Persuasion and Epistemic Paternalism

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Abstract**:** Many of us hold false beliefs about matters that are relevant to public policy such as climate change and the safety of vaccines. What can be done to rectify this situation? This question can be read in two ways. According to the *descriptive* reading, it concerns which methods will be *effective* in persuading people that their beliefs are false. According to the *normative* reading, it concerns which methods we are *permitted* to use in the service of persuading people. Some effective methods—a programme of brainwashing, say—would not be permissible. In this paper I compare "methods of rational persuasion" with what you might call "marketing methods" such as how one frames the problem of climate change. My aim is to show that "marketing methods" are preferable to "methods of rational persuasion". My argument has two parts. First, I argue that the evidence suggests that "marketing methods" are more effective in persuading people to change their minds. Second, I argue that "marketing methods" are an acceptable response to the normative question.

We all hold some false beliefs. Many of these false beliefs are inconsequential. Sadly, others are rather more consequential. According to a recent report, 18% of Americans think either that the Earth's climate is not changing, or that human activity is not responsible for any change that is taking place.[1] While this is hardly the only obstacle to the implementation of policies to reduce greenhouse gas emissions and mitigate climate change impacts, it is one reason why politicians and other policy makers have been reluctant to act. Similar remarks

could be made about the consequences of public misperceptions about the safety of nuclear power or GMOs, or the efficacy of vaccines. This prompts a question: what (if anything) can we do about the problem of consequential false beliefs?

It is important to distinguish two issues. The first, which is empirical, concerns which methods are *effective* in persuading people that they hold false views about issues like global warming. The second, which is normative, concerns which methods we are *permitted* to use in the service of persuading people to change their minds. (Brainwashing the public to accept the science on global warming might be effective, but it wouldn't be ethical).

In answering the first question, we can draw on multiple empirical literatures, including work on (the science of) science communication, the psychology of persuasion and motivated reasoning.[2]

In answering the second, I advocate adopting the perspective of a de-idealised social epistemology. A de-idealised social epistemology makes concrete suggestions for improving our epistemic situation that are *evidence-based* (that is, based on an answer to the first, descriptive, question). The de-idealised social epistemologist recognises that human beings are not ideal epistemic agents, and this has consequences for the normative prescriptions we should make.

Here is the plan for the paper. I start by saying a little more about the methodology of de-idealised social epistemology. I then canvass the empirical literature to draw up a list of suggestions for how to improve public understanding and acceptance of scientific issues like global warming. Many of these suggestions depart from the familiar view that the main task for science communicators (and science educators) is to improve the public's scientific literacy and general critical thinking skills.[3] They involve attempts to structure the "epistemic environment"[4] in such a way that epistemic agents are more likely to form true beliefs about

2

the relevant scientific issues than they would otherwise be. As such, they involve various forms of interference with inquirers' cognitive endeavours, and this in turn raises the question whether these forms of interference are problematic for the reasons that paternalistic interference is regarded by many as problematic. After sharpening this worry, I attempt to address it.

DE-IDEALISED SOCIAL EPISTEMOLOGY

What does epistemology have to contribute to the problem of consequential false belief? One strand in contemporary epistemology—a strand initiated by W.V.O Quine's "Epistemology Naturalized" (Quine 1969)—views epistemology as *ameliorative*. The task for the epistemologist is to, first, draw on the empirical sciences to form an understanding of how we go about forming beliefs (and, more generally, conducting our inquiries) and then, second, to identify ways in which we could do a better job of forming beliefs (and inquiring in general). What counts as "better" depends on one's epistemological views: some hold that what matters is holding more true beliefs (Goldman 1999), some that what matters is gaining more knowledge (Williamson 2000), and still others that what matters is improving understanding (Kvanvig 2003). For my purposes, we can set this debate aside, though for simplicity I'll talk as if the first, "veritistic", view is right.

Viewed from this perspective, the task for the epistemologist is to, first, gain an understanding of how people go about forming beliefs about issues like global warming and then, second, to identify how we can make it more likely that they form true beliefs about these issues. An epistemology that is adequate to this task needs to do certain things. First, it needs to pay attention to the multifarious ways in which we rely on others in our inquiries. We don't figure out what to think about global warming by conducting our own research (and

even if we did, we would also need to rely on research conducted by others). We draw on what others (climate scientists, the media, friends and acquaintances) tell us about the issue. Thus, it needs to be a *social* epistemology (Goldman and Blanchard 2018).

Second, it needs to be *evidence-based*. There is a (large) empirical literature on what sorts of interventions are likely to correct public misperceptions about issues like global warming (and what sorts aren't). This has consequences for the sorts of suggestions for ameliorating our epistemic situation that the social epistemologist should make. Suggestions that might seem plausible in the abstract may not prove so effective in the "real world" (see below for examples). If our aims are genuinely ameliorative, it is no good coming up with a list of prescriptions that work in the abstract but not in practice. Thus, we need a *de-idealised* social epistemology: an epistemology that issues prescriptions that take our cognitive limitations and the environments we inhabit into account.

