The Denialism Frame: Footnotes

1. 'Denialism' in New Scientist, Nature, Global Environmental Change, referenced by Lewandowsky, in news-papers, on government and other websites, in various blogs and many health / medical sites and articles. Plus practically a one-man industry on the topic by John Cook, including books, the Skeptical Science blog, and a core part of his course on Making Sense of Climate Science Denial. All these works include direct references or quotes. Far more literature has similar sentiments yet lacking direct reference; it isn't possible to trace whether or not such sentiments stem from D&M2009 or Hoofnagle's influence, although after seven to nine years of percolation presumably *some* will have.

2. The so-called Slayers (from 'Slaying the Sky Dragon', i.e. slaying the theory of greenhouse gases), appear to be such a case in the climate domain. They oppose the certainty of climate calamity but for the wrong reasons, which reasons stem from theoretical misunderstanding (according not only to the climate orthodox, but also the great majority of climate skeptics). See critique of their work. Their impact on the domain is modest.

3. Noble cause corruption, an emotive and often culturally aligned behavior, can flourish wherever high morals are not constrained, yet typically will be amplified in contested domains where culture drives one or both sides. Ironically, opposing sides may *both* suffer from this, as each believes they are right. So in a domain with major societal risks, each also believes they are minimizing risk and hence saving society. In practice noble cause behavior (whether it actually 'corrupts', an emotive word in itself, or just creates major bias and exaggeration) can be so strong we no longer know whether the right side *is* right (i.e. even when it appeared to have excellent evidence), or whether it is *defined by the righteousness*. In other words it is much harder to tell who is who when noble cause is in play. The second-hand smoking domain 'inherited' righteousness from the more obvious evidence in the first-hand smoking domain, and this *may* have exceeded reasonable bounds. I haven't investigated this domain and have no particular reason to question the consensus of danger, yet there are articles which raise the possibility that strong noble cause *may* have gripped the consensus side, with ill effects. The linked article references Diethelm and McKee as (challenged) domain authorities, yet in truth regarding experts how do we tell who is who?

4. A Google search for 'denialism' within the last dozen individual years, yields hit numbers of:

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Last 1 Year to April 4th
276	685	689	3450	6740	11600	11700	12600	12500	14600	17200	21500	27,100

This isn't science, partly because usage may seem to increase as internet usage increases, plus the hits for 'any time' are much greater despite very few before 2004, so the algorithms are not consistent. Yet there seems to be a big percentage lift in a short span from 2006 to 2009, and also a marked increase over about the last 4 years. Mark Hoofnagle's initial blog posts were in 2007, and both Michael Specter's book plus D&M2009 came out in 2009. These modest hit numbers suggest a likewise modest impact upon a general global audience, yet the sites / articles are heavily weighted towards particular narrow domains, especially AIDS / HIV and Climate, and to a lesser extent Tobacco (conflated with climate where it is often quoted as a similar model) plus the Holocaust, so likely would have significant impact within these, for better or worse. Google Trends shows 'denialism' much flatter with big spikes in 2009/10 after Specter's book and in 2015 (?). Not sure which algorithm to trust the most here. Yet Trends also shows terms like 'climate

deniers' rising significantly over the last few years, so maybe the general searches are picking up variant terms too, which is still valid for seeing growth of the general concept. Google Ngrams only goes to 2008 but shows a strong rising trend in modern times starting in the 1990s. Searches pull up many references to Diethelm and / or McKee (and Hoofnagle), see footnote 1 for a few samples. In a more limited context, both Diethelm and Specter have used the 'denial' concept in writings going back some years before their respective publications above. See footnote 20 for more on Specter's book.

5. Captured 5th March 2016, Mark Hoofnagle is also attributed.

6. Scientific certainty regarding just about any local or global impact due to ACO2 within the wicked climate system seems very low, yet is promoted as high. Indeed the authoritative consensus position is one of certainty of imminent (before 2100) climate calamity, absent drastic emissions reduction. *Domain independent* social analysis confirms that this high certainty of climate calamity is a cultural position, opposing the evidential position that we cannot know this, with even the likelihood as possibilistic not probabilistic. In the US, the culture of climate calamity has an asymmetrical alliance to political cultures, being much more strongly aligned to the Dem / Libs. Hence the Rep / Cons are largely triggered to oppose the climate culture, yet frequently do so *with their normal cultural arsenal rather than arguing the evidence*. (And Dem / Libs sometimes use *their* traditional cultural arsenal rather than primarily climate cultural devices, even while theoretically arguing within the climate domain). However, the culture on the evidential side is not skeptic fostered, but Rep / Con fostered. So both sides feature strong cultural behaviors. See figure 6 in here for a 2D cultural map of the relevant alliances.

