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Beyond counting climate consensus

Reiner Grundmann, University of Nottingham, School of Sociology and Social Policy, University Park, Nottingham NG7 2RD. Reiner.Grundmann@nottingham.ac.uk

Warren Pearce, University of Sheffield, The Department of Sociological Studies, Faculty of Social Science. Warren.Pearce@Sheffield.ac.uk

Mike Hulme, Kings College, Department of Geography, London WC2R 2LS. Mike.hulme@kcl.ac.uk

Sujatha Raman, University of Nottingham, School of Sociology and Social Policy, University Park, Nottingham NG7 2RD. Sujatha.Raman@nottingham.ac.uk

Eleanor Hadley Kershaw, University of Nottingham, University of Nottingham, School of Sociology and Social Policy, University Park, Nottingham NG7 2RD. Eleanor.hadleykershaw@nottingham.ac.uk

Judith Tsouvalis, University of Nottingham, School of Sociology and Social Policy, University Park, Nottingham NG7 2RD. Judith.Tsouvalis@nottingham.ac.uk

ABSTRACT:

Several studies have been using quantified consensus within climate science as an argument to foster climate policy. Recent efforts to communicate such scientific consensus attained a high public profile but it is doubtful if they can be regarded successful. We argue that repeated efforts to shore up the scientific consensus on minimalist claims such as 'humans cause global warming' are distractions from more urgent matters of knowledge, values, policy framing and public engagement. Such efforts to force policy progress through communicating scientific consensus misunderstand the relationship between scientific knowledge, publics and policymakers. More important is to focus on genuinely controversial issues within climate policy debates where expertise might play a facilitating role. Mobilising expertise in policy debates calls for judgment,

context and attention to diversity, rather than deferring to formal quantifications of narrowly scientific claims.

INTRODUCTION

Quantification of consensus within climate science continues to occupy a central role in public discussions of climate change, with a particular focus on the level of agreement regarding the anthropogenic contribution to global temperature rise. Since 2004, a series of papers have addressed this issue (Oreskes, 2004; Anderegg et al., 2010; Cook et al., 2013; Verheggen et al., 2014). One of these (Cook et al., 2013) (C13) has gained particular prominence with the claim that 97.1% of those papers expressing a position on anthropogenic global warming either explicitly states or implies that humans cause warming. The claim has had significant media impact (Skeptical Science, 2014), inspired a popular television comedy programme (Kelly, 2014), been adjudged Environmental Research Letters' best article for 2013 (Kammen, 2013), and even been tweeted by President Obama (Obama, 2013) (albeit embellishing C13's original claim with the word 'dangerous'). Consensus quantification is justified by arguing that public ignorance of consensus amongst climate scientists provides a barrier to the implementation of climate change mitigation policy (Oreskes, 2004; Anderegg et al., 2010; Cook et al., 2013; Verheggen et al., 2014). Here, we argue that focusing on consensus amongst experts as a route to policy progress misunderstands the role of scientific knowledge in public affairs and policymaking. Drawing on examples from the extensive science and technology studies (STS) literature, we show that building the basis for policy action cannot be done simply with appeals to fact. Where these facts are complex and negotiated, as in the case of climate change, experts and policymakers need to acknowledge and engage more actively with public 'matters of concern' (Latour, 2004).

SCIENCE

Nowhere is the social negotiation of fact clearer than in the case of C13 itself. The publication of the article prompted a long-running and robust debate on blogs (e.g. …and Then There's Physics, 2014; Pile, 2013; Nuccitelli, 2013; Hulme, 2014), within the pages of scientific journals (Tol, 2014; 2016; Cook et al., 2014; Cook & Cowtan, 2015; Duarte, 2014) and even in the US Congress (Vaidyanathan, 2014). One focus of discussion has been the high proportion of abstracts in C13 without a position, when compared with the previous consensus study conducted by Oreskes (2004). Both studies rate abstracts, 'but where Oreskes finds 75% agreement and 25% no position, Cook has 33% agreement, 66% no position and 1% disagreement.' (Tol, 2016). In fact, C13 re-analysed the sample used by Oreskes based on their methodology. They found a wide discrepancy: 'Of the ... 894 [papers], none rejected the consensus, consistent with Oreskes' result. Oreskes determined that 75% of papers endorsed the consensus, based on the assumption that mitigation and impact papers implicitly endorse the consensus. By comparison, we found that 28% of the 894 abstracts endorsed AGW while 72% expressed no position.' (Cook et al., 2013).

