

<https://doi.org/10.1038/s44168-024-00171-9>

Challenging the neutrality myth in climate science and activism

Christel W. van Eck, Lydia Messling & Katharine Hayhoe

Check for updates

We argue that Büntgen's (2024) claim that climate science must be separated from activism is fundamentally flawed. Activism does not inherently lead to biased science and striving for value-free science is both unattainable and undesirable. Instead, we advocate for redefining the boundaries of acceptable influence of values in scientific communication and offer practical strategies to move beyond the misleading myth of neutrality.

The myth of a scientist as a purely rational thinker, a “brain in a jar” devoid of emotions and values¹, still exists in some scientific circles. However, philosophers of science have long shown that it is a fundamental misconception to believe that science can be entirely free of social, political, and ethical values, and function as a neutral entity^{2–4}. As Lynda Walsh explains compellingly in “Scientists as Prophets,” the question of how scientists ought to engage with society is a value judgement itself³. This is particularly true in complex crises like climate change where traditional democratic debate alone cannot ascertain the optimal course of action. Scientists often play a crucial role in such crises, not only through conducting rigorous research, but also through engaging in dialogue with society by framing their research in terms of societal values - which includes rejecting the notion of morally neutral engagement.

This school of thought was recently challenged in a comment in *Nature Climate Action* titled “The importance of distinguishing climate science from climate activism⁵.” In it, Ulf Büntgen, a Professor of Environmental Systems Analysis at Cambridge University, communicated his personal concerns about climate scientists engaging in activism. The comment sparked considerable debate on social media, particularly among climate scientists, many of whom reject the views presented by Büntgen.

We believe a response is necessary, as many of Büntgen's assumptions are unnuanced or unjustified. It is difficult to provide a full critique when Büntgen has not clearly defined what he means by ‘climate activism’, ‘quasi-religious belief’, or ‘a priori interests’, nor explicit examples evidencing what sort of interaction he finds to be objectionable. However, whether scientists consider certain activities to be activism, and their opinions on colleagues who engage in such activities, along with the general public's perception of these activities, has been the subject of multiple research studies^{6–12}. While the opinion of an individual scientist is interesting, we argue it is not representative of the broader community's views nor does it reflect the efficacy of such actions. Furthermore, by making unilateral value-based judgements, we propose that Büntgen is engaging in precisely the activity he deprecates.

Advocacy versus objectivity is a false dichotomy

Büntgen recommends that “a neutral science should remain unbiased and avoid any form of selection, over-attribution and reductionism that would reflect a type of activism,” adding that scientists “should not have a priori interests in the outcome of their studies.” However, motivations for engaging in research, advocating for funding, being interested in achieving a successful outcome (including rejoicing when the experiment *actually* works), and wanting to contribute to scientific knowledge are all forms of having ‘interests in the outcome of studies.’ What scientist undertakes research where they have no interest whatsoever in the outcome? Many of these are legitimate interests, and part of what makes for ‘good science’.

Instead, we argue that engaging in activism does not inevitably result in biased science, which we define as per Douglas & Elliott (2022 p.202)¹³ as “a systematic deviation from truth (or from accuracy).” Moreover, we contend that reaching a state of ‘neutral’ science (communication) is not only impossible but undesirable. Neutrality here refers to “science free from values,” which should not be confused with objectivity, which has been defined as “science free from personal biases of scientists” (e.g., Schroeder)¹⁴.

There is one important exception, of course. If Büntgen is referring to a form of biased science where political values directly determine the scientific method and disregard scientific norms to produce research outcomes that align with the scientist's ideology, we agree that this type of biased science, and those who create it should be rejected¹³. Examples of this type of biased science being conducted to discredit the detection and attribution of climate change to human causes have been identified by various studies (e.g., Benestad et al.)¹⁵. We also agree that those Büntgen describes as “activists who pretend to be scientists” are misrepresenting their expertise.

However, to date, there is no evidence that engaging in climate activism *necessarily* results in crumbling the credibility of the science or of the scientist. While the evidence is still preliminary, recent research on public perception generally finds that climate-policy advocacy and civil disobedience does not diminish the credibility or trustworthiness of these scientists^{6,9,11}. Indeed, scientists who deny the existence of the biases all humans are prone to, or fail to consciously and transparently acknowledge these biases, could be argued to be at risk of producing more biased research. Openly acknowledging their biases shows that scientists are aware of them and allows readers to judge for themselves the extent to which these biases may have influenced the outcomes, a practice known as reflexivity. Moreover, the scientific method and peer-review process, while imperfect and subject to error and misuse (e.g., submitting biased analyses to journals that are not topically relevant, where reviewers would not be familiar with the nuances of the science¹¹), is designed and constantly being refined to provide a system of checks to identify and filter out overt biases that overly influence the results of the study. For example, pre-registration and positionality statements are becoming more common in the social sciences as methods for acknowledging and minimizing biases.

So in conclusion, Büntgen's argument that climate scientists should not become climate activists because to do so means they have

“*a priori* interests in the outcome of their studies” is flawed in multiple ways: it assumes it is possible to conduct science with no *a priori* interest; it assumes such interest automatically creates biased science; and it disregards the role of the scientific method and peer-review in identifying and filtering biased science.

