinger, 2008). Their findings cast a dark shadow on contemporary science: public ignorance of crucial policy-relevant facts has been cultivated and maintained by 'an increasingly politicized and commercialized science' (Kourany & Carrier, 2020, p. 3).

Thanks to this literature, we have a much clearer picture of how our reliance on expertise leaves us vulnerable to empirical corruption: to being misled about empirical facts. Since a successful exercise of moral agency depends on knowledge of relevant empirical facts, our vulnerability to empirical corruption leaves us vulnerable to moral and political failure. What this literature neglects, however, are the ways in which scientific expertise can be deployed to undermine moral agency in ways that do not involve misleading audiences about empirical facts; indeed, which involve candidly presenting the relevant facts. The aim of this paper is to explore such wrongful deployment of scientific expertise beyond empirical corruption. To do so, I develop an account of *morally subversive expertise*, building on recent work in political philosophy (Howard, 2016). Expertise is subversive if it sets up its audience to fail morally, either intentionally or negligently. I distinguish three modes of subversion: *empirical*, *normative*, and *motivational subversion*. The three modes of subversion differ with respect to the mechanisms by which they induce moral failure. Roughly, empirical subversion transpires when an agent renders another ignorant of morally relevant empirical facts (the focus of agnotology); normative subversion transpires when an agent renders another ignorant of the content or role of morality; and motivational subversion transpires when an agent tempts another to act wrongly, e.g., by presenting them with practical incentives for wrongdoing. Scientific expertise, I argue, can be deployed to induce wrongdoing along all three dimensions – our reliance on expertise leaves us vulnerable to moral failure in broader ways than is often appreciated.

While the main contribution of this paper is to offer a broader account of wrongful expertise that accommodates but goes beyond agnotology, the paper makes a second-

ary contribution to the agnotology literature itself – by situating it within an explicitly moral framework: Whereas we have a highly developed literature on what makes, say, the practices of the tobacco industry wrongful *epistemically*, accounts of their *moral* wrongfulness lag behind. Existing moral critiques of the tobacco strategy point to the ultimate consequences of factual ignorance on population health or the welfare of marginalised groups as the wrong-making feature. By analysing the relevant practices as forms of subversion, this paper identifies what is wrong, in the first instance, with the strategies documented in the agnotology literature: they are wrongful firstly because they disrespect the moral agency of the subverted audience, and secondly because of their ultimate harmful social consequences – subversive expertise thus involves *two* injustices.

Ultimately, my aim in developing this framework of subversive expertise is to illuminate actual cases of political wrongdoing, and of climate deregulation in particular. As such, I use the framework to analyse a climate assessment produced by the Trump Administration to justify deregulating vehicle emissions (NHTSA, 2018), dismantling a key US climate mitigation policy. I demonstrate, contra ubiquitous charges of 'bias' and 'anti-science' levelled at it, that the Administration produced a highly reliable assessment: endorsing the scientific consensus on climate change and conceding that the Administration's proposed policy will exacerbate climate change more so than all other feasible policies, on every timescale considered and on every metric of risk. The puzzle left by this conclusion – namely how such an apparently damning assessment could plausibly lend support to the Administration's policy – is answered by shifting away from the empirical reliability of the assessment to its normative and motivational impact. The assessment supports deregulation, I argue, by deploying its empirically reliable content to assault the normative and motivational bases for mitigation: the assessment tempts its reader to accept greater emissions, noting that the harms of the policy will only marginally worsen an already bleak future, that the harms to which the policy contributes cannot be directly attributed to the policy, and that these harms will not disproportionately fall within the borders of the United States, among other subversive discourses. To understand the ways in which scientific expertise can be (and has been) deployed to prop up unjust policies, even Trump-era deregulation, we must look beyond empirical subversion towards other modes of morally subversive expertise.

I proceed as follows. Section 2 introduces the basic concept of moral subversion, distinguishing its three modes of empirical, normative, and motivational subversion. Section 3 develops the framework of subversive expertise, building on the basic concept. Section 4 uses the framework to analyse a case study from the Trump Administration's climate assessments, exemplifying normative and motivational subversion in expert communication. Section 5 concludes.

2 Moral subversion

At its core, moral subversion is an intuitive concept: it refers to activities that induce others to fail morally. The aim of this section is to unpack this concept in more detail, developing Jeffrey Howard's (2016) recent account, which forms the starting point for my discussion.[1]

2.1 Howard's account of subversion

Howard (2016) offers an account of moral subversion in the context of analysing what goes wrong, morally speaking, in cases of criminal *entrapment*: where a state agent induces a person to commit a crime in order to prosecute them. E.g., when a police officer bribes, persuades, or otherwise incentivises a suspected gang member to commit a criminal offence as part of an investigation leading to their arrest. Rather than locating the wrongness of entrapment in the prosecution and eventual punishment of the entrapped defendant, as prevailing accounts of entrapment do (ibid., pp. 25–28), Howard focuses instead on the initial act of incitement itself, arguing that entrapment is wrong, in the first instance, because it involves *moral subversion*, defined as follows: 'To subvert an agent's moral capacities is to interfere with the agent's practical reasoning in ways that increase the likelihood she will culpably choose to act wrongly' (ibid., p. 25). For the purposes of this paper, I will abstract away from the context of entrapment that inspired Howard's discussion and focus purely on understanding the underlying notion of moral subversion, 'what goes wrong when *any* moral agent induces another moral agent to act wrongly' (ibid., p. 29).

Howard's objection to subversion is grounded in a duty of respect for moral agency (ibid., pp. 29–31). Howard contends that respecting a person's moral agency involves taking up appropriate attitudes towards their agency, in light of its value, and regulating one's conduct by norms that reflect the relevant attitudes (ibid., pp. 29–30). The relevant attitudes appropriate towards moral agency, i.e., that convey respect for moral agency, are *recognition* and *support*: recognition of others' abilities to reason about right and wrong, and support for the exercise of their abilities, helping them 'live up to morality's demands' (ibid., p. 30). Setting up others to fail morally is thus incompatible with this second attitude of support for the successful operation of others' moral capacities (ibid., p. 25). Subversion, in short, violates a duty of respect that we owe to each other qua moral agents.[2] The upshot of the respect-based analysis of subversion is this: When we think about the wrong of subversion, e.g., in standard

[1] Although I focus on Howard's account of subversion in this paper, I also draw inspiration from Buchanan's (2002, 2009) closely related work on 'social moral epistemology', which also explores social-epistemic interactions that trigger moral failure.

[2] Howard's discussion of moral agency draws on a distinction that I omit for simplicity throughout this paper but describe here for completeness. Howard draws on a distinction in liberal political philosophy between agents' *two moral powers*: The first is the capacity to reason about right and wrong and regulate one's conduct accordingly. The second is the capacity to form and pursue a conception of the good (ibid., p. 29). Strictly speaking, the disrespect of moral agency involved in subversion is directed at one component of moral agency: the first moral power. Throughout this paper, for simplicity, I will use 'moral agency' to refer to the capacity to reason about the right, rather than the more precise term, 'first moral power', but nothing substantive rides on this choice.

cases of incitement to violence, we typically point to the ultimate consequences and victims of violence, the harms caused by the subverted agent's actions. However, on the respect-based analysis, the subverted agent themself is also wronged – subversion thus typically involves two injustices. Importantly for Howard, though the subverted agent has a complaint against their subverter for tripping them up morally, since subversion does not involve coercion, or other exculpatory factors, their own responsibility for wrongdoing is not diminished; hence Howard's insistence that the subverted agent 'culpably choose[s] to act wrongly' (ibid., p. 25, see also pp. 30–33).

Having identified disrespect for moral agency as the wrong-making feature of subversion, Howard proceeds to distinguish two broad categories of subversive activity: *motivational subversion* and *epistemic subversion*. Motivational subversion transpires when an agent 'either creates a reason for another agent to act wrongly, or strengthens the practical force of a temptation the agent faces to act wrongly' (ibid., p. 31). Motivational subversion can take the form of material incentives for wrongdoing, e.g., money, or communicative practices that render a wrongful act more attractive or, conversely, render a moral duty less attractive. Epistemic subversion, by contrast, transpires when an agent 'causes the formation of false beliefs in another agent' (ibid.). The beliefs in question include beliefs about the substance and role of morality. E.g., when a person convinces another to adopt norms of racial supremacy, or to rank moral reasons on par with non-moral reasons, 'rather than decisive and regulative' (ibid.). They also include beliefs about morally relevant facts, such as empirical facts about climate change, factory farming, drug safety, etc., that are relevant to the application of moral principles. In short, subversive practices work to undermine others' moral agency by either targeting their beliefs or motivations.

Let us now consider the scope of activities that properly qualify as subversive on Howard's account. There are plenty of activities that increase the likelihood of others' wrongdoing which we would not want to condemn as subversive. Easy cases include those where an agent does not know and cannot reasonably foresee the effects of their actions on others. For example, when I sincerely believe that I am alone, I have a habit of talking to myself out loud. Suppose unbeknownst to me, my friend is in the other room and overhears a claim that leads them to act wrongly. Such cases fall outside the scope of subversion on Howard's account; subversive activity is that which '*foreseeably* increases the likelihood' of others' wrongdoing (ibid., p. 37, emphasis in original), a rider that importantly covers *negligent* subversion (ibid., pp. 33–37), where an agent ought to have known the subversive effects of their actions, but excludes the easy cases exemplified above.

There are, however, harder cases where our actions foreseeably increase the chance of others' wrongdoing, but which we would also want to exclude from the scope of subversion. To see this, consider two examples that Howard offers: Jones, a black man, walks down a street frequented by white supremacists, thereby increasing the likelihood they will harm him; a government justly raises taxes on the rich, increasing the likelihood they will wrongfully evade them (ibid., pp. 31–32). It seems perverse to subsume such cases under subversion, as that would amount to saying, e.g., in the first case, that the white supremacists have a complaint of justice against Jones for disrespecting their moral agency. To exclude such cases, Howard distinguishes between morally *protected* and *unprotected* activities (ibid., p. 32). To say

that an activity is morally protected is to say that the agent has a moral right or duty to engage in the activity, e.g., Jones has a morally protected right to freedom of movement, and the government has a moral duty to pass just tax laws. Morally protected activities fall outside the scope of subversion, even if they foreseeably increase the chance of others' wrongdoing. Thus, we arrive at Howard's more precise definition: 'Subversion, then, is otherwise morally unprotected activity that foreseeably increases the likelihood that others' first moral power will culpably operate defectively' (ibid., p. 33).[3]

These three elements – the analysis of the wrong of subversion in terms of disrespect of moral agency; the different modes of subversion; and the scope of activities that qualify as subversive – form the core of Howard's account of moral subversion. Before applying the concept to the analysis of wrongfully deployed expertise, I will strengthen the element that will figure most centrally in the subsequent discussion but is underdeveloped in Howard's account: the analysis of the different modes of subversion.