We do not wish to adjudicate on this disagreement here. Rather, these arguments demonstrate the pitfalls of attempting to quantify consensus in the scientific literature in the manner of C13 in order to produce 'proof' for persuading the public. Rather than securing certainty that was absent before, this exercise has invited intense scrutiny to the judgments underpinning their claim, and generated further doubt. This was a predictable outcome on the basis of STS studies which show that doing more research on politically controversial, high-stakes policy matters typically increases uncertainty (Collingridge & Reeve, 1986). This happens as different parties are motivated to undercut each other's claims, and the complexity of scientific judgment lends itself to generating endless disagreement on technical grounds (Sarewitz, 2004). Contributing to public debate and policy therefore calls for a more cosmopolitan approach to climate knowledge where the limits of scientific resolution to intractable disputes are acknowledged and efforts made to communicate and engage with the implications of different positions, not all derived from science (Beck, 2012). This brings us to the rationale for consensus quantification, not only as a means of communication within the scientific community, but also as a means of public communication and persuasion.

PUBLICS

The argument for quantifying the scientific consensus on climate change is often made in terms of better informing a misinformed public. For example, proponents use opinion poll evidence to argue that there is a "significant gap between public perceptions and reality, with 57% of the US public either disagreeing or unaware that scientists overwhelmingly agree that the earth is warming due to human activity" (Cook et al., 2013, p. 6), and that this misperception is a result of misinformation spread by opponents of climate policies (Oreskes & Conway, 2010). Since the public seems unaware that such a science consensus exists, consensus communicators seek to publicize its existence. Following experimental evidence from psychology, this gap is believed to be associated with reduced support for a range of climate policies (Ding et al., 2011) and that this gap can be closed by providing effective information regarding the extent of consensus within climate science (Lewandowsky et al., 2013). However, these experimental findings have been challenged in two ways in the literature. First, if increasing (consensual) scientific knowledge merely accentuates the cultural “conflict of interest” within some individuals (Kahan et al., 2012), then climate science knowledge need not be the only basis upon which climate-friendly policies can be advocated. Second, if one treats the history of research and public communication of climate consensus as a natural experiment, then the persistence of the ‘consensus gap’ suggests consensus messaging has limited efficacy (Kahan, 2015). A more recent study acknowledges the influence of political ideology and cultural values in shaping attitudes about climate, but still argues that ‘the positive effect of climate information (or conversely, the negative effect of misinformation) still plays a significant role in influencing climate literacy levels' (Cook, 2016, p. 5). Here, consensus messaging is argued to be important because even people with left-liberal views do not know the correct level of scientific consensus. It is also argued that it is important to refute misinformation, since this is the mechanism through which beneficial framings and correct information about climate are being 'neutralized' (2016, p. 13). The scholarly debate about consensus messaging is intense but based on a relatively small pool of researchers and published papers. Debates within psychology, and broader debates about the usefulness of laboratory studies in assessing efficacy present a picture of an emerging field of study that has yet to reach a 'consensus on consensus'.

Even if one were to identify the precise effect of consensus messaging as a variable in climate communication, the fact remains that in many fields of climate change research scientific consensus is elusive. Scientific consensus exists among some relevant, small communities (for example, attribution studies leading to affirm AGW), but there are many fields relevant to climate change impacts where such a consensus does not hold. For example, the IPCC reported in its Fifth Assessment Report that "[n]o best estimate for equilibrium climate sensitivity can now be given because of a lack of agreement on values across assessed lines of evidence and studies" (IPCC, 2013, p. 16). Regarding increases in North Atlantic tropical cyclone activity "[t]here remains substantial disagreement on the relative importance of internal variability, GHG forcing and aerosols for this observed trend" (IPCC, 2013, p. 914). Since the release of the Fifth Assessment Report, diverse views have been published in the academic literature regarding the existence or otherwise of a slowdown in global surface warming (Karl et al., 2015; Fyfe et al., 2016).