7. It is part of the 'job' of cultures to form a consensus in the face of the unknown, and wherever culture flourishes a consensus will not only arise, but typically will be *enforced* by a whole raft of mechanisms. Such social consensuses can be modest, e.g. as exhibited in the closing of ranks by authority, or deeper, e.g. as promoted by groupthink that pervades an entire enterprise or social segment, or fundamental, e.g. consensus on an entire worldview as is found in full-blown cultural entities, such as a religion. Social consensuses frequently bias or wholly derail science; this problem is acknowledged, yet I think is greatly underappreciated and hence there is little systemic defense. Many helpful articles nevertheless often leave me feeling that the depth of the problem is not grasped. Taking medicine as an example, its history is littered with, in fact almost defined by, the overturning of one long held and authoritative and widely supported consensus after another. Hence for D&M2009 and Hoofnagle to offer up major consensus as their ultimate guarantor of who is right and who is practicing 'denialism', should surely have raised much skepticism. Science is self-correcting in the longer term, but how can we objectively know where we are in the cycle of correction for any particular issue? Because science cannot (usually) leap to endpoints in one go, *scientific* consensuses are inevitable, yet when as frequently occurs these become entrenched and policed *social* consensuses tangled with authority, new knowledge that can help society and save lives ends up being suppressed, on occasion severely (e.g. demonization of challengers) and for a long time.

8. For example consensus on: static continents, the motion of blood, miasma, cause of ulcers, superfluous hand washing, Ptolemaic system, saturated fats cause heart disease, and obesity plus diabetes, eugenics, bloodletting. These were not perceived as interim concepts to evolve from (I guess there must be many thousands of those). The consensuses were enforced, socially promoted, clung to and defended against evidence to varying degrees, sometimes with much damage. For clarity, the point here is not: 'because some consensuses are wrong and inappropriately defended, means that all other consensuses are wrong'. Or even that any other *particular* consensus must by comparison also be wrong. But merely that neither

Diethelm and McKee, or Hoofnagle, or anyone else, can cite a major consensus as the ultimate criteria for determining who is speaking to the evidence, and who is not. They may be right most of the time, but are not guaranteed to be right. We need a much more objective criteria than 'consensus'.

9. See figures 1 and 5 here, which depict increasing polarization with increasing domain knowledge in two very different domains: Creationism and Climate Change. These domains are also 2 out of the 4 examples that D&M2009 cites. The graphs are sourced from Dan Kahan's excellent Cultural Cognition blog.

10. HIV to AIDS replication documented here. So no consensus is required, the concept is manifest. This is a reminder that the only kind of consensus science should support is that of provisional frameworks to describe domains where uncertainty is still significant, or maybe even dominant. Scientists working with such frameworks perforce must receive valid criticisms, and indeed should welcome challenge as the best means of either advancing via correction, or gaining validation. Yet for science with major social impact, or even *perceived* major social impact, and where genuine difficulties can limit and slow the input of new evidence over many years, social authority may attach to a consensus and so dangerously entrench it. At that point a consensus may no longer be amenable to challenging evidence.