2.2 Three modes of subversion

Recall that Howard distinguishes epistemic and motivational modes of subversion. While I will borrow Howard's definition of motivational subversion unchanged, I will modify the definition of epistemic subversion, and further distinguish the category into empirical and normative varieties, giving us three modes of subversion in total.

For Howard, epistemic subversion transpires when an agent 'causes the formation of *false beliefs* in another agent' (ibid., p. 31, emphasis added). This definition, however, is too restrictive – true belief has other 'contraries' beyond false belief (Goldman, 1999, p. 5). Following Guerrero (2007, p. 63), let us distinguish three states of *ignorance* where an agent lacks true belief: (I1) A person is ignorant because they have never thought about an issue, and therefore hold no explicit beliefs about it: 'has no beliefs about F or only has unexamined 'implicit' beliefs about F'. (I2) A

[3] The exclusion of morally protected activity in Howard's account raises a worry. If we take speech to be morally protected, the exemption of morally protected activity from the scope of subversion appears to exclude the very practices that motivated Howard's account, e.g., speech that incites wrongdoing. Although Howard does not address this point in his account of subversion, elsewhere (Howard, 2019) he has argued against the view that all speech is morally protected irrespective of its content. Note that rejecting such blanket *moral* protection for speech – e.g., denying that 'hate speech' is *morally* protected – does not imply rejecting its *legal* protection (see Howard, 2019, p. 247). Thus, it is important to interpret Howard's proviso, that only 'otherwise morally unprotected activity' counts as subversive, in a way that leaves room to condemn speech that undermines others' moral agency as subversive; and, again, this is compatible with the view that such subversive speech 'may still merit *legal* protection in the final analysis' (Howard, 2024). While I hope this clarification is helpful, the issue at hand is tricky and turns on fundamental questions over the morality of speech that go beyond this paper. Suffice it to say that if one were persuaded that all speech is morally protected, or that the range of morally unprotected speech is so narrow that it would exclude the examples of expert communication that I will discuss shortly, then one option to consider is to drop Howard's proviso so as not to exclude the relevant speech acts from the scope of moral subversion – although dropping the proviso comes with its own set of challenges (see Howard, 2016, pp. 32–33). I thank an anonymous reviewer for pressing me on Howard's proviso and its potential to exclude expert/academic speech.

person is ignorant because, having thought about an issue, they have come to hold false beliefs about it: 'believes that not-F when in fact, F'. (I3) A person is ignorant because, though they have thought about an issue, they do not know what to believe and have come to suspend judgement: 'doesn't believe that F or that not-F'.[4] Note that only I2 is captured in Howard's definition of epistemic subversion. Clearly, however, agents can be induced to act wrongly by being rendered ignorant in the first sense, keeping them unaware of an issue; or in the third sense, being made ignorant through engendering doubt and suspension of judgement on an issue. Indeed, one of the main contributions of the agnotology literature regarding the manufacture of ignorance in science has been to show how industries successfully halted regulatory action in more subtle and effective ways than the propagation of outright falsehoods, but rather through inducing the public to suspend judgement on scientific matters despite the existence of a scientific consensus, as I will review shortly. As such, let us broaden the definition of epistemic subversion from false belief to ignorance: *epistemic subversion transpires when an agent renders another ignorant of the content or role of morality or of morally relevant empirical facts.* Furthermore, let us distinguish epistemic subversion into two sub-modes, empirical and normative, to separate the analysis of factual versus moral beliefs going forward, giving us three modes of moral subversion:

1. *Empirical subversion* transpires when an agent renders another ignorant of morally relevant empirical facts.
2. *Normative subversion* transpires when an agent renders another ignorant of the content or role of morality.
3. *Motivational subversion* 'transpires when an agent either creates a reason for another agent to act wrongly, or strengthens the practical force of a temptation the agent faces to act wrongly' (Howard, 2016, p. 31).

To close this discussion, let us ground these distinctions in an everyday example before moving to the context of expertise. Consider a person rightly convinced that eating meat – or, at least, eating some form of meat, e.g., factory farmed chicken – is wrong. A subversive 'friend' may induce them to consume meat along any of the following routes: by misleading them about morally relevant empirical facts: e.g., claiming that a new study shows that chickens do not feel pain (empirical subversion). Or they may go directly for the norm in question, misleading them about the content or role of morality, e.g., arguing that animals, despite feeling pain, are not worthy of moral consideration (normative subversion). Or they may tempt their friend to consume meat by chipping away at their motivation to live up to morality's demands, by saying something as simple as, 'But you used to love eating chicken!', or by placing their vegetarian friend in a context that breaks their resolve, e.g., by inviting them to a dinner where refusing meat would shame them (motivational subversion). Finally, note that although these modes are conceptually independent, as the example illustrates, they are often entangled in practice, with the same subversive act undermin-

[4] See Mills (2007, p. 23) and Wilholt (2020) for similar conceptions of ignorance.

ing moral agency along multiple modes, e.g., subverting both moral convictions and motivations simultaneously, as will become clear in the case study (Sect. 4).[5]

3 Morally subversive expertise

With the basic concept in place, I now turn to a particularly potent form of subversion, where scientific expertise is deployed to undermine moral agency; what I call, *morally subversive expertise*, analysing it along the three modes of subversion distinguished above. By 'deployment of expertise', I mean the use of one's own epistemic advantage (specialist knowledge or ability) *or that of others*. I.e., I mean to cover both cases where experts appeal to their own authority as well as cases where non-experts appeal to the authority of experts, e.g., when spokespersons for an industry appeal to the expertise of friendly scientists.

Before proceeding, I note that the focus of this section is limited in two ways. Firstly, I limit the discussion of subversive expertise to *scientific* expertise. Of course, other forms of expertise can be deployed subversively, e.g., a journalist or historian, deferred to by readers for their expertise on a political issue, can empirically subvert their audience. Second, I focus on subversive uses of science in the *regulatory* context. Again, scientific expertise can be used to subvert agents in contexts that do not concern state policies and regulations. A self-help book may normatively subvert readers by, say, drawing on evolutionary biology to normalise unjust social hierarchies in human society. This choice of focus reflects the aims of the paper – namely, to illuminate the role of science in cases of regulatory failure, and of climate inaction in particular – while noting that the concept of subversive expertise extends beyond my focus.

3.1 Empirically subversive expertise

Expertise is empirically subversive if it is deployed in ways that foreseeably render an audience ignorant of morally relevant empirical facts, increasing the likelihood that they will choose to act wrongly.[6]

[5] Another, potentially deeper reason for the entanglement of these modes of subversion, particularly the normative and motivational modes, relates to the internalist/externalist debate on moral motivation (see Svavarsdóttir, 2006; Wallace, 2006). On at least the stronger brand of motivational internalism, moral judgement is itself a source of moral motivation, i.e., the judgement that some action is right or wrong motivates, on its own, the agent making the judgement. If one holds this view, then whenever normative subversion occurs, motivational subversion co-occurs. This way in which modes of moral subversion may be entangled rests, however, on a controversial position, so I merely note it here as a possibility but will not emphasise it in the discussion.

[6] Recall that Howard's definition of subversion assumes that subverted agents *culpably* choose to act wrongly. In defining subversive expertise, I have chosen to drop the culpability assumption. This is partly because questions of culpability, at least for factual ignorance, are especially tricky when the cause of such ignorance is reliance on (subversive) expert testimony, to which laypersons are generally meant to defer – the question of laypersons' culpability for factual ignorance in such cases turns on whether we think lay assessment of expert testimony is a straightforward matter or not (Anderson, 2011; cf. Pongiglione & Martini, 2022), and I want the account of subversive expertise to remain neutral on this debate. I thank Jeffrey Howard for a helpful exchange on this issue.

This mode captures the familiar epistemic wrongdoing of industries identified in the bias/agnotology literature that dominates analyses of regulatory failure at present. I will review the main insights of this literature before noting its limitations and the need to attend to other modes of subversive expertise to account for political inaction on issues such as climate change.

Scholars of scientific assessment for policy note that, in the twentieth century, complex regimes of assessment were institutionalised as an integral component of public policy in modern states (see Oppenheimer et al., 2019, Chap. 1). Pamuk puts this point succinctly when she writes, 'It is a core assumption of modern states that claims to truth in policy contexts must be scientific' (Pamuk, 2021, p. 151). As such, for industries under regulation, science represents 'both a danger and an opportunity' (Franta, 2022, p. 556), a source of power that must be aligned with an industry's pronouncements, a fact keenly noted by industry strategists, as an early industry playbook for avoiding regulation makes strikingly clear:

> Regulatory policy is increasingly made with the participation of experts, especially academics. A regulated firm or industry should be prepared whenever possible to coopt these experts. This is most effectively done by identifying the leading experts in each relevant field and hiring them as consultants or advisors, or giving them research grants and the like. This activity requires a modicum of finesse; it must not be too blatant, for the experts themselves must not recognize that they have lost their objectivity and freedom of action. (Owen and Braeutigam 1978, p. 7, cited in Franta, 2022, p. 556)

In recent years, scholars have mapped this landscape of co-option, uncovering strategies of empirical subversion that deploy scientific expertise to render publics and policymakers ignorant of morally relevant facts. The tobacco industry, a paradigm example in this literature, created what they referred to as a 'stable' of expert witnesses (Galison & Proctor, 2020, p. 31), marshalled to defend their product in public and in court. Scientists hired by the tobacco industry worked for decades to dispute the empirical basis for tobacco regulation, manufacturing uncertainty on the science linking smoking – and second-hand smoking – to lung cancer, heart disease, and other illnesses, and attacking the reputation of scientists who demonstrated such links (Fernandez Pinto, 2017; Michaels & Monforton, 2005; Proctor, 2011). Typically, the deployment of external experts was done covertly, via third-party agencies and law firms who handled the recruitment of experts and their training (Fernandez Pinto, 2017, p. 58), so that the tobacco industry could claim them as independent experts 'without anyone knowing who was pulling the strings' (Proctor, 2011, p. 207). In addition to mobilising external experts, the reliable but inconvenient results of in-house studies, evidencing, e.g., the addictive properties of nicotine, were withheld from the public – by shutting down entire research divisions to supress leaks, in extreme cases (Proctor, 2011, pp. 263–267). Beyond challenging the science linking cigarette smoking to cancer and other diseases directly, the industry also funded vast swathes of legitimate research in virology, genetics, biochemistry, and other disciplines that might be expected to reveal alternative causes to the diseases in question – over seven thousand papers were published with grants from the Council of Tobacco