Acknowledging scientific dissensus in these matters is not the same as rejecting climate change as a global policy problem. What this does demonstrate, however, is that in the complex, multifaceted realm of climate science, relying on scientific consensus to cauterise public debate is a self-defeating strategy. Climate science is complex and findings often contradictory and, most importantly, does not tell us anything about *what to do* about climate change. Consensus-seeking is neither a social requisite nor a normative ideal for a viable democracy (Rescher, 1993); acknowledging and valuing dissensus would allow a more publicly inclusive and accessible debate over approaches to climate change that do not prematurely foreclose particular policy options (Machin, 2013). Attempts to remove political conflict from climate change have proved to be a dead end, part of a troubling wider trend towards depoliticising key policy issues (Hay, 2007) and which is now being called into question in an ongoing ‘populist’ backlash.

~~Attempts to remove political conflict from climate change have proved to be a dead end, part of a troubling wider trend towards depoliticising key policy issues.~~ ~~Depending on which facet of climate change one picks, the statement ‘there is no consensus’ is more likely to hold than not.~~ ~~[This will be a controversial statement, so specific examples backed up with citations is needed here. I would recommend deleting the statement. The meaning of the paragraph would still hold, avoiding unnecessarily distracting the reader from your core arguments. In short, I don’t think you gain much from the statement, and stand more to lose persuasively]~~ ~~TThe science is complex and often contradictory and, most importantly, does not tell us anything about *what to do* about climate change.~~

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The focus on quantifying scientific consensus as a way of trying to settle controversy or persuade the public to support specific policies reveals an unquestioned faith in a particular repertoire for producing, validating and using knowledge, what scholars in science and technology studies call ‘civic epistemology’ (Jasanoff, 2011; Miller, 2005). Consensus quantification is just one way of trying to resolve epistemic conflicts into useful evidence. Traditionally favoured in US environmental risk assessment, this approach has sometimes had the opposite effect of exacerbating controversy. For example, the attempt to identify and regulate potential carcinogens such as formaldehyde has foundered in an American regulatory system that demands quantified evidence of hazard and encourages adversarial scrutiny and endless deconstruction of competing evidentiary claims (Jasanoff, 1986).

Quantification may well work in specific times and cultures as a way of making the unseen visible or of holding governments to account, or indeed, as a symbol around which a particular community coalesces. In this way, the ‘97% consensus’ may be a number around which those already committed to climate change action who are inclined to trust climate scientists can rally (Corner & Roberts, 2014), rather than one which can be persuasive for other groups in political discussion (Kahan et al., 2011). Groups who are not persuaded by appeals to scientific authority as a justification for policy might (rationally) seek to question whether such science is ‘sound’ (Demeritt, 2001), placing climate science under stresses it is ill-equipped to bear (Pearce et al., 2015). Fundamentally, no set of calculations about epistemic consensus can help to tie people together in the absence of other social connections (Miller, 2005). For example, research in political psychology emphasises the importance of morality and values in binding together societal groups (Haidt, 2012; Lakoff, 2002) and in religious studies the role of cosmology and cultural identity (Wilson & Steger, 2013)