But what would a de-idealised social epistemological approach to the problem of consequential false belief look like? The rest of this paper illustrates it.[5]

THE SCIENCE OF SCIENCE COMMUNICATION

So how do people form views about issues like climate change, and how can we go about correcting any misperceptions they may have? In this section I give an overview of some empirical research on this question.

According to Cook et al. (2016), 97% of climate scientists agree that human activity is a major cause of global warming. But most people think that the level of consensus is in fact far lower. The numbers vary from country to country, but in the US only 13% think the level is higher than 90% (Ballew et al. 2019).[6] There are, of course, many ways in which one might try to narrow this gap. Which strategies one recommends will depend on what one takes the

4

explanation for this "consensus gap" to be. One explanation cites the public's lack of scientific understanding and literacy (Bak 2001; Sturgis and Allum 2004). If this is right, then narrowing the consensus gap requires providing the public with the relevant facts—by telling them that global warming is happening, and explaining some of the mechanisms involved. There is ample evidence that some ways of providing the public with relevant facts are effective (see below). But there is also ample evidence that it does not suffice to correct these misperceptions (Downing and Ballantyne 2007; Gardner and Stern 1996). As Moser and Dilling (2011) put it:

> Clearly, much can be said for broad public education in the principles and methods of science in general and in climate science specifically. A sturdier stand in science education may leave lay individuals less susceptible to misleading, factually untrue argumentation. But ignorance about the details of climate change is NOT what prevents greater concern and action (163).

This is for two, importantly different, reasons. The first is the influence of political ideology on information processing. The evidence suggests that the strongest influence on estimates of the level of consensus on global warming is political ideology, not level of scientific literacy (Hamilton et al. 2015; Hamilton 2011; Hardisty, Johnson, and Weber 2010; Hornsey et al. 2016; Kahan, Jenkins-Smith, and Braman 2011; Lewandowsky and Oberauer 2016; Tranter and Booth 2015). We don't generally process and evaluate the information we receive in a neutral or unbiased way. Rather, our background beliefs, views and values— including our political beliefs, views and values—influence our information processing. Thus, liberals (in the US sense) generally tend to form a more favourable view of the scientific evidence on global warming than conservatives (again, in the US sense), no matter

how much conservatives know about the underlying science (Kahan, Jenkins-Smith, and Braman 2011).

The second is the prevalence of misinformation on global warming in the public sphere (Cook 2017; 2016; Cook et al. 2018). While liberals tend to think the level of scientific consensus on global warming is higher than conservatives, they still underestimate the true level (Ballew et al. 2019). This illustrates that the influence of political ideology on information processing is only part of the story. Even those not driven to deny that there is scientific consensus on global warming for ideological reasons are affected by the misinformation spread by global warming deniers. This is because (put roughly) misinformation tends to "drown out" information. There is good evidence that informing the public that scientists agree on certain issues (such as global warming) can be very effective in increasing public acceptance, even among those who, for ideological reasons, are disposed to deny the existence of consensus on global warming (Cook and Lewandowsky 2011; Toby Bolsen, Leeper, and Shapiro 2014; Lewandowsky, Gignac, and Vaughan 2013; van der Linden et al. 2014). But there is also evidence that this effect is drastically reduced when there is also widespread misinformation about the level of scientific consensus (and the integrity of climate scientists) (Cook 2017; 2016; van der Linden et al. 2017). As van der Linden et al. (2017) put it:

> Results indicate that the positive influence of the 'consensus message' is largely negated when presented alongside [misinformation]. Thus, in evaluating the efficacy of consensus messaging, scholars should recognize the potent role of misinformation in undermining real-world attempts to convey the scientific consensus (5).

This suggests that the problem is not just that the public lack understanding of climate science, or are scientifically illiterate (and, insofar as the public do lack understanding, this is

not because of lack of education). Public lack of understanding and scientific illiteracy is exacerbated by, first, the ubiquity of ideologically-driven cognition and, second, the prevalence of misinformation. If this is right, then strategies for dealing with public misperceptions that assume the task is to correct misunderstandings by providing relevant facts are not going to solve the problem.

What can we do? I will canvass three sets of strategies from the literature. First, a common strategy with global warming misinformation is to *debunk* it. While debunking consequential false beliefs *can* work, it needs to be done carefully because misperceptions can be difficult to dislodge once they take hold (Lewandowsky et al. 2012; Seifert 2002). A different strategy is what you might call *prebunking*. Where debunking involves refuting misinformation once it has been taken on board, prebunking involves pre-emptively refuting it before it can be taken on board. The prebunking strategy is based on a key idea in inoculation theory, which is that exposing someone to refuted misinformation conveys resistance to it, in much the same way that exposing someone to a virus in a weakened form conveys resistance (Compton 2013). There is growing evidence of the effectiveness of prebunking, both in the specific case of misperceptions about global warming, and in general (Tony Bolsen and Druckman 2015; Cook, Lewandowsky, and Ecker 2017; Ivanov et al. 2015; Pfau 1995; Pfau and Burgoon 1988; van der Linden et al. 2017). So, for instance, you might present someone with a common climate skeptic argument along with a refutation of it. Take the claim that human CO_2 emissions are tiny in magnitude compared to natural emissions. You would accompany a presentation of this argument with the refutation: human CO_2 emissions interfere with the natural carbon cycle, putting it out of balance.