11a. Though not the one that is argued over most; proxies for *potential* danger such as sea ice or surface temperature soak up most of the debate, how these may or may not translate into actual global danger seems to get less voice on either side. D&M2009 says regarding proofs of climate change: '*For example, those denying the reality of climate change point to the absence of accurate temperature records from before the invention of the thermometer. Others use the intrinsic uncertainty of mathematical models to reject them entirely as a means of understanding a phenomenon.*' The latter point is at least within the bandwidth of plausibility, skeptics do question the divergence between model output and observations, plus the use of immature models to base world-transforming policy on. I doubt though that most skeptics reject models simply as a tool with which to gain some understanding. The former point does not seem too relevant w.r.t. the current debate. Both sides know the temperature record only goes back so far, and this is neither an argument for or against calamitous climate change. Both sides present proxies for prior temperature in their arguments. D&M2009 distills these points from Hoofnagle's 2007 blog, so maybe this line of argument is from influence at the time of the original, un-curved Hockeystick, which placed a very strong emphasis on the 'unprecedented' (high) level of the modern global surface temperature. Yet the orthodox have moved to more subtle positions since then, for instance heat accumulated in the oceans, and the CO2 damage plus energy building up 'in the system'. At any rate, unless D&M2009's mention of models also includes sea-level modeling, which may more easily translate into coastal damage, neither of these points actually address a threshold of proof for calamity by 2100.

11b. I was most struck by comment from Professor Michael Siegel, summarized here, who far from occupying the opposite position to Deithelm and McKee regarding second hand smoke (or ETS – environmental tobacco smoke), is a tobacco control advocate who apparently argued that ETS kills over 50,000 US Americans each year, and whose testimony contributed towards a 145 billion dollars verdict against tobacco companies. Yet he is robust to say the least in his criticism of D&M2009, excerpt:

"*Diethelm and McKee have endangered the integrity of public health by comparing those who challenge the conclusion that secondhand smoke causes heart disease and lung cancer with those who deny the Holocaust. As a primarily science-based movement, public health is supposed to have room for those who*

dissent from consensus opinions based on reasonable scientific grounds. To argue that those who fail to conclude that the small relative risk for lung cancer of 1.3 among persons exposed to secondhand smoke is indicative of a causal connection are comparable to Holocaust deniers is to turn public health into a religion, where the doctrines must be accepted on blind faith to avoid being branded as a heretic."

Diethelm and Mckee reply to Siegel (see 13th February eletter), yet the editor of *Reason* magazine, Jacob Sullum, notes: "*Diethelm and McKee reject Siegel's analogy while hanging on to theirs, saying they are not advocating censorship of denialists. Of course, Siegel never said they were. Instead they are advocating branding, ad hominem attacks, and blithe dismissal.*" Sullum also accuses Diethelm and McKee of false insinuations regarding the financial interests of the authors of another smoking study. And epidemiologist Geoffrey Kabat notes regarding D&M2009 (see 16th February eletter):

"*Diethelm and McKee's sleight-of-hand is to imply that there should be equal certainty across all the historical and scientific issues they mention. Thus, questioning the weak-to-null association of passive smoking with fatal disease is tantamount to Holocaust denial or denial that HIV causes AIDS. Their true goal is to assert the existence of an unquestionable consensus concerning passive smoking, and to discredit anyone who would dare to bring the best scientific evidence to bear on the question.*"

While tobacco researcher Kamal Chaouachi complains (see 17th February eletter) about Diethelm and Mckee's "*abuse of strong phrases and words such as 'fake experts', 'denialism', etc.*" also that they are defaming Siegel. Some of the eletter writers also claim, essentially, that Diethelm and Mckee have been cherry picking in the assembly of their cases (both for ETS and for 'denialism').

These various robust criticisms of D&M2009 seem not to have made it out of the smoking domain into the wider world; I'd never come across them in the climate domain for instance even though I've seen both D&M2009 and Hoofnagle referenced w.r.t. 'denialism'. What are we to make of such criticisms? Are the promoters of 'denialism' partaking of denialist behavior as they themselves would define it? Or are all their detractors simply wrong? *More to the point, how could we tell*? Certainly not, it would seem, by applying D&M2009's own criteria. And Kabat specifically calls out Diethelm and McKee's expertise as *false* (see 16th February eletter):

"*It is also relevant to note that neither Diethelm nor McKee has ever published any substantive scientific study dealing with ETS. This explains their lack of interest in what the actual evidence really shows. For their purposes, which relate solely to policy, as opposed to science, it is expedient to refer only to the activist consensus concerning ETS."*