Research, the main research arm of the tobacco industry (Galison & Proctor, 2020, p. 30). By funding such 'decoy'/'distraction' research (Proctor, 2011, pp. 261–263), the tobacco industry could point to an endless list of alternative causes for the diseases linked to smoking, placing the onus on regulators to rule out such alternative causes, thus perpetually raising the burden of proof for regulation. Since regulatory agencies are typically required by law to respond to submitted evidence (Michaels, 2008, p. 73), this strategy of flooding the system with 'noise' proved highly effective in buying time and creating a public impression of a highly contested scientific controversy which had in fact long been resolved (Galison & Proctor, 2020, p. 31).[7]

The 'tobacco strategy', as it has since been dubbed (Oreskes & Conway, 2010, p. 6), has been deployed by numerous industries to undermine the empirical basis for regulation, obscuring everything from the risks of pharmaceutical drugs to the industrial causes of environmental degradation, e.g., acid rain and ozone depletion and, most significantly in recent years, the link between fossil fuels and climate change (see, e.g., Fernandez Pinto, 2017; Franta, 2022; Michaels, 2008; Oreskes & Conway, 2010).[8] 'Doubt is our product', and 'time to come up with more confusion!', are among the leaked industry memos that encapsulate the aims of the strategy (Michaels, 2022, p. 20; Oreskes & Conway, 2010, p. 34). Despite their diversity, the strategies in question all belong to what I am calling empirically subversive expertise: the deployment of expertise along the lines of the tobacco strategy undermines moral agency by misleading audiences with respect to empirical facts. Clearly, understanding this mode of subversive expertise is critical to an understanding of regulatory failure, particularly in the case of climate change. Yet, the near-singular focus in the literature on empirical subversion neglects other ways in which scientific expertise can and has been mobilised to contest and dismantle protective regulation, limiting our understanding of deregulatory phenomena (see Mansfield, 2021). As such, it is crucial to recognise how empirically unimpeachable expertise can still be deployed to undermine just regulation by shaping normative commitments and moral motivations directly.

Before moving on, however, I will cash out an important insight that follows from situating the tobacco strategy within an explicitly moral framework. Although a great deal of scholarly attention has been devoted to the tobacco strategy – and forms of empirical ignorance-making involving scientific expertise, more broadly – the focus of the literature has been on providing *epistemic accounts* of wrongdoing. I.e., on explaining what makes the various elements of the tobacco strategy – doubt mongering, strategic dissent, character assassination, etc.– wrongful in terms of their

[7] Note that tobacco companies deployed expertise beyond the scientific: e.g., mercenary historians testified in court on the side of tobacco companies, giving historical evidence that claimed to prove that smokers always knew the harms of cigarette smoking; as such, they were not 'mislead consumers', but fully informed adults personally responsible for their lifestyle choices (Proctor, 2006).

[8] It is also worth noting that the literature on the strategic deployment of science to produce ignorance has moved beyond the tobacco strategy. E.g., Kleinman and Suryanarayanan (2013, 2015) show how Bayer Corporation used the accepted standards of evidence set by regulatory agencies and favoured by toxicologists to ensure that beekeepers' evidence of the harms of neonicotinoids on bee populations was excluded from the regulatory process. I.e., some norms of regulatory science play in favour of industry interests; in such cases, industries need not contest existing academic and regulatory studies but can appeal to them directly to supress inconvenient knowledge.

detrimental effects on the production of knowledge within expert communities or the uptake of knowledge among non-expert audiences. Such epistemic accounts are highly developed, drawing on everything from virtue epistemology (e.g., Biddle et al., 2017) to agent-based models (e.g., Weatherall et al., 2020) and much more. By contrast, *moral accounts* of the tobacco strategy have lagged behind, and have tended to focus on the ultimate risks posed to certain communities who are disadvantaged by the social and political consequences of manufactured ignorance/dissent (e.g., Leuschner, 2018; Leuschner & Fernández Pinto, 2021). By analysing the tobacco strategy, and similar empirically subversive strategies, as forms of moral subversion, this paper strengthens existing moral accounts. Such empirically subversive strategies are morally wrongful not only because of their harmful consequences for ultimate victims, but because, in the first place, they disrespect the moral agency of the subverted agents (recall that subversion involves two injustices, an immediate injustice against the subverted, and a final injustice against those harmed by the subverted agent's actions). E.g., in addition to those harmed by unmitigated climate change, subverted publics in developed nations, say, the US, have a complaint of justice against those scientists who did the bidding of the oil industry for 'undercut[ing] their quests to be just persons' (Howard, 2016, p. 25).[9]

3.2 Normatively subversive expertise

Expertise is normatively subversive if it is deployed in ways that foreseeably render an audience ignorant of the content or role of morality, increasing the likelihood that they will choose to act wrongly.

In familiar cases where an industry attempts to defend its product, or where a regulatory agency defends its policy, basic moral assumptions are typically uncontested: e.g., industries typically contend that their products are safe when used responsibly by consumers, granting that if proven harmful it would be wrong to sell them. Tobacco companies routinely made such commitments, e.g., when a tobacco company executive announced that his company would 'stop business tomorrow' if 'we had any thought or knowledge that in any way we were selling a product harmful to consumers' (Proctor, 2011, p. 257). The existence of such moral common ground is precisely why industries tend to focus, at first, on empirical subversion, contesting claims that their products are harmful, as surveyed above.[10] Note, however, that industries could take a different route: they could contest the moral ground directly, and scientific expertise can furnish the empirical premises in such moral arguments. They could say, e.g., 'Granted, we're exacerbating climate change, but our scientists have run simulations showing that the majority of those harmed by climate impacts

[9] See Irzik and Kurtulmus (forthcoming, Sect. 6) for a rare moral account of the tobacco strategy that also attends to the injustice done to the empirically subverted agent, rather than their ultimate victims. Our accounts, while drawing on different theoretical resources, are complementary, offering two perspectives on the injustice of rendering a person ignorant of morally relevant facts.

[10] Schroeder (2017, p. 1052) makes a related observation in the context of climate change: 'Climate change skeptics more often object to the empirical claims made by climate scientists—not to the basic values they hold. This is what makes them climate change skeptics or deniers and not climate change apathists'.

are people outside our borders and, since national interest is what matters, mitigating climate change isn't a priority for us'. Arguments of this kind defend a product/policy not by obscuring or denying inconvenient scientific findings, but by deploying such findings as premises in arguments that generate moral ignorance. This, in essence, is what normatively subversive expertise denotes. To get a better sense of this mode in action, consider the following passage from a 1995 advertorial in the New York Times by the oil giant Mobil Corporation (to become ExxonMobil following a merger):

> […] to those who think [the fossil fuel] industry and nature cannot coexist, we say show a little respect for Mother Nature. She is one strong lady, resilient and capable of rejuvenation. The environment recovers well from both natural and man-made disasters. When Mount Saint Helens erupted in 1980, it destroyed 200 square miles of land and 19 million old-growth trees. Just 15 years later, much of the area has recovered. New generations of elk have learned to feed in new-growth forests rather than old growth. Coho salmon, thought unable to survive in the now unnaturally warm waters of the area, are thriving. Even Alaska's Prince William Sound survived the 1989 oil spill and today is biologically alive thanks to the remarkable powers of nature. (Mobil, 1995)

In this passage, Mobil does not defend fossil fuels by contesting their role in climate change, as it has done elsewhere (see Supran & Oreskes, 2017). Rather, Mobil grants that, at least to some degree, its products are responsible for climate and environmental degradation, and attempts instead to reshape readers' moral conception of what an attitude of respect for nature enjoins. Activists desperate to protect Mother Nature from fossil fuel emissions fail to properly respect her, Mobil contends, since doing so involves recognising her profound resilience and acting in a manner consistent with that recognition – namely, continue emitting. The advertorial cites a range of ecological findings to support its key premise: nature is resilient. I suggest that the deployment of expertise in this passage strikes us as subversive not primary because it misleads readers about empirical matters – though the specific claims about Mother Nature bouncing back from oil spills and the health of Coho salmon, etc., are surely contestable. The deployment of expertise is subversive, in the first instance, because it marshals a set of ecological findings with the aim of reshaping audiences' moral conceptions, persuading them to endorse and guide their actions in accordance with a false environmental ethic, and this is what is distinctive about the example.[11]

Let us now turn to the final mode of subversive expertise, where a speech act involving the expression of a scientific claim incentivises wrongdoing.

[11] The example is not perfect, because it is an 'impure' case of normative subversion – likely mixing empirical subversion as well (I thank Karen Kovaka and Heather Douglas for noting the impurity of this case). It is hard to find pure cases of normative and motivational subversion in existing studies of industry and deregulatory science because these modes have not been the focus of the literature. The analysis in Sect. 4 of the Trump Administration's climate assessments will furnish such pure cases.

3.3 Motivationally subversive expertise

Expertise is motivationally subversive if it is deployed in ways that either create a reason for another agent to act wrongly, or strengthen the practical force of a temptation the agent faces to act wrongly.

Beginning with a simple example, consider a demographics expert advising an official on where to spend a development budget. The expert presents the politician with the following information: 'We've crunched the numbers from the previous election. We find voter turnout in deprived neighbourhoods is low. If you spend the money on richer areas instead, you'll win the next election'. Assume that this information is accurate. What objection might we have to this form of expertise? Strictly speaking, the expert is not attempting to reshape the politician's moral commitment, they are not claiming that those in deprived neighbourhoods are less worthy of moral consideration, so this is not normative subversion. They are, rather, creating a practical incentive for the politician to act wrongly. This speech act functions essentially like a bribe.

Moving on to the climate context, consider what Lamb et al. (2020) have recently dubbed, 'discourses of climate delay'– forms of speech that accept the reality of climate change but demotivate effective regulation. These discourses are compelling, because they tap into 'legitimate concerns and fears' (ibid., p. 5), and are often promulgated by actors with a genuine concern for climate change, although they can be cynically deployed. They include discourses of 'surrender', e.g., where an agent describes in excruciating detail the challenges posed by climate change, the vanishing chances of success, the historical record of failed negotiations, the widespread greenwashing by governments and corporations, the prospect of having already crossed tipping points, etc. Surrender discourses are typically accurate in what they describe, faithfully citing the latest scientific assessments. Yet, in certain contexts, such discourses reliably trigger a sense of despair in audiences, sapping their motivation for action.