Second, we can consider how issues like global warming are *framed*. There is a large body of evidence suggesting that whether individuals are willing to accept specific global

warming mitigation policies—and even the underlying science—depends on how those policies are described (Campbell and Kay 2014; Corner et al. 2015; Dahlstrom 2014; Dryzek and Lo 2015; Hardisty, Johnson, and Weber 2010; Kahan 2014; MacInnis et al. 2015). For instance, discussions of what to do about climate change are often framed in terms of what we can do to reduce carbon emissions. This leads to a situation where (put crudely) conservatives need to choose between the science and their conviction that business should be free from government interference. There is evidence that framing the problem as amenable to technological solutions (e.g. geoengineering) can make those who are ideologically opposed to regulating carbon emissions more willing to accept that action is needed to combat global warming (Kahan et al. 2015). Or, to take another example, there is evidence that framing charges for environmental costs as "carbon offsetting" rather than as a "carbon tax" increases public acceptance of the necessity of the charges (Hardisty, Johnson, and Weber 2010).

Third, as well as considering the content of the message, we can look at who delivers it. Climate scientists have generally been the messengers of choice. This makes sense, given that public trust in scientists is quite high (American Academy of Arts & Sciences 2018; Ipsos MORI 2014). But scientists are not the most trusted source on every issue, or the best person to communicate key messages on a politically contentious issue such as global warming (Cvetkovich and Earle 1995; Cvetkovich and Löfstedt 1999; Kahan et al. 2010; Moser and Dilling 2011). This is in part because of a fact noted above: our background ideological beliefs influence how we process information. This extends to our assessments of expertise. Put crudely, we would often rather rely on someone we perceive to share our ideological beliefs and values than an "expert" with different values from our own (Kahan, Jenkins-Smith, and Braman 2011). While this has its downsides—we would rather listen to someone

who is like us than someone who isn't, even if we have reason to think they are less likely to be right—it has potential upsides in the present context. If we take steps to ensure that a politically diverse group make the case for action on climate change, we have reason to think that this would be more effective.

This completes my survey of possible strategies for combatting the problem of consequential false beliefs. Put broadly, these strategies involve attempting to construct a better epistemic environment—an environment in which it is more likely that individuals form true beliefs about climate science than it would be otherwise. We have reason to think that each strategy will be successful, both in general and in the particular case of misperceptions about climate science.

EPISTEMIC PATERNALISM AND EPISTEMIC AUTONOMY

In the previous section I canvassed three strategies for correcting public misperceptions about climate science. The general message was that solving the problem of consequential false beliefs is going to require conscious efforts to construct an epistemic environment in which it is more likely that people will form accurate beliefs about climate science. But the fact that a strategy is likely to be effective is not conclusive reason for deploying it. Maybe there is something ethically problematic about some (or all) of the strategies I discussed. In this section I try to make this worry more precise, before addressing it in the final section.

We can frame the worry here in terms of *paternalism*. Specifically, we can frame it in terms of *epistemic* paternalism. Put roughly, a practice is paternalistic if it involves interfering with someone's choices or actions for their own good, but without their consent. If I hide your cigarettes because I know you'll smoke the whole packet, which will be bad for your health, then I act paternalistically towards you. Equally roughly, we can call a practice

epistemically paternalistic when it involves interfering with someone's cognitive activities—primarily, with the conduct of their inquiries—with the aim of improving their epistemic position, but without their consent.[7] For example, if a judge withholds information about the defendant's criminal record from the jury because they think knowing this would bias their deliberations and so make them less likely to arrive at the right verdict, then the judge engages in epistemic paternalism because he interferes with their cognitive activities (by withholding information) with the aim of making it more likely that they arrive at the right verdict.

Many think that paternalistic interference is always *prima facie* objectionable.[8] This is because any form of paternalistic interference infringes on our right as autonomous individuals to make our own choices and our own decisions about how to act. The point is not that *any* sort of infringement on our autonomy is *prima facie* objectionable. If I have autonomously decided to murder my neighbour, then there seems nothing *prima facie* objectionable about your calling the police to stop me because you are concerned for my neighbour's safety. The point is rather that it is always *prima facie* objectionable to infringe on someone's autonomy *for their own good*. If I hide your cigarettes, then I infringe on your right to decide for yourself if you want to smoke them.

One might think that many (if not all) of the strategies for improving the epistemic environment canvassed in the previous section are objectionable in much the same way that paternalistic interventions are objectionable. This is because they involve interfering with individuals' right to conduct their inquiries in the way that they see fit, with the aim of making them epistemically better off.[9] This is most obvious with inoculation theory. The analogy with vaccination suggests that inoculating someone against global warming

misinformation without their consent would be like inoculating them against a disease without their consent.