POLICYMAKERS

Even if one puts to one side the non-scientific characteristics of public communication, it is unwise to assume that closing the consensus gap will influence public policy. We present two reasons here. First, the literature on science and policy shows that the level of scientific agreement about an issue often has little influence on policy action. For example, before the Montreal negotiations to regulate chlorofluorocarbons, expectations for an ambitious treaty were low despite claims of a science consensus about long-term ozone depletion (Grundmann, 2001). However, the picture changed just prior to the negotiations with the discovery of the Antarctic 'ozone hole', a dramatic crisis signal that was in itself completely unexpected. Thus, the subsequent political agreement of the Montreal Protocol to regulate chlorofluorocarbons was more the result of the unexplained phenomenon of the 'ozone hole' prompting ozone depletion to be a matter of concern than any coalescing of scientific consensus. Influential narratives about the genesis of the Montreal Protocol maintain that not only was the process science driven, but that there was a scientific consensus that led to the political agreement (see Haas, 1992; Tolba, 2008). In fact, the process was driven by changing political constellations, mainly a U-turn of big chemical companies and the European Community, accompanied by the hot crisis signal of the 'ozone hole' (for details, see Benedick, 1998; Grundmann, 2001). If anything moved policy towards the agreement in Montreal it was the discovery of the ozone hole, not the agreement among atmospheric scientists about future ozone losses.

Second, an undue focus on scientific consensus brings about missteps in policy. By narrowing the terms of political debate about the desirability of this or that (or indeed any) climate policy to the physical sciences, scientific facts are used to substitute for matters of public concern. Legitimate and necessary public argument about whether a fact matters, and why, is short-circuited. Debates about the value of carbon emissions reductions are divorced from their social and political contexts

(Cohen et al., 1998). For example, Pearce (2014) demonstrates how scientific consensus constitutes poor evidence for policy in the absence of compelling ideas and arguments, while Twyman et al. (2015) contrast the universal meaning of carbon as a scientific element with its complex local meanings within communities of the global South. In short, scientific consensus does not necessarily beget policy progress. Equally, policy progress is not necessarily dependent on acceptance of scientific consensus. The US nominee for Secretary of Energy, Governor Rick Perry, does not accept the consensus enumerated in the literature, yet still made Texas into "the nation's leading generator of wind power, a renewable technology that he promoted heavily during his 14 years in office" (Mervis, 2016). Also in the U.S., the Green Tea Party, a coalition of grassroots conservatives who have allied with environmentalists, predicates support for decentralised, solar energy primarily as an expression of libertarian values rather than as a means of reducing carbon emissions, enabling it to sidestep the cultural polarisation that exists around belief in human-caused climate change (Kormann, 2015). Research in the UK also emphasises the potential for concepts of patriotism and conservation as a means of building coalitions of support for climate policy with conservatives in the UK (Whitmarsh and Corner, 2017).

While these examples demonstrate that the relationship between science and policy is not linear, we emphasise that scientific advice to policymakers remains a crucial element of democracy (Gluckman & Wilsdon, 2016). However, important and controversial issues within climate change, such as the effect of GHGs and aerosols on monsoonal weather systems and the the likelihood of ice-shelf collapse may not easily lend themselves to quantifiable claims of scientific consensus. Merely emphasising the strength of a narrowly drawn epistemic consensus underestimates the challenges of many of these issues. Expertise can play a role in policy deliberation and public endorsement, but it requires attention to judgment, context and diversity. What makes knowledge useful for policy is the ability to identify levers for action and an appreciation of how scientific advice will be interpreted and used in policy processes (Grundmann & Stehr, 2012; Geden, 2016). Engaging with this question of action inevitably means acknowledging different values and pathways forward. This opens up questions about the social dimensions of successful policy-making, beyond fantasies of technocratic solutions.

For political action on climate change, the messier work of engaging diverse publics across different scales and with different interests and affiliations is urgently needed (Jasanoff, 2010), particularly as there is strong evidence that linking climate to local issues is an important factor in successful policy implementation (Ryan, 2015). Climate change is conventionally framed as a global problem, causing tension with local policy implementation (Pearce, 2014). Thus, policymakers must often focus on other drivers in order to make successful arguments for policy; for example, improving local air quality or public transport (Ryan, 2015). In the absence of such connections, efforts to quantify scientific consensus about an abstract global process come across as strategies to close down political debate rather than 'moving it on'. Defining the central problem in terms of reducing carbon emissions has allowed technical fixes such as geo-engineering and low-carbon energy to take centre-stage at the expense of a host of wider visions for social, economic and political change. We do not want to endorse any one of these, but merely wish to call attention to the many such visions of transformative innovation being put forward (Leach et al., 2012), and that debating these does not need to wait until a narrow scientifically-defined consensus has been achieved.