Before moving on let me say something more about which surrender discourses in particular I consider problematic, as their presentation in Lamb et al. (2020) is quick, and it is important not to condemn all such discourses as motivationally subversive. In a paper entitled, 'Hope from Despair', Huber (2023) argues persuasively that certain expressions of despair are critical in guarding ourselves and our listeners from succumbing to false hope, and can ultimately help us hope well. Huber distinguishes between 'episodic' and 'fundamental' despair, where the former is compatible with ultimate hope and action, and is the form of despair deployed by activists, culminating in action – think, e.g., of Greta Thunberg's famous speech: 'I don't want you to be hopeful. I want you to panic. […] And then I want you to act' (Thunberg 2019, cited in Huber, 2023, n. 3)– whereas fundamental despair destroys 'our basic underlying sense that the future is open to our interventions', undermining 'practical agency as such' (Huber, 2023, p. 82). The sort of surrender discourses that ought to be condemned as motivationally subversive are those that engender fundamental, rather than episodic, despair.

Beyond surrender discourses, Lamb et al. (2020) describe other discourses of delay that include the use of elaborate statistics comparing carbon footprints of differ-

ent nations or projects, demotivating those with relatively low carbon footprints from acting first, emphasising the unfairness of current burden sharing arrangements and the likelihood that other actors will free ride on one's efforts, etc. I will not unpack the motivationally subversive effects of each, but simply note their salient feature: they typically include an appeal to reliable science, framed and presented in ways that motivate a wrongful act or, conversely, demotivate a moral duty.

With this framework of subversive expertise in place, I now turn to analyse a central case of climate deregulation under the Trump Administration. As I will argue, without recognising the many of ways in which expertise can be deployed to undermine moral agency beyond empirical subversion, we cannot account fully for the strategic use of science in deregulatory politics.

4 Beyond empirical subversion: the trump administration's climate assessments

During its tenure, the Trump Administration made dismantling US federal climate and environmental laws a strategic priority (Davenport, 2020a; Jotzo et al., 2018; Pitt et al., 2020). According to various regulatory trackers, the Administration succeeded in rolling back over 100 environmental regulations set by previous administrations – regulations aiming at preserving natural habitats and wildlife, protecting human health from industrial pollutants and chemical toxins, and mitigating climate change (Davenport, 2020b; Popovich & Plumer, 2020).[12] As required by law, underpinning these deregulatory actions are detailed environmental assessments analysing the foreseeable impacts of the Administration's proposals and justifying them accordingly. Despite their significant political legacy, however, the role of environmental assessments in supporting Trump-era deregulation remains understudied. In particular, ubiquitous charges of 'bias' and 'anti-science' levelled at the Administration's agencies, charging that its deregulatory actions are based on empirically unreliable assessments, have gone largely unchallenged.[13] The following analysis cuts against the grain of these dominant charges, revealing a more complex– and more problem-

[12] Estimates vary; a recent study puts the number of deregulatory actions as high as 210 (Barnosky et al., 2021, p. 2).

[13] Becky Mansfield's (2021) study of risk analysis in Trump's EPA is an important exception, and my analysis in this section aligns with Mansfield's central thesis: that 'contesting deregulation by declaring it anti-science' (28) is both unilluminating, analytically, and leads to an impasse in public debates over regulation, with each side in the political debate claiming the mantle of science. Rather, critical engagements with the science underpinning deregulation, which Mansfield dubs, 'deregulatory science', should go beyond demarcation efforts that seek to discredit it on empirical grounds and move instead towards an explicitly moral critique of the underlying values and assumptions that shape its practices. Note that in seeking to go beyond the 'anti-science' critique of deregulatory science, both Mansfield and I have in mind standard uses of the epithet 'anti-science', that translate in my terminology as 'empirically subversive', i.e., that condemn deregulatory assessments on grounds that they render the public ignorant of empirical facts. There are, however, exceptional uses of 'anti-science' that go beyond challenging empirical subversion and involve a more thoroughgoing moral critique (e.g., Hicks, 2022). The present paper is sympathetic to this more subtle notion of anti-science.

atic – deployment of scientific expertise in the Trump Administration. As such, I will briefly rehearse the dominant empirical subversion charge to set the scene.

To many observers, the science-policy interface in the Trump era was marked by ubiquitous empirical corruption, with scientific facts traded for alternative facts, and doubt and denial of the scientific consensus on climate change affirmed at the highest levels of the Administration (Becker, 2019; Bomberg, 2017; Desikan et al., 2023; Lavelle, 2020; Warren, 2019). Beyond publicly dismissing inconvenient science and erasing it from government websites (Dillon et al., 2018, p. S92; see also Hook, 2018; Milman & Morris, 2017), the Administration actively undermined the ability of its own agencies to deliver reliable assessments by dismissing or marginalising hundreds of competent scientists, replacing them with industry-funded experts (Perls, 2021, p. 593); appointed industry lobbyists to head regulatory agencies (Selby, 2019, pp. 471–474); defunded critical research projects (Jotzo et al., 2018, p. 813) and interfered with independent scientific assessments (Davenport & Landler, 2019). In short, the Trump Administration's relationship to science represents, as Frickel and Rea (2020, p. 66) vividly put it, an 'anti-science disaster', to be studied 'as other disaster researchers might study the impacts of a drought, hurricane, or wildfire'. A natural assumption to make, in light of these well-documented political pressures on science, is that the alignment between the Administration's environmental assessments and deregulatory policy is straightforwardly due to empirical subversion: the Administration's assessments prop up its policies by 'cooking the books' (Lavelle, 2020), or otherwise manipulating, doubting, or ignoring relevant facts. As I will argue, the story is more complex: other modes of subversive expertise played a central role in propping up the Trump Administration's deregulatory policies.

To make this case, I analyse the Environmental Impact Statement (EIS) (NHTSA, 2018) developed by the Administration to justify rolling back emission standards for passenger cars and light trucks, a major source of global CO_2 emissions, dismantling the Obama Administration's keystone climate mitigation policy. Against reflexive charges of 'anti-science', I will show that the EIS in fact accurately represents the state of scientific knowledge on climate change. Furthermore, the EIS accurately captures the climatic harms of the Administration's proposed policy: comparing it to a broad range of alternatives, the EIS concedes that the Trump Administration's 'preferred alternative' exacerbates climate change more so than all other feasible policies, on every timescale considered and on every metric of risk. As such, empirical subversion utterly fails to capture the way in which the EIS lends support to climate deregulation – yet it was commissioned by the Trump Administration precisely for this purpose. The alternative analysis of the EIS I present reveals the role of normative and motivational modes of subversive expertise in supporting climate deregulation.

I start with some background, contextualising US regulation of vehicle emissions which the Trump Administration sought to dismantle (Sect. 4.1). I then examine the scientific assessment – the EIS – produced by the Administration to justify deregulating vehicle emissions despite their climate impacts, rejecting the empirical subversion diagnosis (Sect. 4.2), arguing instead that the EIS supports deregulation by deploying its empirically reliable content to assault the normative and motivational bases for mitigating climate change (Sect. 4.3).

4.1 Background: regulating and deregulating tailpipe emissions

Historically, federal legislation in the US aimed at curbing vehicle emissions developed in response to a host of national environmental and economic concerns. Global climate change emerged as a key driver of federal vehicle regulation only in recent years, during the Obama Administration (Nesbit et al., 2016, Sect. 2). Given the focus of this paper, this section aims solely at summarising the climatic rationale for reducing vehicle emissions, in order to contextualise the Trump Administration's deregulatory action and its appeal to climate science.

According to the 2019 US greenhouse gas (GHG) inventory, the transportation sector is the leading source of US emissions, emitting 1.9 billion tons of CO_2 equivalent ($GtCO_2e$), or 29% of total US emissions (EPA, 2019). Significantly, unlike emissions from other key sectors which show declining trends, transportation emissions have increased 23% between 1990 and 2017 (ibid., p. 3–21), rising every year between 2012 and 2019 (Wang & Ge, 2019). Within this sector, passenger cars and light-duty trucks (hereafter, vehicles) contribute the lion's share, accounting for 58% of US transportation emissions (EPA, 2019, p. 3–21). I.e., vehicles contribute roughly one fifth of US GHG emissions. To put their significance into global perspective, analysing data from 2017, Oppenheimer and Duffy (2018, p. 3) put it this way: 'If emissions from US passenger cars and light trucks were considered their own country, they would rank 7th-largest worldwide: bigger than Germany and Indonesia and slightly smaller than Brazil'. As such, any serious attempt by the US to mitigate climate change must address vehicle emissions.

Beginning in 2009, the Obama Administration directed the Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) – the two federal agencies with overlapping mandates to set vehicle regulation – to develop a national policy that would improve vehicle fuel efficiency and, in turn, reduce GHG emissions. On the first page of the joint EPA and NHTSA proposal, climate change was cited, for the first time in federal vehicle emissions regulation (Davenport, 2020a; Nesbit et al., 2016), as the main rationale for curbing emissions: '[…] responding to the country's critical need to address global climate change and to reduce oil consumption' (EPA & NHTSA, 2009, p. 49,454). Over the following years, the two agencies released rules that gradually increased fuel efficiency standards.[14] For our purposes, the relevant standards that were in place as the Obama Administration left office required car manufacturers to improve the fuel efficiency of their vehicles on average by 5% annually (EPA & NHTSA, 2012, p. 62,679), with increased efficiency (more miles travelled per gallon) translating into emissions reduction.