Quite apart from views on D&M2009, as an outsider looking into the ETS debate I do not see obvious signs of a true scientific consensus that is open to debate, and many signs of the usual defensive battles that characterize long-standing contests where strong culture is involved, e.g. media self censorship. There is defensive behavior on both sides; I don't know who is siding with the best evidence. This does not inspire me with confidence regarding the consensus that prior to looking, I had no reason to question. Stretching out a little further than Diethelm and McKee's work, it is easy to find various apparently reasonable works challenging what seem to be foundational pillars of the consensus view, for instance the rates of myocardial infarction after smoking bans. These works are no doubt subject to uncertainty too and do not necessarily invalidate the consensus. Yet their presence suggests that calling challengers of the

consensus 'denialists', is at best highly inappropriate, and gives the unfortunate impression to observers that legitimate yet disagreeing scientists are being branded as liars, or crazy.

12. DNA was not discovered until almost a century later, hence *ultimate* proof was simply not available, and indirect evidence was not yet properly marshaled. Various theories on the mechanisms of evolution during this intervening century turned out to be wrong, including Darwin's own. Religious conservatism stretched deep into science and education, so the weight of opinion at this time was still set against the concept of evolution. Even where some concessions to evolutionary theory were made, man's place within the system and the actual mechanism of natural selection remained contested. In an era when the existence of eyes and even rational thought were seen as evidence of a creator, what standard of proof was acceptable? And how would an educated person have determined who were the most trustworthy experts regarding the question of origin, and so whether any particular evidential threshold made sense?

12a. The authors might argue that denialism (e.g. from evolution deniers in the 1860s) is excusable when the science that they are criticizing is not yet mature. I.e. they are not really deniers. But if that's the case, then we are faced with having to determine whether a science *really is* mature, before we can know that 'denialist' behavior is actually taking place. However, within a long-contested domain opinions on the relevant science's level of maturity will also be divided, and we'd have no means of knowing whether those who promote maturity / certainty are part of a genuine scientific consensus, or a socially enforced consensus, the latter of which by its very nature *will* promote certainty.

12b. For instance this timeline, at the end of which *a decades long consensus* is collapsing, allowing the evidential position to emerge. Consensus mechanisms suppressed the prior and accumulating evidence.

It is interesting that the messaging on calamitous climate change has moved from an emphasis on Global Surface Temperature as its indicator ('Global Warming'), to extreme weather events ('Climate Change'), to a sort of slow motion apocalyptic via the combined effect of ocean acidification, species extinction, plastic overload etc. ('The Anthropocene'). Something to reflect upon regarding 'moving the goalposts', albeit 'moving goalposts' is not a reliable criteria regarding who is right or wrong. Maybe it tells us about the level of the maturity of the science though, and hence is a reflection on certainty, or lack thereof.

13. There are many conceptions of ideology. I think something along these lines is pretty mainstream: A construction of symbolic forms, images and texts that encodes and transmits belief systems, these usually understood to be *modern* belief systems, and in some interpretations also associated with modern mass communications. As such they are often viewed as filling the vacuum left by declining religious systems. Hence generically, both ideologies and religions are the social machinery, or at least a large part of the machinery, of (evolving) cultures and in some cases 'a cultural entity', which themselves are emergent from gene-meme co-evolution.

13a. *Eccentricity* and *idiosyncrasy* are by definition individualistic behaviors, without social scope and, on their own at any rate, without a draw upon social power. Humans have evolved as a social species and motivators that draw upon or express group dynamics will get power amplification. The ultimate dynamic to tap is altruism, upon which most social systems are founded. [Although bear in mind that a culture leveraging altruism may have an agenda of its own (in a non-agential and non-sentient manner) and is not necessarily net beneficial to its human hosts; it may be a parasite riding upon the mechanisms of group altruism]. *Ideology* (see footnote 13 above) and *faith* reflect secular and religious belief systems that are

founded on fundamental social mechanisms, so do receive powerful amplification. Hence we'd expect a completely different scope and pattern of behavior from motivation by *eccentricity* and *idiosyncrasy*, to motivation by *ideology* and *faith*. A common pattern over many domains, as D&M2009 implies, seems unlikely. *Greed* is ultimately a personal motivation, but does have group expression (e.g. a criminal gang, a cartel), and can tangle in stronger cultural drives that encourage a cultural elite, for instance. Ultimately though, greed opposes altruism, which robs it of prime social power. Hence *greed* falls between the above two categories and is rarely the *primary* motivator for strong social effects; it's unlikely to produce common ('denialism') characteristics across very different domains, especially as these differ greatly in respect of potential rewards for 'denialist' activity.