BEYOND COUNTING CONSENSUS

We have highlighted the limited public and policy value of enumerating consensus within climate science. A fundamental point is that, while knowledge and concerns about anthropogenic climate change have emerged mainly from scientific enquiry, responding to climate change is a deeply political process. Social media provide~~s~~ one means of studying the political life of climate change. ~~This distinction was exemplified~~ For example, the publication of the 2014 ~~following the release of the most recent~~ IPCC report on the physical science ~~basis~~ of climate change~~, as social media~~ prompted ~~saw an explosion of new meanings~~ exchanges on social media that ~~which went well beyond the contents of the report itself~~extended into political aspects of climate change such as ~~; for example,~~ the ~~role of the~~ media's role in publicising climate change ~~in the public sphere~~, the ~~national party~~ politics of climate change within certain nation states, ~~carbon taxes~~ and activism around fracking (Pearce et al., 2014). ~~This plurality of meanings~~This attachment of new public meanings to a scientific report opens a window into the politics of dissensus, rather than of consensus, which is critical to understand and engage with if widespread support for policy measures is to be gained. Climate change is a political challenge where establishing facts such as 'humans cause climate change' is largely irrelevant to the more important task of establishing which facts matter, to whom and why (Jasanoff, 2010).

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One implication for research arising from our argument is to better understand the forms and conditions of knowledge which 'open-up' spaces for constructive policy innovation and deliberation (Stirling, 2010). Centering on consensus about climate science in public debates does little to resolve the most pressing questions in climate policy design and implementation. Instead, it distracts attention away from important practical challenges that highlight the need to negotiate between different scales of concern and action rather than box them into a linear relationship between scientific consensus and political action. These challenges include the need to: i) attend to, and work with, different local meanings of climate and climate change (Hulme, 2017) and their relationship to human institutions and behaviour (Jasanoff, 2010); ii) negotiate between concerns about the planet as a whole and local expressions of development rights and responsibilities (Jasanoff & Martello, 2004); and iii) find more inclusive ways of fostering innovation in cleaner energy technologies and selecting appropriate levels of investment in climate adaptation. These challenges may also represent opportunities to connect apparently disparate issues, human values and policy objectives in productive ways. But this requires developing skills in expert judgment across multiple spaces of science, political and public discussion (Hoppe, 2011; Raman, 2014) rather than a focus on scientific consensus. At some point, political questions will necessarily be closed down, at least temporarily, when policy decisions are taken. We argue that the legitimacy of such a closing down is achieved through a process of engaging with dissent on alternative policy pathways, and indeed, actively creating the conditions for a more diverse range of possibilities to be explored where these are not already apparent.

CONCLUSION

~~In terms of publicity, recent efforts to communicate the scientific consensus may be judged a success. Such efforts imply the primacy of scientific knowledge in the formation of public beliefs about matters of concern and in the successful implementation of policy.~~ In this ~~commentary~~commentary, we have argued that r~~the opposite. R~~epeated efforts to shore up the scientific consensus on minimalist claims such as ‘humans cause global warming’ are distractions from the~~se~~ more urgent matters of knowledge, values, policy framing and public engagement. We maintain that researchers concerned about the relationship of knowledge to policy would be better advised to invest their efforts in these areas rather than in exercises of quantifying consensus about tightly drawn statements of scientific fact. This lesson goes beyond climate change and should be

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acknowledged by those hoping that communicating scientific consensus can defuse other environmental controversies, such as around genetically modified organisms (e.g., Lynas, 2016). In short, we need the skills for developing and deploying expert judgment in practical contexts, rather than quantitative techniques for capturing consensus in climate science and then using such metrics as a rhetorical driver of climate policy.

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