In 2017, an alliance of major automakers, as well as oil-industry lobbyists, urged the Trump Administration to reconsider the EPA/NHTSA rules of the Obama Administration in favour of less stringent emission standards (Becker, 2019; Puko, 2020; Tabuchi, 2018; White & Shepardson, 2018). The Trump Administration obliged. In 2018, Trump's EPA and NHTSA proposed a new fuel economy standard, abandon-

[14] First in 2010, covering model years 2012–2016 (EPA & NHTSA, 2010); then in 2012, for model years 2017–2025 (EPA & NHTSA, 2012).

ing the requirement of 5% annual increase in efficiency (for vehicle model years 2021–2026) for a new standard of 0% (EPA & NHTSA, 2018). In other words, freezing emission standards indefinitely at, 2020 levels, removing federal incentives for the auto industry to produce cleaner cars going forward. The standard of 0% was a step too far for the auto industry, which had hoped for a less stringent target than the Obama Administration's, not an abandonment of efficiency requirements altogether (Becker, 2019; Davenport, 2020a).[15] The Trump Administration ultimately settled on a standard of 1.5% (EPA & NHTSA, 2020), shifting the US auto market from one of the most ambitious fuel efficiency standards globally to one of the weakest (Davenport, 2020a). Crucially, as part of this rollback, the Trump Administration revoked California's famous 'waiver' (EPA & NHTSA, 2019), which allows the state to set its own vehicle emission standards at a more ambitious level than those set by the federal government – a hard-won exemption dating back to the Clean Air Act of 1970, granted to California in recognition of the urgency of its air pollution crisis (Claiborne, 2019, pp. 11–13). Later amendments to the Clean Air Act extended the exemption to other states, allowing them to choose between either federal standards or California's more ambitious standards (Nesbit et al., 2016, p. 17). Since then, over a dozen states have adopted California's standards (Popovich & Plumer, 2020), covering more than 40% of cars sold in the US under stricter emission standards than federal policy (Shepardson, 2019). By revoking California's waiver, the Trump Administration made the federal government the sole regulator of vehicle emissions, effectively forcing over a dozen states to abandon their independent efforts to mitigate climate change and limit urban pollution.

In summary, then, whereas the Obama Administration's policy aimed at gradually raising federal vehicle emission standards to the standards of California, the Trump Administration's policy aimed to do the opposite: to lower federal standards, and force California and its allied states to lower their standards in turn. The name given to this two-part deregulatory action is the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule. To many analysists, SAFE constitutes the most significant climate rollback completed by the Trump Administration (Davenport, 2020a; Davenport & Landler, 2019; Pitt et al., 2020; Puko, 2020; White & Shepardson, 2018).

US law requires federal agencies proposing actions 'significantly affecting the quality of the human environment' to prepare 'a detailed statement' addressing, among other things, the 'environmental impact of the proposed action', including a comparison with a reasonable set of policy alternatives (the National Environmental Policy Act of 1969, NEPA). Accordingly, the Trump Administration prepared a lengthy, 500-page Environmental Impact Statement (EIS) to defend SAFE's environmental credentials (NHTSA, 2018). At a time when calls for radical emission cuts to mitigate climate change intensify globally, how did the Administration defend a deregulatory policy which, as we shall shortly see, results in a massive increase in emissions from its most polluting sector? Let us turn to this question.

[15] Without significant incentives, the industry was already achieving an annual increase in fuel efficiency of 2.4% (Bento et al., 2018, p. 1120; Davenport, 2020a).

4.2 Is the EIS empirically subversive?

Given the problematic nature of the science-policy interface in the Trump Administration, surveyed above, it seems reasonable to suspect the EIS of empirical subversion: to assume, as many of its critics did, that the Administration's avowed climate scepticism and its deregulatory agenda distorted the assessment of SAFE's impacts, resulting in empirically unreliable findings that vindicate its proposed policy as environmentally responsible, against the facts. In this section, I consider and reject the empirical subversion diagnosis. The conclusion raises a puzzle: namely, how a reliable assessment which acknowledges the risks of climate change and the harmful contributions of SAFE could plausibly be deployed in its support. Answering it requires an alternative analysis that looks to other modes of moral subversion (Sect. 4.3).

To evaluate the empirical subversion diagnosis, I focus on the EIS's answer to three key questions relevant to political deliberation over SAFE in light of climate change: (1) What is the state of scientific knowledge on climate change? (2) What impacts will SAFE have on climate change? (3) How do SAFE's climate impacts compare to a reasonable set of policy alternatives? While government agencies have a degree of flexibility in producing EISs with respect to the range of issues they address, contextualising a policy, detailing its predictable environmental impacts and comparing them against a reasonable set of policy alternatives is a statutory obligation (NEPA, Sect. 102(2)(C). I.e., these three questions address the basic empirical facts which set the legal bar for an EIS, and we should regard the EIS as empirically subversive if it generates ignorance with respect to any of them. E.g., we should regard the EIS as empirically subversive if, in answering (1), it casts doubt on the reality or severity of anthropogenic climate change, exaggerates uncertainties in climate knowledge, etc. And likewise, if, in answering (2) and (3), the EIS denies or underplays the magnitude of SAFE's impacts, denies that feasible alternatives exist or that they have better climate credentials than SAFE.[16]

[16] A note on methodology and the limits of the analysis: The Trump administration issued two EISs for SAFE: the first, Draft EIS was issued in 2018 for the proposed 0% annual increase in fuel economy (NHTSA, 2018). A Final EIS was issued in, 2020, accompanying the final rule which raised the fuel economy target slightly to 1.5% (NHTSA, 2020). The two EISs are virtually identical in terms of their structure, content and arguments. They differ slightly in the estimates they provide for the environmental impacts of SAFE, due to the effects of adopting either target of 0% or 1.5%. As such, the analysis and arguments presented in the subsequent sections of this paper do not depend on the choice of which EIS to draw from – the argument that the EIS offers an empirically reliable assessment, if sound, stands for both documents. Going forward, I will draw mainly from the Draft EIS of 2018, as it was issued during the period of public comment on SAFE and as such has accumulated a broader secondary literature. Where they arise, relevant differences between the two documents will be flagged in the discussion. In terms of limits: the analysis focuses exclusively on the EIS's assessment of *climate change*. The EIS assesses other environmental consequences associated with SAFE (e.g., urban pollution, noise, impacts on the ozone layer), and I make no claims about the empirical reliability of the EIS with respect to these other environmental considerations. Despite this limitation, demonstrating the reliability of the EIS on climate change is an important result: SAFE's climate impacts are the main focus of the EIS, taking up the largest proportion of its assessment, reflecting the fact that mitigating climate change was the basic rationale for the fuel efficiency standards that SAFE sought to dismantle. Showing the empirical reliability of the EIS on climate change is thus sufficient to raise our puzzle: how an empirically reliable assessment of SAFE, detailing its harms, can be offered as a vindication.

Let us begin with the EIS's answer to the first question, its assessment of the state of scientific knowledge on climate change.

Discussions of the evidence for anthropogenic climate change are threaded throughout the EIS, reflecting the fact that climate change is a crosscutting issue in environmental assessments and cannot be dealt with neatly in one chapter. All in all, the EIS devotes over 100 pages to the assessment of climate change, making it by far the most carefully investigated environmental consideration in the EIS. The main chapter where the findings of climate science are summarised, Chap. 5: 'Greenhouse Gas Emissions and Climate Change', begins with a note of epistemic deference to authoritative expert panel-reviewed reports on climate change, such as the IPCC's (NHTSA, 2018, p. 5−1), affirming the trustworthiness of their conclusions, noting that they have 'endured a more thorough and systematic review process than information on virtually any other topic in environmental science and policy' (5–20). The EIS goes on to describe a broad set of detected phenomena that 'provide evidence for rapid climate change' (5–10): e.g., extreme temperatures; global and regional sea-level rise; drought; ocean acidification; retreat of glaciers and ice sheets; thawing of the permafrost (5–13–17). With the basic evidence for climate change in place, the EIS then proceeds to enumerate hundreds of specific global and regional risks predicted by climate science: e.g., mass species extinction (8–70); 'catastrophic' impacts due to the release of methane from the permafrost, among other tipping points (8–67–72); increased prevalence of disease (8–57); increased risk of drought, wildfires, and flooding (8–55); disruption of infrastructure essential for maintaining healthcare access (8–55); etc.

It is worth noting that the EIS does not merely list climate risks without context. Rather, it offers a rich discussion of their implications and distribution across various populations, threading considerations of climate justice throughout the EIS. 'Across all potential impacts', we are told, 'disadvantaged groups such as children, elderly, sick, and low-income populations are especially vulnerable' (8–55). Diminishing air quality due to climate change mostly affects 'impoverished communities' (8–57). Heat stress is particularly risky for 'pregnant women and their fetuses', as it may increase 'preterm birth, decrease birth weights, and increase the rate of stillbirths' (8–56). Burdens of 'distress' and 'adverse mental health consequences' from 'climate-related disasters' will predominantly fall on 'first responders', the 'economically disadvantaged' and the 'homeless', 'women', 'children', among other groups (8–58).

In addition to accurately laying out the first-order evidence, the EIS also offers policymakers important meta-reflections on the state of scientific knowledge, emphasising the tendency of the scientific community to underestimate the risks of climate change, especially when producing consensus reports, such as the IPCC's (see 5–13, 5–40 and Figure 5.2.2-2). I.e., not only does the EIS offer an accurate answer to the question, 'What is the state of scientific knowledge on climate change', it also warns policymakers that the climate assessment of the EIS likely reflects the conservativism of the scientific literature it relies on.

Let us then set aside the empirical subversion diagnosis in relation to the first question. Still, for policymakers to appropriately assess SAFE in light of climate change, it is not enough for them to be well-informed on the state of climate science. They

also need to know whether SAFE will exacerbate climate change (question 2) and whether there are reasonable alternative policies to SAFE with better climate credentials (question 3). Let us turn to these more specific questions.

In short, the EIS offers candid answers to these questions as well, concluding that SAFE is more harmful to the climate system than every alternative assessed on every metric of climate risk in all simulated timescales. Firstly, the EIS compares SAFE's impacts to those of the Obama Administration's policy. The EIS estimates that vehicles produced under SAFE will emit in their lifetime approximately an additional billion tons of CO_2 compared to if they had been produced under Obama-era standards – about the sum of present annual emissions from Germany and the UK. Looking beyond the lifetime emissions of these vehicles to the long-term, cumulative impacts of SAFE on US vehicle emissions to 2100, the EIS predicts that SAFE will lead to an increase of approximately 8 $GtCO_2e$– more than a decade's worth of emissions from Germany (Ritchie et al., 2020) and 'more than a century's worth of emissions from Portugal' (Oppenheimer & Duffy, 2018, n. 17).[17] Importantly, the EIS translates these technical numbers for the benefit of lay audiences: the emission increases in a single year from adopting SAFE vs. maintaining the Obama policy is roughly equivalent to the emissions resulting from adding 9 million vehicles to the road (NHTSA, 2018, p.14).