But what about framing and the considerations about spokespersons? While neither of these strategies involve outright deception or the straightforward withholding of information (as when a judge withholds information about a defendant's criminal record from the jury), they all involve presenting information in ways that are designed to make it more likely that the audience will react in a desired way (here, form accurate views about climate science). As such, they are similar to the sort of interference proposed by adherents of "nudging" (Thaler and Sunstein 2008). A "nudge" is (according to Thaler and Sunstein) "any aspect of the choice architecture that alters behavior in a predictable way without forbidding any options" (6). An example of a "nudge" would be telling patients who are deciding whether to have an operation that 90% of those who have it are alive after 5 years, rather than that 10% of those who have it are dead after 5 years. These are two ways of presenting the same statistical information, but the former framing has been shown to make it more likely that patients will opt to have the operation than the latter (McNeil et al. 1982). Similarly, framing the issue of global warming in a certain way, or choosing a particular spokesperson to give a message, involves presenting information in ways that make it more likely that the audience will form accurate beliefs about climate science than they would otherwise.

To summarise: While there are several strategies for combatting the problem of consequential false beliefs that may be effective, some (or all) of them involve a sort of interference in the cognitive activities of individuals that one might think is *prima facie* problematic in the way that paternalistic interference is problematic. Indeed, one might think that they involve a form of (epistemic) paternalism. I finish by arguing that these forms of interference aren't *prima facie* problematic.

11

JUSTIFYING EPISTEMIC PATERNALISM

One way of arguing that the strategies canvassed above aren't *prima facie* problematic would be to argue that they aren't really paternalistic. I won't pursue this route, because I am inclined to think that they are. Another way would be to argue that they are both paternalistic *and* justified. Thus, there are justified instances of epistemic paternalism. Ahlstrom-Vij (2013) argues that there are justified instances of epistemic paternalistic interference. Rather than re-iterate this argument, I will construct my own. But let me emphasize that it complements rather than supplants Ahlstrom-Vij's work.

It is commonly assumed that there is a crucial difference between paternalism and *rational persuasion*. Rationally persuading someone to do (or think) something involves offering reasons, evidence and arguments; paternalistic interference with what they do (or think) involves manipulation of some form. In the present content, many would assume that there is a crucial difference between persuading someone to accept that human activity is the major cause of global warming through the provision of reasons, evidence and arguments, and persuading them to accept this through the sorts of strategies canvassed in above. In a recent paper, George Tsai (2014) has argued that this common assumption (that there is a crucial difference between rational persuasion and paternalistic forms of persuasion) is false:

> [I]t is possible to rationally persuade someone to do something, yet treat her paternalistically … Rational persuasion may express, and be guided by, the motive of distrust in the other's capacity to gather or weigh evidence, and may intrude on the other's deliberative activities in ways that conflict with respecting her agency (79).

Thus, for Tsai, rationally persuading someone to do something (e.g. stop smoking) can be problematic for reasons that paternalistically interfering with them to get them to stop (e.g. hiding their cigarettes) is problematic.

12

While I agree with Tsai that rational persuasion and paternalistic interference are far more similar than many suppose, I want to urge that we draw almost the opposite conclusion: paternalistic interference is often justifiable for precisely the reasons that rational persuasion is often justifiable. Thus, where Tsai sees the similarities between rational persuasion and paternalistic interference as casting doubt on the legitimacy of rational persuasion, I see these similarities as justifying many instances of paternalistic interference.

Tsai holds that there are two aspects of paternalistic interference that are problematic. The first is that it is guided by what Tsai calls a *motive of distrust* in the rational capacities of another person. The second is that it involves interfering with the deliberations and decisions of another person in ways that disrespect their agency. Tsai's claim is then that some (if not many) cases of rational persuasion also have these two aspects, and so are problematic for the same reasons that paternalistic interference is.

To illustrate this, he gives an example. Claire is trying to decide whether to go to graduate school in philosophy or to law school. Her father, Peter, is trying to persuade her to go to law school. To this end, he bombards Claire with information about the multiple ways in which law school is the better option. Peter is trying to persuade Claire to decide to go to law school through rational means; he isn't black-mailing her, tricking her into going, or anything of the sort. But Tsai thinks his actions are morally problematic because

they interfere with Claire's ability to make the decision for herself:

when others offer us reasons to persuade us at the wrong time or in the wrong way,

they make it harder for us to be able to engage more purely and directly with the

reasons most centrally tied to the choice-worthiness of our options. When our

deliberations are *distorted* in this way, this potentially alters the self-determining and

self-expressive aspects of our decision … the point is that even the rational pressure

13

of Peter's *reason-giving* (as distinguished from the rational pressure of the *reasons* themselves) might potentially alter the nature of Claire's deliberations in a way that results in a sense of loss for Claire … Insofar as the timing of Peter's attempt at rational persuasion precludes Claire from having the purer, more direct engagement with the reasons most centrally relevant to her deliberative situation, this limits her exercise of epistemic agency (95-6).