14. For instance 'Inversionism': '*There is also a variant of conspiracy theory, inversionism, in which some of one's own characteristics and motivations are attributed to others*.' Hoofnagle writes that he finds this extra nuance to '*ring true*'.

15. From Mark Hoofnagle's blog: '*Denialists are not honest brokers in the debate (you'll hear me harp on this a lot)*'. '*This tendency towards quote-mining and misrepresentation of science is really the clearest proof of the dishonesty inherent in denialist tactics*'. '*Cranks and denialists aren't honest brokers in a debate, they stand outside of it and just shovel horse manure into it to try to sow confusion and doubt about real science.*' Plus footnote 16 below: 'knows' they are spouting BS, implies deliberate lying.

16. From Mark Hoofnagle's blog '*Cranks are a bit more deserving of pity, a bit closer to delusion and mental illness than the pure denialist, who knows that they are spouting BS to sow confusion.*'

17. One can't help but speculate that Diethelm and Mckee also dropped *dishonesty* because they sensed this would result in blow-back from folks who'd feel *inappropriately* branded. However they got there, after realizing that looking to dishonesty as a primary cause was barking up the wrong tree, then it's a shame this realization didn't stretch further, i.e. to all individual psychology as weak causation. Some typically much more bounded social phenomena can appear to be driven by dishonesty, for instance the 2008 global banking crisis. Yet research suggests that even these cases are more complex; the dishonesty seems to be a proxy for a toxic culture. The folks going into this culture are no more dishonest than their peers, and outside of business identity, *they remain so*. But *within* their business identity, they acquire dishonest (or at least reckless) behavior. The apparent fact that culture can selectively amplify dishonesty is a complicating factor.

18. There are many largely overlapping lists of rhetoric devices or 'fallacies'. There is some history of them provided by Stanford. Some have many names; 'cherry picking' as discussed in the main post is also known as 'half truth' or 'stacking the deck', 'slanting', the 'fallacy of exclusion', and more names. 'Impossible proofs' can come under 'special pleading', and 'false experts' is really 'appeal to authority'; there is some overlap between differently named fallacies. These two lists contain the above, and a very comprehensive list is available here . Assumption of conspiracy is also an ancient pastime pervading much literature. One presumes some knowledge of this weakness is also ancient; I'm always surprised by how much *some* individuals knew about our nature millennia ago, despite it does indeed seem to take millennia for the knowledge to percolate.

19. For instance at Cultural Cognition Dan Kahan is doing some great work on 'identity-protective cognition', a powerful effect that occurs when an evidential position generated by science (or indeed other

cultures) threaten the cultural identity of people. The effect along with the major biases it produces are comprehensively explored within several topic domains, and Kahan has developed tools to measure the effects, which attempt to insulate from domain knowledge via appropriate questioning styles. While Kahan unfortunately leaks his own bias towards the orthodox climate position into the mix, his low level tools are designed well enough to survive this, and provide great data.

20. Published about 9 months after D&M2009, Michael Specter's popular science book Denialism : How Irrational Thinking Hinders Scientific Progress, Harms the Planet, and Threatens our Lives, does not reference D&M2009 or Hoofnagle. The introduction proposes a theory that 'denialists' are primarily driven by fear of technology gone out of control, saying "*nothing scares us quite so much*". This fear is a largely a cultural effect; technology threatens existing cultural modes in various domains and one would expect a defensive reaction, which Specter acknowledges can encompass '*an entire segment of society*'.

Hence this is a much more viable proposition regarding causation, yet when people speak of 'denialism' are they speaking of Specter's 'denialism' or that of Diethelm, McKee and Hoofnagle? I guess these are confused in the public (maybe also the academic) consciousness anyhow. And Specter's consideration of a cultural driver is rather undermined by the fact that he emphasizes only *a subset* of cultural defense. 'Denialism' in the Holocaust or creationism domains is indeed the result of cultural defense, but not one invoked by a fear of technology. Maybe it's this approach which also leads to his firm assumption that corporations are the main amplifiers of the 'denialism' of scientific evidence: "*Corporations, wrapping themselves in the mantle of progress but all too often propelled by greed, have done more than religion or even Luddism to inflame denialists and raise doubts about the objectivity of science.*" I've no idea how this assumption could be objectively measured, yet even setting aside religion's centuries of very stiff resistance to science, there's plenty of evidence that organizations of every type, including governments and NGO's, can likewise exhibit anti-science behavior.