Secondly, in addition to comparing SAFE's climate impacts to the Obama policy, the EIS also compares SAFE to 7 'reasonable alternative' policies less stringent than the Obama policy but more stringent than SAFE (i.e., the EIS considers 7 intermediate fuel efficiency standards falling between the Obama Administration's 5% and SAFE's 0% standard). The EIS concludes that SAFE is more harmful to the climate system than every alternative assessed on every metric of climate risk in all simulated timescales (5–29–47). Importantly, such apparent indictments of SAFE are not hidden away in obscure appendices or footnotes, rather they are announced in the heart of the summary for policymakers, cashed out in comprehensible terms (e.g., number of additional vehicles equivalent to a quantity of emissions), and represented visually (see, e.g., Fig. 1).

The Trump Administration issued the EIS to support SAFE. But how could such an empirically reliable assessment, with its 'startling' admissions on climate change (SEEC, 2018), possibly lend support to SAFE?

4.3 Normative and motivational subversion in the EIS

To answer this question, I turn now to the discursive strategies embedded in the EIS which organise its empirically reliable content into an assault on the normative and motivational bases for mitigating climate change. This assault on moral agency is achieved mainly through four connected discourses, which may be condensed as follows: 'The world is heading for disaster anyway'; 'We're adding a mere drop

[17] Roughly the same as the estimates in the Final EIS (see footnote 16). For exact figures, see NHTSA (2020, Table 5.4.1-1).

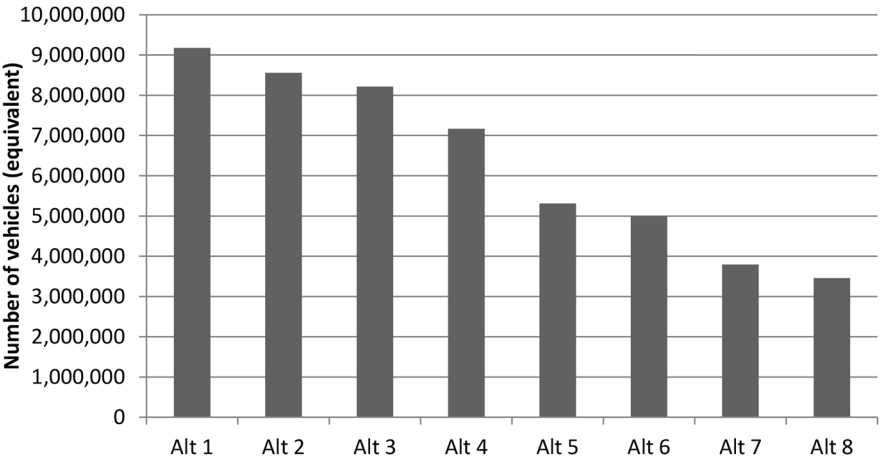

Fig. 1 Increase in emissions in terms of vehicle equivalence from SAFE (Alt 1) compared to the Obama policy (*x*-axis) and 7 intermediate alternatives (NHTSA, 2018, Figure 5.4.1-1)

to an ocean of impacts';[18] 'The most severe impacts will fall outside our borders'; 'Specific climate impacts cannot be traced back to this policy – so no liability'. I will unpack each discourse in turn.

The EIS reviews efforts to mitigate climate change to date, as well as 'reasonably foreseeable future actions' based on the promises and pledges of various governments, and concludes that, most likely, they will fail to avoid extreme levels of climate change. The EIS begins its analysis by assuming a baseline scenario that takes the world as it is, assuming current levels of policy ambition, and asks what climate change will look like by 2100 on 'the current climate trajectory' (5–28). The EIS concludes that, by 2100, atmospheric CO_2 concentrations will reach 789 parts per million (ppm), resulting in global warming of 4°C relative to preindustrial levels (5–31, cf. IPCC, 2023, p. 11). Next, the EIS adopts a more optimistic scenario based not on the current climate trajectory but on a trajectory that factors in pledges and international efforts 'already underway or reasonably foreseeable' (8–21–25). Still, the EIS finds these international pledges woefully inadequate to limit global warming to 2°C (5–30), let alone 1.5°C, projecting a global warming of 3.3°C by 2100 (8–28).

The EIS then calculates the increment that SAFE would add to this grim outlook, and finds that SAFE would add 1 ppm to CO_2 concentrations, would deplete the remaining carbon budget consistent with 2 °C by a further 1%, add another 0.003 °C to global warming, etc. The EIS thus concludes that SAFE's harms 'are extremely small compared with total projected future climate change, they would *only marginally increase* the potential risks associated with climate change' (S-20); that cli-

[18] These first two discourses were picked up on by some observers/journalists who went beyond the reflexive 'anti-science' charge and engaged more thoroughly with the EIS. E.g., 'The analysis assumes the planet's fate is already sealed' and therefore that the 'policy would add just a very small drop to a very big, hot bucket' (Eilperin et al., 2018). This section draws inspiration from their work and extends it.

mate change will be 'exacerbated *but only to a marginal degree*' (S-21); that SAFE 'would result in *marginal increases in the already anticipated increases*' in climate risk (8–38, emphases added), etc. It is hard to overstate the pervasiveness of the first two discourses throughout the EIS: phrases such as, 'very small compared to total' (5–46), 'extremely small in relation to' (S-14), 'marginal degree in proportion with' (S-21) are threaded throughout the analysis, impressing upon its reader that 'drastic reductions in all US sectors and from the rest of the developed and developing world' are needed to bend the global emissions curve (5–30), tempting them to regard mitigation as futile and resign themselves to a policy that would marginally worsen an already bleak outlook (9 − 1). The most rhetorically powerful manifestation of these two discourses, however, is not in the text of the EIS, but in its figures. For each climate variable assessed, the EIS visually drives home the drop-in-an-ocean narrative. As shown in Fig. 2, the EIS ranks SAFE as the worst policy among all feasible alternatives with respect to its impacts on global warming (top panel); then, by adding the total anticipated warming on the world's current level of ambition, the figure erases the differences between SAFE and its alternatives (bottom panel).[19]

While the first two discourses – 'The world is heading for disaster'; 'We're adding a mere drop to an ocean'– play the dominant subversive role in the EIS, they are further propped up by discourses that deploy other (true) features of the climate predicament to subvert its reader.

For example, the EIS reminds its reader, at various points, that causation in climate change is complex. Once released into the atmosphere, individual packets of GHG emissions mix together and jointly cause climate impacts (more accurately, jointly *increase the likelihood* of impacts). As such, tracing a specific impact back to a specific policy choice is, as the EIS puts it, 'inappropriate': 'it is inappropriate to identify increases in GHG emissions associated with a single source or group of sources as the single cause of any particular climate-related impact or event' (8–38, n. 13), since they 'alone would neither cause nor prevent climate change' (8–38). In case the 'no liability' message was missed in these quotes, taken from the technical chapters, the EIS delivers the basic point bluntly in the summary: 'the emissions resulting from this rule *cannot be tied* to any particular climate impact' (S-21).[20] Furthermore, the EIS notes that the impacts of climate change, to which SAFE will contribute, will disperse globally and will be felt unevenly, and will not fall mainly within US borders. Thus, the EIS rounds off its summary of its key findings with the sentence, 'The impacts of the Proposed Action […] would occur on a global scale, and *would not disproportionately affect the United States*' (S-14, emphases added).

[19] In fairness, Trump's EIS is not alone in comparing the incremental impacts of a policy to the global trend. The Obama Administration's EIS, which justified regulating vehicles emissions, also noted the small impact of regulating the sector in relation to global trends, but offered the scale of the global challenge as a *reason* for action across all countries and sectors: e.g., 'Although the projected reductions [from regulating US vehicle emissions] are small compared to total projected future climate change, they are quantifiable, directionally consistent, and would be an important contribution to reducing the risks associated with climate change (NHTSA, 2012, p.51).

[20] The final draft of the EIS replaces the crude but revealing, 'cannot be *tied'*, in this quote with the more technical phrase, 'cannot be *directly attributed*' (NHTSA, 2020, p.19).

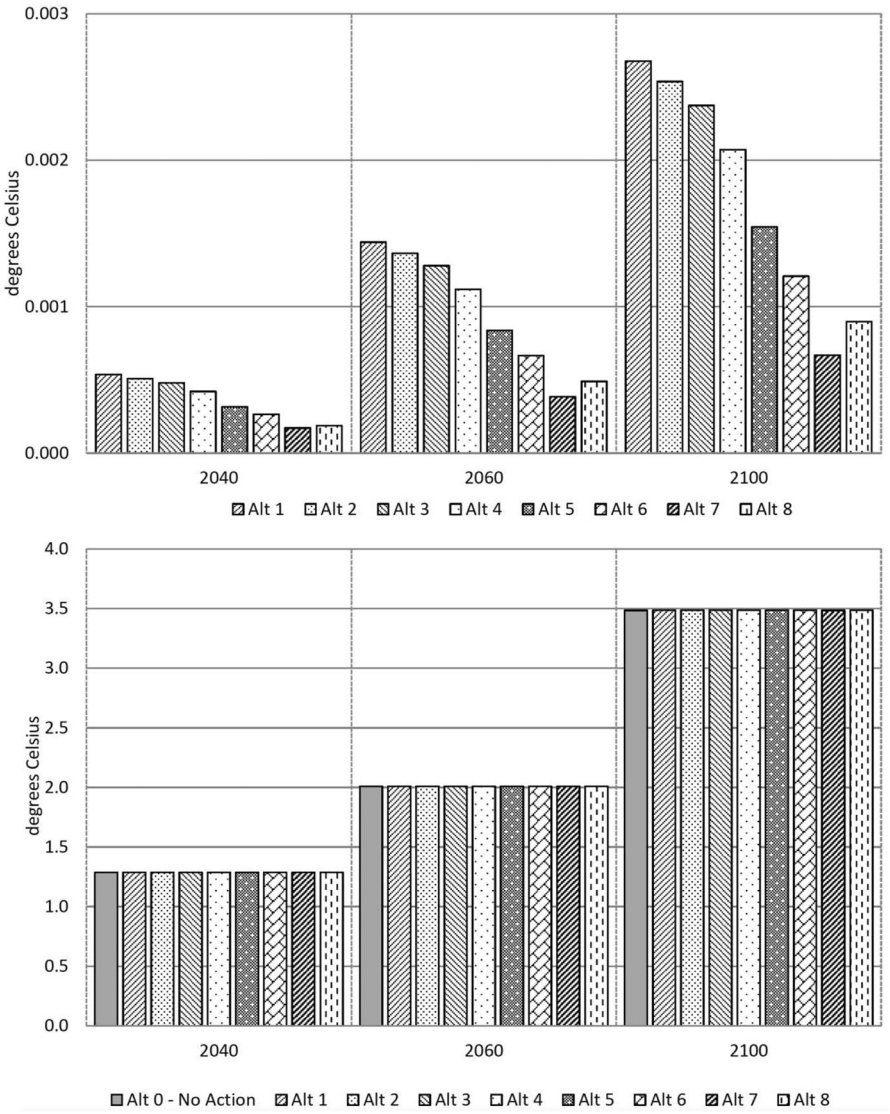

Fig. 2 Top: SAFE's (Alt 1) contribution to global temperature increase is highest among alternatives. Bottom: Impacts of SAFE, the Obama policy and 7 alternatives on global temperature ranked in terms of their comparative impacts on the global trend (NHTSA, 2018, Figure 5.4.2-3 and Figure 5.4.2-4)

Through these discourses, the EIS offers a description of the climate predicament, grounded in reliable expertise, that renders an injustice more attractive and undermines its readers' normative commitments. The discourses summarised above trade on the 'fragmentation of agency', the 'dispersion of causes and effects' and the 'institutional inadequacy' of global mitigation frameworks – all the peculiar elements that make climate change a 'perfect moral storm', where a number of factors converge in such a way so as to predispose agents towards wrongdoing (Gardiner, 2011, p. 24).