I think Tsai is right that Peter's behaviour in Tsai's example is problematic. Peter is interfering with Claire's ability to deliberate and decide for herself because he has no trust in her ability to make this decision in a competent manner. That his interference takes the form of rational persuasion makes no difference. But I don't think this example shows what Tsai thinks it does. Tsai presumably thinks that this example generalises: paternalistic interference (perhaps invariably) and rational persuasion (perhaps only very often) involves a lack of trust in the capacity of another person to deliberate and make decisions in a competent manner, which leads to interference in their deliberations and decisions. But I think this is wrong: neither paternalistic interference nor rational persuasion need be problematic in these ways.

First, part of the reason why Peter's distrust in Claire's capacity to make this decision is so problematic is that the decision in question (whether to go to law school or graduate school in philosophy) concerns Claire's life, and in particular, what she wants to do with it. Peter's distrust in her ability to make this decision for herself reflects not just a lack of respect for Claire's deliberative capacities, but also for her ability to make life-choices, and his distrust is disrespectful in part for this reason. It is therefore unclear whether Tsai's point will generalise to cases where the decision has nothing to do with the life choices of the deliberator, whether these cases involve rational persuasion or paternalistic interference. (Thus it is no surprise

that hiding someone's cigarette packet strikes us as problematic: this involves the same sort of interference with their life choices that is so problematic in Tsai's example).

Second, there are different *ways* of interfering with the deliberations and decisions of another person. The quoted passage above suggests that Tsai's fundamental objection to Peter's behaviour is that he has made it harder for Claire to engage with the reasons for and against her two choices. But this is a consequence of the way in which Peter has chosen to interfere with Claire's deliberations, not of him interfering at all. Peter could have "stated his case" in a way that didn't interfere with Claire's ability to engage with the reasons. He could have sat her down and told her why he thought law school was the right option, but made it clear that it was her decision to make, and he was just there to provide her with information, not to make the decision for her.

Third, while it is hard to see why you would interfere with the deliberations of someone you were confident didn't need your help, this doesn't mean that interference must always be guided by the sort of distrust that drives Peter to interfere with Claire's deliberations. In another version of the case, Peter might have simply been worried that Claire didn't have all the information she needed to make an informed choice, and have taken it upon himself to find some information about the benefits of going to law school.

You might object: this is all very well, but doesn't it just show that Tsai is wrong in thinking that rational persuasion is often problematic in the same way that paternalistic interference is? I have given us reasons to think that rational persuasion need not involve the sort of interference with the deliberations and decisions of another that is so problematic in Claire's case. What about paternalistic interference?

Consider the strategies for combatting the problem of consequential false beliefs canvassed above: inoculating people against climate misinformation, framing the issue in

15

such a way as to make it more likely that they accept the scientific consensus, and choosing spokespeople so as to neuter ideological biases and blind spots. It can be argued that all of these strategies can avoid the problems Tsai identifies in his example.

Firstly, our deliberations about what to believe when it comes to climate change don't directly concern our life-choices (though they do so indirectly, in that what we believe about climate change may inform our life-choices). Thus, interfering with people's decisions about what to think about climate change need not reflect any disrespect for their ability to make life-choices.

Secondly, someone utilising these strategies is not aiming to interfere with people's abilities to engage with the scientific evidence pertaining to climate change. On the contrary: their aim is to facilitate engagement with this evidence, by drawing attention to what the evidence actually is and neutering ideological biases and blind spots that get in the way of engaging with it. As Dan Kahan (2010) puts it:

> It would not be a gross simplification to say that science needs better marketing. Unlike commercial advertising, however, the goal of these techniques is not to induce public acceptance of any particular conclusion, but rather to create an environment for the public's open-minded, unbiased consideration of the best available scientific information (3).

The strategies identified above need not detract from our rationality. In fact, they may enhance it. The key message here is that, sometimes, we need a little help to think rationally in the first place.

Thirdly, and finally, while the empirical literature I have canvassed in this paper does engender a sort of distrust in the capacity of laypersons to form views about complex issues like climate change, it is important to note that this distrust is based on the evidence provided

16

by the empirical literature. Moreover, the distrust is in our capacity to form views about these issues *in the complicated socio-epistemic environment in which we find ourselves*. This need not involve any sort of lack of respect for laypersons' epistemic agency. It is simply the consequence of the realisation that we are epistemic agents in an imperfect world.

I conclude that, while Tsai is right in arguing that rational persuasion isn't that different from paternalistic interference, he draws the wrong moral. Tsai argues that rational persuasion is often as problematic as paternalistic interference. I have argued that, on the contrary, in many cases neither rational persuasion nor paternalistic interference are problematic.