However, a bigger snag with Specter's book is that despite implying 'denialists' are well characterized and identifiable, like D&M2009 he also doesn't appear to have any objective means of actually telling who is who, or at least my google-fu is not up to finding one in his various writings. Considering that he names climate skeptics 'climate denialists', hence presuming a certainty that the domain doesn't support, I guess he's using the same ultimate criteria as D&M2009, i.e. a current major consensus, which is an unsafe assumption. Hence his efforts on a good cause which will frequently be correct and valuable, may sometimes be working for the 'wrong' side. *Note:* I have not read all Specter's book, only some sections.

The strong Grist critique of Specter's book is interesting. Specter is admonished for not spending enough time on climate denialism, and apparently '*he lurches toward a kind of denialism of his own*', according to Tom Philpott. That's the massive problem with a concept that has such weak, in fact essentially non-existent, underpinning as 'denialism'. Everyone can use it against anyone and everyone else.

21. Investigation purely of lists of particular scientific topics cannot guarantee to distinguish 'denialism', 'cranky' or otherwise, from skepticism. Yet this is exactly what D&M2009, and Hoofnagle, and indeed Specter too, are all attempting to do in somewhat differing ways. Probing the particulars of each list item is simply an exercise in acquiring sets of domain knowledge, along with which inevitably comes domain bias. For immature domains especially, which side the investigator ends up on will depend more on his / her initial cultural leanings, which vector further knowledge acquisition, as upon investigatory skill. The

way to maximize objectivity is to distance as much as possible from domain knowledge, see footnote 22 below for more.

22. Rather than branding a side wielding rhetoric 'denialist' (in most cases both sides will wield anyhow), or relying ultimately on the existence of a major consensus (this is unsafe, see footnote 8 for overturned major consensuses fuelled by bias), or attempting to distinguish acceptable from unacceptable science by acquiring domain knowledge, a better approach is to try and distance as far as possible from the detailed domain arguments, and indeed all domain knowledge. There are a couple of ways to pursue this.

a) The cause of resistance to evidential knowledge is cultural defense. Cultures create recognizable social signatures that are *domain independent*. So look for the occurred of these, e.g. consensus policing, or the cultural alliances of individuals causing them to state belief in an allied cause yet not act in the spirit of that belief, or powerful emotive investment, etc. There may be cultural behaviors from multiple influence on both sides. Yet distinguishing the main propagators and hence which side is, largely, *not* aligned to the evidence, isn't too difficult *if* the contest is global and major and relatively long-lived. This basic analysis shows via *the same* three steps that the creationism position is cultural, and that the orthodox climate consensus position is also cultural. If you don't like the three steps for the latter, then you have to say why they're also wrong for the former.

b) A problem occurs if the contest isn't global and major and relatively long-lived such as the creationism domain (very long lived) or the climate change domain. For instance the ETS contest. The cultural effects may be harder to pick up, and in deepening the search one inevitably has to engage with *some* domain knowledge. The way forward here is to try and develop tools that insulate from domain knowledge when attempting to see what people think, hence what their cultural influences are. Over at Cultural Consensus, Dan Kahan is doing a great job developing tools of this kind. At a higher level of analysis, Kahan is not certainly not yet separated from domain bias, but some of his lower level tools are great and have made objective data available. Step 1 of the above dual analysis uses some of Kahan's data obtained this way.

Given that culture has some characteristics that are expressed only at group level and not individual level, the emphasis regarding causation should be on social psychology and not personal psychology, though D&M2009's shopping list of motivations for 'denialism' conflates the two.