Needless to say, these discourses would not pass moral scrutiny: The fact that past mitigation efforts have failed and existing policies and pledges remain thoroughly inadequate gives us reasons to *strengthen* mitigation efforts, not abandon them; and recognising that the contribution of even the most harmful individual climate policy pales when cast against a global trend tells us only what we already know about climate change – that it is a global challenge requiring comprehensive mitigation from all. And there is little debate among climate ethicists that affluent nations have special obligations to aggressively mitigate climate change; on basic questions of this sort, irrespective of one's conception of climate justice, 'all roads lead to Rome' (McKinnon, 2022, p. 55). Knowing this, however – and reporting on my own 'research encounter' with the EIS – does little to blunt the rhetorical force of these discourses which press, page after page, on one's predisposition to fail morally.

5 Conclusion

My aim in this paper has been to develop a framework of morally subversive expertise and apply it to shed light on the science underpinning climate deregulation. I distinguished three modes of subversive expertise, capturing broader ways in which expertise can undermine moral agency beyond misleading audiences about empirical facts. The framework of subversive expertise accommodates the dominant, agnotological framework in the literature on industry bias and deregulatory science, with its focus on the use of expertise to generate factual ignorance in an audience, situating it alongside other ways in which expertise can be used to trip up others morally. To further explore the framework and show its fruitfulness, I analysed a case of climate deregulation under the Trump Administration. I argued that a broader analysis, attending to the normative and motivational dimensions of subversion, and not just the empirical, is necessary to capture the use of science in deregulatory politics. The lesson of the analysis is that dismissing the expertise that underpins climate deregulation as empirically corrupt 'anti-science' both obscures its actual role in the politics of climate change and understates its wrongfulness: it misses the breadth of the assault on moral agency that sustains climate injustice.

Acknowledgements I am deeply grateful to Craig Callender, Karen Kovaka, Andrew Bollhagen, Heather Douglas, Kevin Elliott, Ted Richards, Ryan McCoy, Dan Hicks, Daisy Underhill, and two anonymous reviewers for Synthese for their generous feedback. Drafts of this paper were presented at the Canadian Society for the History and Philosophy of Science CSHPS 2021 Conference; the Institute for Practical Ethics (IPE) Workshop at UC San Diego; the Socially Engaged Philosophy of Science workshop at Michigan State University; and at the Science, Values, and Policy workshop organized by Dan Hicks. I am particularly grateful to Craig Callender and colleagues at IPE UCSD for facilitating my visiting research at the institute, where I completed this paper. I owe the greatest debt to Stephen John and Katie Weinheimer for nurturing every aspect of this paper.

Funding This research was kindly supported by the Cambridge Trust and the Department of History and Philosophy of Science at the University of Cambridge.

Declarations

Competing interestse The author has no conflicts of interest to declare that are relevant to the content of this article.

References

Anderson, E. (2011). Democracy, Public Policy, and Lay assessments of scientific testimony. *Episteme*, *8*(2), 144–164. https://doi.org/10.3366/epi.2011.0013

Barnosky, C., Sadler, J., Yates, R., & Zimmerman, Z. (2021). *Reversing Trump Environmental Rollbacks: A 100 Day Analysis on the Biden Administration's Reversals*. Center for Law, Energy, & the Environment, UC Berkeley. https://www.law.berkeley.edu/research/clee/first-100-days/

Becker, R. (2019, August 31). California's fight over tailpipe emissions, explained. *CalMatters*. https://calmatters.org/explainers/california-auto-emissions-standards-fight-with-donald-trump-explained/

Bento, A. M., Gillingham, K., Jacobsen, M. R., Knittel, C. R., Leard, B., Linn, J., McConnell, V., Rapson, D., Sallee, J. M., van Benthem, A. A., & Whitefoot, K. S. (2018). Flawed analyses of U.S. auto fuel economy standards. *Science*, *362*(6419), 1119–1121. https://doi.org/10.1126/science.aav1458

Biddle, J., Kidd, I. J., & Leuschner, A. (2017). Epistemic corruption and manufactured doubt: The case of climate science. *Public Affairs Quarterly*, *31*(3), 165–187. https://doi.org/10.2307/44732791

Bomberg, E. (2017). Environmental politics in the Trump era: An early assessment. *Environmental Politics*, *26*(5), 956–963. https://doi.org/10.1080/09644016.2017.1332543

Buchanan, A. (2002). Social Moral Epistemology. *Social Philosophy and Policy*, *19*(2), 126–152. https://doi.org/10.1017/S0265052502192065

Buchanan, A. (2009). Philosophy and Public Policy: A role for Social Moral Epistemology. *Journal of Applied Philosophy*, *26*(3), 276–290. https://doi.org/10.1111/j.1468-5930.2009.00452.x

Claiborne, M. (2019). The SAFE vehicles rule: How the Trump Administration's Course Change on Vehicle emissions reflects a larger policy shift away from environmentally friendly regulations. *Emory Corporate Governance and Accountability Review*, *6*(1), 9–15.

Davenport, C. (2020a, March 30). U.S. to announce Rollback of Auto Pollution rules, a key effort to Fight Climate Change. *New York Times*.

Davenport, C. (2020b, November 9). What Will Trump's most profound legacy be? Possibly Climate damage. *New York Times*.

Davenport, C., & Landler, M. (2019, May 27). Trump Administration hardens its attack on Climate Science. *New York Times*.

Desikan, A., MacKinney, T., Kalman, C., Carter, J. M., Reed, G., & Goldman, G. T. (2023). An equity and environmental justice assessment of anti-science actions during the Trump administration. *Journal of Public Health Policy*, *44*(1), 147–162. https://doi.org/10.1057/s41271-022-00390-6

Dillon, L., Sellers, C., Underhill, V., Shapiro, N., Ohayon, J. L., Sullivan, M., Brown, P., Harrison, J., & Wylie, S. (2018). The Environmental Protection Agency in the Early Trump Administration: Prelude to Regulatory capture. *American Journal of Public Health*, *108*(S2), S89–S94. https://doi.org/10.2105/AJPH.2018.304360

Eilperin, J., Dennis, B., & Mooney, C. (2018). *September 28). Trump administration sees a 7-degree rise in global temperatures by 2100*. The Washington Post.

EPA (2019). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2017*. United States Environmental Protection Agency. https://www.epa.gov/sites/default/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf

EPA, & NHTSA. (2009). Proposed rulemaking to establish light-duty vehicle Greenhouse Gas Emission standards and Corporate Average Fuel Economy standards. *Federal Register*, *74*(186), 49454–49789.

EPA, & NHTSA. (2010). Light-duty vehicle Greenhouse Gas Emission standards and Corporate Average Fuel Economy standards; final rule. *Federal Register*, *75*(88), 25324–25728.

EPA, & NHTSA. (2012). 2017 and later Model Year Light-Duty Vehicle Greenhouse Gas emissions and Corporate Average Fuel Economy standards. *Federal Register*, *77*(199), 62624–63200.

EPA, & NHTSA. (2018). The Safer Affordable fuel-efficient (SAFE) vehicles rule for Model Years 2021–2026 passenger cars and light trucks. *Federal Register*, *83*(165), 42986–43500.

EPA, & NHTSA. (2019). The Safer Affordable fuel-efficient (SAFE) vehicles Rule Part one: One National Program. *Federal Register*, *84*(188), 51310–51363.

EPA, & NHTSA. (2020). (SAFE) vehicles rule for Model Years 2021–2026 passenger cars and light trucks. *Federal Register*, *85*(84), 24174–25278.

Fernandez Pinto, M. (2017). To Know or Better not to: Agnotology and the Social Construction of Ignorance in commercially Driven Research. *Science & Technology Studies*, *30*(2), 53–72. https://doi.org/10.23987/sts.61030

Franta, B. (2022). Weaponizing economics: Big oil, economic consultants, and climate policy delay. *Environmental Politics*, *31*(4), 555–575. https://doi.org/10.1080/09644016.2021.1947636

Freudenburg, W. R., Gramling, R., & Davidson, D. J. (2008). Scientific certainty argumentation methods (SCAMs): Science and the politics of doubt. *Sociological Inquiry*, *78*(1), 2–38. https://doi.org/10.1111/j.1475-682X.2008.00219.x

Frickel, S., & Rea, C. M. (2020). Drought, Hurricane, or Wildfire? Assessing the Trump Administration's Anti-science Disaster. *Engaging Science Technology and Society*, *6*, 66–75. https://doi.org/10.17351/ests2020.297

Galison, P., & Proctor, R. (2020). Agnotology in action: A dialogue. In J. Kourany, & M. Carrier (Eds.), *Science and the production of ignorance* (pp. 27–54). MIT Press.

Gardiner, S. M. (2011). *A Perfect Moral Storm*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195379440.001.0001

Goldman, A. I. (1999). *Knowledge in a Social World*. Oxford University Press. https://doi.org/10.1093/0198238207.001.0001

Guerrero, A. A. (2007). Don't know, don't kill: Moral ignorance, culpability, and caution. *Philosophical Studies*, *136*(1), 59–97. https://doi.org/10.1007/s11098-007-9143-7

Hicks, D. J. (2022). When virtues are Vices: Anti-science epistemic values in environmental politics. *Philosophy Theory and Practice in Biology*, *14*. https://doi.org/10.3998/ptpbio.2629

Holman, B., & Elliott, K. C. (2018). The promise and perils of industry-funded science. *Philosophy Compass*, *13*(11), e12544. https://doi.org/10.1111/phc3.12544

Hook, L. (2018, September 28). Trump administration agrees CO2 will warm planet. *Financial Times*.