CONCLUSION

The problem of consequential false beliefs is a problem for everyone. In this paper I have addressed it from the perspective of a de-idealised social epistemology. The task for a de-idealised social epistemology is to identify evidence-based strategies for improving the public's epistemic health. I have identified three strategies for improving the public's epistemic health with regard to scientific issues like global warming that have become politically contentious: prebunking, framing, and judicious choice of messenger. These strategies prompted an ethical concern: do they constitute a problematic form of paternalism that infringes on epistemic autonomy? I argued that, while they are plausibly epistemically paternalistic, they are not ethically problematic.

BIBLIOGRAPHY

Ahlstrom-Vij, Kristoffer. *Epistemic Paternalism: A Defence*. Palgrave-Macmillan, 2013.

American Academy of Arts & Sciences. *Perceptions of Science in America*, 2018. Accessed

    http://www.publicfaceofscience.org/.

Anderson, Elizabeth. 'Democracy, Public Policy, and Lay Assessments of Scientific

    Testimony'. *Episteme* 8, no. 2 (2011): 144–64.

Bak, Hee-Je. 'Education and Public Attitudes Toward Science: Implications for the "Deficit

    Model" of Education and Support for Science and Technology'. *Social Science*

    Quarterly 82, no. 4 (2001): 779–95.

Ballew, Matthew T., Anthony Leiserowitz, Connie Roser-Renouf, Seth A. Rosenthal, John E.

    Kotcher, Jennifer R. Marlon, Erik Lyon, Matthew H. Goldberg, and Edward H.

    Maibach. 'Climate Change in the American Mind: Data, Tools, and Trends'.

    Environment: Science and Policy for Sustainable Development 61, no. 3 (2019): 4–

    18.

Bolsen, Toby, Thomas J. Leeper, and Matthew A. Shapiro. 'Doing What Others Do: Norms,

    Science, and Collective Action on Global Warming'. *American Politics Research* 42,

    no. 1 (2014): 65–89.

Bolsen, Tony, and James N. Druckman. 'Counteracting the Politicization of Science'.

    Journal of Communication 65, no. 5 (2015): 745–69.

Bullock, Emma C. 'Knowing and Not-knowing For Your Own Good: The Limits of

    Epistemic Paternalism'. *Journal of Applied Philosophy*, 2016, 433–47.

Campbell, Troy H., and Aaron C. Kay. 'Solution Aversion: On the Relation between

    Ideology and Motivated Disbelief'. *Journal of Personality and Social Psychology*

    107, no. 5 (2014): 809–24.

Compton, Josh. 'Inoculation Theory'. In *The SAGE Handbook of Persuasion: Developments in Theory and Practice*, edited by James P. Dillard and Lijiang Shen, 220–36. Thousand Oaks, CA: Sage Publications, 2013.

Cook, John. 'Countering Climate Science Denial and Communicating Scientific Consensus'. *Oxford Encyclopedia of Climate Change Communication*, 2016. Accessed doi:10.1093/acrefore/9780190228620.013.314.

———. 'Understanding and Countering Climate Science Denial'. *Journal and Proceedings of the Royal Society of New South Wales* 150, no. 465/466 (2017): 207–19.

Cook, John, and Stephan Lewandowsky. *The Debunking Handbook*. St. Lucia, Australia: University of Queensland, 2011. Accessed http://sks.to/debunk.

Cook, John, Stephan Lewandowsky, and Ullrich K. H. Ecker. 'Neutralizing Misinformation through Inoculation: Exposing Misleading Argumentation Techniques Reduces Their Influence'. *PloS One* 12, no. 5 (2017): e0175799.

Cook, John, Sander van der Linden, Edward H. Maibach, and Stephan Lewandowsky. *The Consensus Handbook*, 2018. Accessed http://www.climatechangecommunication.org/all/consensus-handbook/.

Cook, John, Naomi Oreskes, Peter T. Doran, William R. L. Anderegg, Bart Verheggen, Edward H. Maibach, J Stuart Carlton, Stephan Lewandowsky, Andrew G. Skuce, and Sarah A. Green. 'Consensus on Consensus: A Synthesis of Consensus Estimates on Human-Caused Global Warming'. *Environmental Research Letters* 11, no. 4 (2016): 048002.

Corner, Adam, Stephan Lewandowsky, Mary Phillips, and Olga Roberts. *The Uncertainty Handbook*. Bristol: University of Bristol, 2015.

Cvetkovich, George, and Timothy Earle. *Social Trust: Toward a Cosmopolitan Society*.

    Westport, Conn.: Praeger, 1995.

Cvetkovich, George, and Ragnar Löfstedt, eds. *Social Trust and the Management of Risk*.

    Abingdon: Earthscan, 1999.

Dahlstrom, Michael F. 'Using Narratives and Storytelling to Communicate Science with

    Nonexpert Audiences'. *Proceedings of the National Academy of Sciences* 111, no.

    Supplement 4 (2014): 13614–20.

Downing, Phil, and Joe Ballantyne. *Tipping Point or Turning Point? Social Marketing and

    Climate Change*. London: Ipsos MORI Social Research Institute, 2007.

Dryzek, John S., and Alex Y. Lo. 'Reason and Rhetoric in Climate Communication'.