Perhaps in part because of the dominant framing of 'denialism', to some extent self-evolving yet pushed along the way by the vague D&M2009, there seems to be a great deal of effort in discovering 'denialism' in all sorts of domains and combating it. Yet very little effort on discovering true causes and whether the troops are actually fighting the right thing. In an interesting essay Massimo Pigliucci says: '*denialism in its various forms is a pernicious social phenomenon, with potentially catastrophic consequences for our society. It requires a rallying call for all serious public intellectuals, academic or not, who have the expertise and the stamina to join the fray to make this an even marginally better world for us all. It's most definitely worth the fight.*' Well this may be true. Yet if we have no underlying theory to truly isolate 'denialism' and objectively figure out who's doing it and who isn't, then not only may much of the noble fight be wasted, it may not infrequently attach itself *to the wrong side*. Naïve extrapolation of classic cases like the tobacco executives to any cause one feels justified about, is hardly objective or scientific.

Pigliucci provides hopeful insight: '*Participants at the conference agreed that what the large variety of denialisms have in common is a very strong, overwhelming, ideological commitment that helps define the*

denialist identity in a core manner. This commitment can be religious, ethnical or political in nature, but in all cases it fundamentally shapes the personal identity of the people involved, thus generating a strong emotional attachment, as well as an equally strong emotional backlash against critics.' Yet investigating such causes should ultimately lead to uncovering something like the characteristics in section 8 of the main post, which is a very different framing of 'denialism'. And should lead to tools which don't depend upon virtually ubiquitous rhetoric like D&M2009 does, but tools which navigate down to the (usually multiple) cultural identities involved, also avoiding the fruitless path of trying to separate acceptable from unacceptable science via the acquisition of domain knowledge within immature domains. Along the way, in regard to 'a strong emotional attachment', they might notice this in mainstream climate scientists.

Regarding dishonesty, Pigliucci mentions that: '*...my best moments as a debater (against Institute for Creation Research's Duane Gish, or Discovery Institute's Jonathan Wells) came when I was able to show the audience that these people were consciously lying to them. Nobody likes to be treated as a fool, not even a creationist.*' Which may unfortunately over-emphasize in reader's minds the causal importance of lying. Sure it occurs, yet it rides on the back of strong cultural drives, not vice versa.

While there's no shortage of literature and efforts on systemic bias mechanisms and cultural defenses, I can't find anywhere that this is being applied to the concept of 'denialism', even though Pigliucci and Specter and others cite ideology as causal. And anyone can *claim* to be fighting denialism, even if their internal biases are actually leading them to do this in order to shut down debate (see footnote 24). Proper tools would not only help to distinguish cultural resistance from appropriate skepticism, but would help to distinguish who's deploying 'denialism' for the best intent in regards to defending the evidential case, and who's just on an emotional crusade.

23.In a 2010 paper that largely overlaps D&M2009, Diethelm and Mckee say: '*Confronting Denialism may also require the use of less usual methods of communication, such as analogy and narrative. Crucially, it demands speed of response. However, health authorities and nongovernmental organizations are rarely able to respond rapidly, especially at weekends when in our experience, misleading stories tend to appear in the media.*' There's nothing wrong with stating such occurrences, yet better balance would be served by pointing out that it will sometimes be the NGOs putting out misleading stories, and corporations or individuals that have to swiftly react. Similarly: '*Creation of impossible expectations of research: This may involve corporate bodies sponsoring methodological workshops that espouse standards in research that are so high as to be unattainable in practice.*' Well it may. Yet oppositely, governmental bodies with an overwhelming presence in the science arena may sponsor methodological workshops that create a consensus regarding standards and associated certainty, which in practice is impossible to challenge. The paper emphasizes 'corporate interests', yet not governmental interests, and likewise D&M2009 cites 'corporate largesse' and 'powerful corporate interests', all fine to point out. Yet neither paper ever cites 'governmental interests' or 'NGO interests', not so fine. And an example of Republican bias is given. Fine. But not one of Democrat bias. One doesn't always have to state a balance explicitly for each point, this would be tedious. Yet overall balance it is highly desirable, and a collection of innocent minor imbalances like this within Diethelm and Mckee's work (well no-one is free of bias), are nevertheless a route to much more serious problems when there is no theoretical underpinning for the effect one is attempting to describe (per section 7 in the main post). See footnote 26 for more on this paper.