Howard, J. W. (2016). Moral Subversion and Structural Entrapment. *Journal of Political Philosophy*, *24*(1), 24–46. https://doi.org/10.1111/jopp.12060

Howard, J. W. (2019). Dangerous Speech. *Philosophy & Public Affairs*, *47*(2), 208–254. https://doi.org/10.1111/papa.12145

Howard, J. W. (2024). Freedom of Speech. In E. N. Zalta, & U. Nodelman (Eds.), *The Stanford Encyclopedia of Philosophy Encyclopedia of Philosophy*. Metaphysics Research Lab. https://plato.stanford.edu/archives/spr2024/entries/freedom-speech/ Stanford University.

Huber, J. (2023). Hope from despair. *Journal of Political Philosophy*, *31*(1), 80–101. https://doi.org/10.1111/jopp.12283

IPCC. (2023). *Climate Change 2023: Synthesis report*. Intergovernmental Panel on Climate Change.

Irzik, G., & Kurtulmus, F. (forthcoming). Distributive Epistemic Justice in Science. *The British Journal for the Philosophy of Science*, *715351*. https://doi.org/10.1086/715351

Jotzo, F., Depledge, J., & Winkler, H. (2018). US and international climate policy under President Trump. *Climate Policy*, *18*(7), 813–817. https://doi.org/10.1080/14693062.2018.1490051

Kleinman, D. L., & Suryanarayanan, S. (2013). Dying bees and the Social production of ignorance. *Science Technology & Human Values*, *38*(4), 492–517. https://doi.org/10.1177/0162243912442575

Kleinman, D. L., & Suryanarayanan, S. (2015). Ignorance and industry: Agrichemicals and honey bee deaths. In M. Gross, & L. McGoey (Eds.), *Routledge International Handbook of ignorance studies* (pp. 183–192). Routledge.

Kourany, J., & Carrier, M. (2020). Introducing the issues. In J. Kourany, & M. Carrier (Eds.), *Science and the production of ignorance*. The MIT. https://doi.org/10.7551/mitpress/12146.003.0003

Lamb, W. F., Mattioli, G., Levi, S., Roberts, J. T., Capstick, S., Creutzig, F., Minx, J. C., Müller-Hansen, F., Culhane, T., & Steinberger, J. K. (2020). Discourses of climate delay. *Global Sustainability*, *3*, e17. https://doi.org/10.1017/sus.2020.13

Lavelle, M. (2020, December 27). The resistance: In the President's relentless war on Climate Science, they fought back. *Inside Climate News*.

Leuschner, A. (2018). Is it appropriate to 'target' inappropriate dissent? On the normative consequences of climate skepticism. *Synthese*, *195*(3), 1255–1271. https://doi.org/10.1007/s11229-016-1267-x

Leuschner, A., & Fernández Pinto, M. (2021). How dissent on gender Bias in Academia Affects Science and Society: Learning from the case of climate change denial. *Philosophy of Science*, *88*(4), 573–593. https://doi.org/10.1086/713903

Mansfield, B. (2021). Deregulatory science: Chemical risk analysis in Trump's EPA. *Social Studies of Science*, *51*(1), 28–50. https://doi.org/10.1177/0306312720970284

McKinnon, C. (2022). *Climate Change and Political Theory*. Polity.

Michaels, D. (2008). *Doubt is their product: How industry's assault on science threatens your health*. Oxford University Press.

Michaels, D. (2022). Mercenary science: A Field Guide to recognizing scientific disinformation. *American Educator*, *45*(4), 20–25.

Michaels, D., & Monforton, C. (2005). Manufacturing uncertainty: Contested Science and the Protection of the public's health and environment. *American Journal of Public Health*, *95*(S1), S39–S48. https://doi.org/10.2105/AJPH.2004.043059

Mills, C. (2007). White ignorance. In S. Sullivan, & N. Tuana (Eds.), *Race and epistemologies of ignorance* (pp. 13–38). State University of New York.

Milman, O., & Morris, S. (2017, May 14). Trump is deleting climate change, one site at a time. *The Guardian*.

Mobil (1995, September 28). *The sky is not falling*. New York Times.

Nesbit, M., Fergusson, M., Colsa, A., Ohlendorf, J., Hayes, C., Paquel, K., & Schweitzer, J. P. (2016). *Comparative study on the differences between the EU and US legislation on emissions in the automotive sector*. Publications Office of the European Parliament. https://doi.org/10.2861/503165

NHTSA. (2012). *Final Environmental Impact Statement Corporate Average Fuel Economy standards passenger cars and light trucks Model Years 2017–2025*. National Highway Traffic Safety Administration (NHTSA).

NHTSA. (2018). *Draft Environmental Impact Statement for the Safer Affordable fuel-efficient (SAFE) vehicles rule for Model Year 2021–2026 passenger cars and light trucks*. National Highway Traffic Safety Administration (NHTSA).

NHTSA. (2020). *Final Environmental Impact Statement for the Safer Affordable fuel-efficient (SAFE) vehicles rule for Model Year 2021–2026 passenger cars and light trucks*. National Highway Traffic Safety Administration (NHTSA).

Oppenheimer, M., & Duffy, P. (2018). *Comment submitted by Wendy B. Jacobs, Esq., Environmental Law & Policy Clinic at Harvard Law School on behalf of Dr. Michael Oppenheimer, Albert G. Milbank Professor of Geosciences and International Affairs, Director, Center for Policy Research on Energy*. https://www.regulations.gov/comment/EPA-HQ-OAR-2018-0283-5486

Oppenheimer, M., Oreskes, N., Jamieson, D., Brysse, K., O'Reilly, J., Shindell, M., & Wazeck, M. (2019). *Discerning experts: The practices of Scientific Assessment for Environmental Policy*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226602158.001.0001

Oreskes, N., & Conway, E. M. (2010). *Merchants of doubt: How a handful of scientists obscured the truth on issues from Tobacco smoke to global warming*. Bloomsbury.

Owen, B. M., & Braeutigam, R. (1978). *The Regulation Game: Strategic Use of the Administrative Process*. Ballinger Press.

Pamuk, Z. (2021). *Politics and expertise: How to use Science in a democratic society*. Princeton University Press.

Perls, H. (2021). Deconstructing environmental deregulation under the trump administration. *Vermont Law Review*, *45*, 591–640.

Pitt, H., Larsen, K., & Young, M. (2020). *The Undoing of US Climate Policy: The Emissions Impact of Trump-Era Rollbacks*. Rhodium Group. https://rhg.com/research/the-rollback-of-us-climate-policy/

Pongiglione, F., & Martini, C. (2022). Climate change and culpable ignorance: The case of pseudoscience. *Social Epistemology*, *36*(4), 425–435. https://doi.org/10.1080/02691728.2022.2052994

Popovich, N., & Plumer, B. (2020). *September 17). What Trump's Environmental rollbacks Mean for global warming*. New York Times.
Proctor, R. (2006). Everyone knew but no one had proof: Tobacco industry use of medical history expertise in US courts, 1990–2002. *Tobacco Control*, *15*(suppl_4), iv117–iv125. https://doi.org/10.1136/tc.2004.009928
Proctor, R. (2011). *Golden Holocaust: Origins of the cigarette catastrophe and the case for Abolition*. University of California Press.
Proctor, R., & Schiebinger, L. (Eds.). (2008). *Agnotology: The making and unmaking of ignorance*. Stanford University Press.
Puko, T. (2020, March 30). Trump Administration to complete Tailpipe-Emissions Rollback. *The Wall Street Journal*.
Ritchie, H., Roser, M., & Rosado, P. (2020). *$CO_2$and Greenhouse Gas Emissions*. OurWorldInData. https://ourworldindata.org/co2-and-greenhouse-gas-emissions
Schroeder, S. A. (2017). Using democratic values in science: An objection and (partial) response. *Philosophy of Science*, *84*(5), 1044–1054. https://doi.org/10.1086/694006
SEEC. (2018). *Trump Administration environmental review reveals willingness to accept a catastrophic 7-degree rise in temperature by 2100*. United States House of Representatives, Sustainable Energy & Environment Coalition (SEEC).
Selby, J. (2019). The Trump presidency, climate change, and the prospect of a disorderly energy transition. *Review of International Studies*, *45*(3), 471–490. https://doi.org/10.1017/S0260210518000165
Shepardson, D. (2019). September 19). Trump administration bars California from requiring cleaner cars. *Reuters*.
Supran, G., & Oreskes, N. (2017). Assessing ExxonMobil's climate change communications (1977–2014). *Environmental Research Letters*, *12*(8), 084019. https://doi.org/10.1088/1748-9326/aa815f
Svavarsdóttir, S. (2006). How do Moral judgments motivate? In J. Dreier (Ed.), *Contemporary debates in Moral Theory* (pp. 163–181). Wiley-Blackwell.
Tabuchi, H. (2018, December 13). The Oil Industry's Covert Campaign to Rewrite American Car emissions rules. *New York Times*.
Thunberg, G. (2019). *No one is too small to make a difference*. Penguin.
Wallace, R. J. (2006). Moral Motivation. In J. Dreier (Ed.), *Contemporary debates in Moral Theory*. Wiley-Blackwell.
Wang, S., & Ge, M. (2019). *Everything You need to Know about the fastest-growing source of global emissions: Transport*. World Resources Institute. https://www.wri.org/insights/everything-you-need-know-about-fastest-growing-source-global-emissions-transport
Warren, E. (2019, November 5). A climate denier-in-chief sits in the White House today. But not for long. *The Guardian*.
Weatherall, J. O., O'Connor, C., & Bruner, J. P. (2020). How to beat science and influence people: Policymakers and Propaganda in Epistemic Networks. *The British Journal for the Philosophy of Science*, *71*(4), 1157–1186. https://doi.org/10.1093/bjps/axy062
White, J., & Shepardson, D. (2018, August 2). U.S. states vow to fight Trump rollback on auto emissions. *Reuters*.
Wilholt, T. (2020). On knowing what one does not know: Ignorance and the aims of Research. In J. Kourany, & M. Carrier (Eds.), *Science and the production of ignorance* (pp. 195–218). The MIT.