    Environmental Politics 24, no. 1 (2015): 1–16.

Fricker, Miranda. *Epistemic Injustice: Power and the Ethics of Knowing*. Vol. 69. Oxford

    University Press, 2007.

Gardner, Gerald T., and Paul C. Stern. *Environmental Problems and Human Behavior*.

    Boston, MA: Allyn & Bacon, 1996.

Goldman, Alvin. *Knowledge in a Social World*. Oxford: Oxford University Press, 1999.

Goldman, Alvin, and Thomas Blanchard. 'Social Epistemology'. Edited by Edward N. Zalta.

    The Stanford Encyclopedia of Philosophy (Summer 2018 Edition), 2018. Accessed

    https://plato.stanford.edu/archives/sum2018/entries/epistemology-social/.

Grill, Kalle, and Jason Hanna, eds. *The Routledge Handbook of the Philosophy of

    Paternalism*. Abingdon: Routledge, 2018.

Hamilton, Lawrence C. 'Education, Politics and Opinions about Climate Change Evidence

    for Interaction Effects'. *Climatic Change* 104, no. 2 (2011): 231–42.

Hamilton, Lawrence C., Joel Hartter, Mary Lemcke-Stampone, David W. Moore, and

    Thomas G. Safford. 'Tracking Public Beliefs about Anthropogenic Climate Change'.

    PLoS One 10, no. 9 (2015): e0138208.

Hardisty, David J., Eric J. Johnson, and Elke U. Weber. 'A Dirty Word or a Dirty World?

    Attribute Framing, Political Affiliation, and Query Theory'. *Psychological Science*

    21, no. 1 (2010): 86–92.

Hornsey, Matthew J., Emily A. Harris, Paul G. Bain, and Kelly S. Fielding. 'Meta-Analyses

    of the Determinants and Outcomes of Belief in Climate Change'. *Nature Climate*

    Change 6, no. 6 (2016): 622–26.

Ipsos MORI. *Public Attitudes to Science 2014*, 2014. Accessed

    https://www.britishscienceassociation.org/public-attitudes-to-science-survey.

Ivanov, Bobi, Jeanetta D Sims, Josh Compton, Claude H. Miller, Kimberly A. Parker, James

    L. Parker, Kylie J. Harrison, and Joshua M. Averbeck. 'The General Content of

    Postinoculation Talk: Recalled Issue-Specific Conversations Following Inoculation

    Treatments'. *Western Journal of Communication* 79, no. 2 (2015): 218–38.

Kahan, Dan. 'Making Climate-Science Communication Evidence-Based--All the Way

    Down'. In *Culture, Politics and Climate Change*, edited by M. Boykoff and D. Crow,

    203–20. New York: Routledge, 2014.

Kahan, Dan, Donald Braman, Geoffrey L. Cohen, John Gastil, and Paul Slovic. 'Who Fears

    the HPV Vaccine, Who Doesn't, and Why? An Experimental Study of the

    Mechanisms of Cultural Cognition'. *Law and Human Behavior* 34, no. 6 (2010): 501–

    16.

Kahan, Dan, Hank Jenkins-Smith, and Donald Braman. 'Cultural Cognition of Scientific

    Consensus'. *Journal of Risk Research* 14, no. 2 (2011): 147–74.

Kahan, Dan, Hank C. Jenkins-Smith, Tor Tarantola, Carol L. Silva, and Donald Braman. 'Geoengineering and Climate Change Polarization: Testing a Two-Channel Model of Science Communication'. *Annals of American Academy of Political and Social Science* 658 (2015): 193–222.

Kitcher, Philip. *Science in a Democratic Society*. Prometheus Books, 2011.

Kvanvig, Jonathan. *The Value of Knowledge and the Pursuit of Understanding*. Cambridge: Cambridge University Press, 2003.

Laudan, Larry. *Truth, Error, and Criminal Law*. Cambridge: Cambridge University Press, 2006.

Lewandowsky, Stephan, Ullrich K. H. Ecker, Colleen M. Seifert, Norbert Schwarz, and John Cook. 'Misinformation and Its Correction: Continued Influence and Successful Debiasing'. *Psychological Science in the Public Interest* 13, no. 3 (2012): 106–31.

Lewandowsky, Stephan, Gilles E. Gignac, and Samuel Vaughan. 'The Pivotal Role of Perceived Scientific Consensus in Acceptance of Science'. *Nature Climate Change* 3, no. 4 (2013): 399–404.

Lewandowsky, Stephan, and Klaus Oberauer. 'Motivated Rejection of Science'. *Current Directions in Psychological Science* 25, no. 4 (2016): 217–22.

Linden, Sander van der, Anthony Leiserowitz, Geoffrey D. Feinberg, and Edward Maibach. 'How to Communicate the Scientific Consensus on Climate Change: Plain Facts, Pie Charts or Metaphors?' *Climatic Change* 126, no. 1–2 (2014): 255–62.