24. No doubt Diethelm and Mckee would distance themselves from any direct connection or support of the way 'denialism' is used for example by Amanda Marcotte and reported in the Boston Review. But that's the problem with an essentially undefined concept which can't reliably be attributed to a particular side in any dispute. A concept to which Diethelm and Mckee have granted academic legitimization, yet without providing any underpinning theory or method of objective determination. Such concepts will mushroom out of control.

Marcotte tweets: '*With those who start with the conclusion that rape doesn't happen, all facts will be bent to fit that claim. That's how denialism works.*' Whether or not the events described in the *Boston Review* actually happened, Marcotte seems to feel justified in attempting to squash legitimate questions merely by citing the 'theory' of 'denialism'. See my underlined emphasis. Yet there is no real theory. As the concept lacks both proper definition and a means of correct attribution, the phrasing and context in which the term 'denialism' is used, and so its associated meaning, will simply evolve via selection of the most successful forms. These typically equate to the most emotive forms in such cases. In turn this determines the impact of deploying the term, which will usually be unhelpful to say the least. And it can be deployed by *anyone* against their opponents, whatever the motivations and relative legitimacy of those opponents happens to be. In short, 'denialism' has become a negative meme.

For better or worse and I suspect usually much worse for the debates in question, the term seems to have spread far outside of its original domains of AIDS/HIV and Climate: For instance: Science denialism, Race denialism, Trump denialism, more Trump denialism, Terror denialism (a kind of opposite to Trump denialism, apparantly), GMO denialism, Math denialism, Renewables denialism, demographics denialism (in France), Technology denialism, and more. If a concept develops a life of its own in part because it was endorsed by flawed science, then that flawed science *is* part of the problem.

25. '*How the growth of denialism undermines public health*', McKee, M; Diethelm, P (2010): '*Unfortunately, confusion is encouraged by the liberal use of the term, such as when the current British government uses the term "deficit deniers" to attack critics of its economic policy, a group that now includes large numbers of distinguished economic researchers, among them several Nobel laureates.*'

Though largely overlapping with D&M2009 this paper does mention a little more about motivations for 'denialism', usefully including cultural beliefs, 'missionary zeal' and confirmation bias. Yet mention is very brief and not followed up to the obvious conclusion that it is much more difficult than Diethelm and McKee imply, to unravel the usual morass of competing biases and cultural tangles. Indeed these causes mean that their stated criteria alone *cannot* determine who is who. The paper provides no more help than D&M2009 regarding an objective and reliable method of determining who is siding with the evidence and who is culturally resisting, which is to say none. They give stronger emphasis and more text to 'corporate interests' and 'vested interests' as cause, which are secondary phenomena and more specific to particular domains, so much less interesting regarding generic root cause. See footnote 23.

26. I find it very surprising that the genie has been allowed to prosper for so long without a formal academic challenge. Considering the flaws outlined in the main post, social psychologists ought to be all over D&M2009. While there are many informal comments criticizing Diethelm and McKee (see footnote 11b for a few), and Hoofnagle too, I can't locate a formal paper doing so. It's pure speculation, but maybe most social psychologists share similar biases and don't want to rock the boat, or perhaps a fear of being branded a 'denialist' denier, or just a 'denialist' regarding one or more of the example domains, is an

issue. Fear can be a powerful censor. The discipline appears to be so deep in its own problems, maybe rocking the boat runs the risk of sinking it: Psychology's replication crisis, Pyschology's overwhelming Liberal bias.

27. Even in our most definitive case, AIDS / HIV, which being replicable should be crystal clear, there is discourse on the 'bad' side that is '*not strictly one of denial*', and '*forms of denial*' on the 'good' side. See '*When Bodies Remember: Experiences and Politics of AIDS in South Africa*', by Didier Fassin, the first and second paragraphs of pg116 (the latter flows into pg117). '*There is a blind spot in denial, which is the denial of those who accuse the others of denial.*' As the work points out, this does not mean that the situation is symmetrical. However, it does mean that even apparently straightforward cases contain much more complexity, and that the ill-defined concept of denialism, far from being useful, merely serves to amplify emotions and further fuel the contest. The above work is referenced in the balance section of the wiki entry on 'denialism', headed 'Prescriptive and polemic'.