Linden, Sander van der, Anthony Leiserowitz, Seth Rosenthal, and Edward Maibach. 'Inoculating the Public Against Misinformation about Climate Change'. *Global Challenges* 1, no. 2 (2017): 1600008.

MacInnis, Bo, John A. Krosnick, Adina Abeles, Margaret R. Caldwell, Erin Prahler, and

    Debbie Drake Dunne. 'The American Public's Preference for Preparation for the

    Possible Effects of Global Warming: Impact of Communication Strategies'. *Climatic*

    Change 128, no. 1–2 (2015): 17–33.

McNeil, Barbara J., Stephen G. Pauker, Harold C. Sox Jr., and Amos Tversky. 'On the

    Elicitation of Preferences for Alternative Therapies'. *The New England Journal of*

    Medicine 306, no. 21 (1982): 1259–62.

Moser, Susanne C., and Lisa Dilling. 'Communicating Climate Change: Closing the Science-

    Action Gap'. In *The Oxford Handbook of Climate Change and Society*, edited by John

    S. Dryzek, Richard B. Norgaard, and David Schlosberg, 161–74. Oxford: Oxford

    University Press, 2011.

Pfau, Michael. 'Designing Messages for Behavioral Inoculation'. In *Designing Health*

    Messages: Approaches from Communication Theory and Public Health Practice,

    edited by Edward H. Maibach and Roxanne L. Parrott, 99–113. Thousand Oaks, CA:

    Sage Publications, 1995.

Pfau, Michael, and Michael Burgoon. 'Inoculation in Political Campaign Communication'.

    Human Communication Research 15, no. 1 (1988): 91–111.

Quine, W. V. O. 'Epistemology Naturalized'. In *Ontological Relativity and Other Essays*,

    69–90. New York: Columbia University Press, 1969.

Ryan, Shane. 'Epistemic Environmentalism'. *Journal of Philosophical Research* 43 (2018):

    97–112.

Seifert, Colleen M. 'The Continued Influence of Misinformation in Memory: What Makes a

    Correction Effective?' In *Psychology of Learning and Motivation*, 41:265–92.

    Academic Press, 2002.

Sturgis, Patrick, and Nick Allum. 'Science in Society: Re-Evaluating the Deficit Model of
Public Attitudes'. *Public Understanding of Science* 13, no. 1 (2004): 55–74.

Thaler, Richard H., and Cass R. Sunstein. *Nudge: Improving Decisions about Health, Wealth,
and Happiness*. New Haven: Yale University Press, 2008.

Tranter, Bruce, and Kate Booth. 'Scepticism in a Changing Climate: A Cross-National
Study'. *Global Environmental Change* 33 (2015): 154–64.

Tsai, George. 'Rational Persuasion as Paternalism'. *Philosophy and Public Affairs* 42, no. 1
(2014): 78–112.

Ungar, Sheldon. 'Knowledge, Ignorance and the Popular Culture: Climate Change versus the
Ozone Hole'. *Public Understanding of Science* 9, no. 3 (2000): 297–312.

Williamson, Timothy. *Knowledge and Its Limits*. Oxford: Oxford University Press, 2000.

NOTES

[1] See https://www.theguardian.com/environment/2019/may/07/us-hotbed-climate-change-denial-international-poll.

[2] For references see below.

[3] One can find this view in both the philosophical literature (e.g. Kitcher 2011) and the non-philosophical literature (e.g. Ungar 2000).

[4] I take this term from Ryan (2018).

[5] I should emphasise that this approach is not new. It informs much of Elizabeth Anderson's work in social epistemology (e.g. Anderson 2011), and one can find manifestations of it in a large body of social epistemological work.

[6] For some cross-national data see Tranter and Booth (2015). The general message is that, while some countries do better than others, there is no country where most people have an accurate belief about the level of scientific consensus.

[7] See Ahlstrom-Vij (2013). While Ahlstrom-Vij requires that epistemic paternalistic interference be with the aim of making the person interfered with epistemically better off, I myself would be inclined towards the view that an epistemic paternalistic practice merely involves interfering with someone's cognitive activities, whether it has the aim of improving or worsening their epistemic position. One might wonder why this qualifies as a form of epistemic paternalism (Bullock 2016). But perhaps epistemic paternalism is "epistemic" in roughly the same sense in which Fricker (2007) thinks epistemic injustice is "epistemic. Just as an individual experiences epistemic justice when they are harmed in their capacity as an epistemic agent, an individual is interfered with in an epistemic paternalistic way when they are interfered with in their capacity as an epistemic agent.

[8] For discussion see many of the essays in Grill and Hanna (2018). For a discussion of the legal case in particular see Laudan (2006).

[9] One might object that science communicators may not be interested in the epistemic health of the populace for its own sake, but merely as a means to the end of securing wider public support for policies to reduce greenhouse gas emissions and mitigate the impacts of global warming. I lack the space to discuss this objection here, but I refer the reader to Ahlstrom-Vij's discussion of this objection (Ahlstrom-Vij 2013, chap. 2).