Neutral science isn't a holy grail: it's an undesirable myth

Büntgen proposes neutral science as a way forward from ill-formed reasoning based on the desire for a ‘neutral science’ that is devoid of values, achieving the so-called ‘value-free ideal’. As described above, however, it is clear that first, values are inherently interwoven in the scientific process; and second, this is desirable. For instance, societal and political values shape research questions, ensuring that policymakers can make informed decisions in addressing societal challenges^{2,4}. Similarly, ethical values guide data collection methods, preventing researchers from conducting intrusive studies on vulnerable populations^{2,4}. Social, political, and ethical values even indirectly influence the conception of the norms for scientific inquiry^{2,16}, such as ‘reproducibility’, ‘transparency’, and ‘generalisability’.

Values in science help create and evaluate good science. Value judgements shape the production and framing of physical climate science, such as the selection of the 1.5 °C and 2 °C thresholds or the design choices in the composition of climate models¹⁷. These same values also help the scientific community to identify when there is the unacceptable influence of political values in creating biased science¹², as outlined above. Numerous instances demonstrate how scientific research is directed, shaped, and constituted by values^{2,4,13,16}. In fact, Büntgen himself is not free from obvious value-ladenness in his comment, as indicated by statements such as “an *alarming* recent rise in surface temperatures [emphasis added]”. The alarm here is not from inbuilt sirens in the data, but from Büntgen’s own judgement that the recent rise should be alarming. This perspective on the alarming nature of observed change aligns with that of many climate scientists with recognized expertise in physical or social sciences.

Acknowledging that reaching a state of ‘neutral’ science is impossible and that striving for it is undesirable does not imply that it is acceptable to allow all values to pervade all aspects of science, resulting in biased science. As Büntgen outlines, along with many others^{18,19}, this matter of values is becoming increasingly important when communicating climate science, especially as it is being used to inform large societal changes. We concur with Büntgen - as would most climate scientists - that over-attribution, reductionism, or exaggeration of scientific findings is unjustified. This includes the mischaracterization of uncertainties, which should always be communicated and appreciated as part of scientific accuracy and integrity.

Nonetheless, it should also be noted that science communication inherently involves making language and framing choices. This is particularly the case when communicating to non-experts who do not share the same understanding of terminologies or concepts. There is much research addressing this very topic, for example highlighting how varying degrees of certainty could be communicated by using the language of “uncertainties”²⁰, “likeliness”²¹, “risk”²², or the “scientific consensus”²³. Each represents different frames that emphasize either the uncertainties or strengths inherent in research. Consequently, Büntgen’s proposal to avoid any form of selection that reflects activism is flawed, as these language and framing choices are inherently selective and *must* involve value judgements.

Rethinking boundaries

For a long time, many climate scientists refrained from speaking publicly about the risks of climate inaction and/or the urgency of climate action, in an effort to maintain their ‘neutrality’ or ‘objectivity’⁸. In doing so, many suppressed their painful emotions around climate change and the future²⁴.

Today, however, a growing number of scientists are now speaking out in various ways, including engaging on social media, writing open letters, seeking public office, or participating in civil disobedience^{19,25}.

It is not only a question of what constitutes ‘crossing the boundary’ from neutral communication to activism, but also who makes that judgement, and what values are used in doing so. One person’s ‘neutral’ communication can be perceived by another to be activism, and values are embedded in that perception. Büntgen himself does not specify who should judge what counts as activism or allow that values are inherent to that assessment. Different people, organizations, and methods could vary in their identification of such actions, even with a clear definition. Concerns about activism could pertain to various elements of communication, such as the language and frames a scientist uses (e.g., advocating for climate policies or presenting science as certain)^{6,9}, the display of emotions (e.g., worry or anger)²⁴, the activities a scientist engages in (e.g., civil disobedience)¹⁹, scientists’ associations (e.g., communicating on behalf of Extinction Rebellion), how expertise is utilized (e.g., epistemic trespassing)²⁶, or even the use of academic symbols in their communication (e.g., lab coats).

All these elements may reflect scientists’ value judgements and could potentially raise concerns regarding the credibility of science, yet there is no singular and fully objective understanding of when science communication is perceived as climate activism - nor, we argue, is one likely possible. In fact, keeping silent in order to maintain a ‘neutrality’ could also be perceived as a form of agreement with the status quo or judgement on scientists who engage with society⁷. Previous research shows that scientists ‘speak out’ or engage in advocacy because they feel the need to defend the integrity of science from misinformation or mischaracterized uncertainties, as Büntgen did. Other scientists argue that it is their right as citizens, fulfilling a moral duty⁷.

We argue that it is pointless to try to separate the citizen from the scientist or to impose silence to create false credibility based on unattainable and undesirable neutrality. In other words, we contend that there is no clear *boundary* between activism and science and that it is pointless to try and separate the citizen from the scientist. Instead, we argue that it is more fruitful to discuss the boundary between acceptable and unacceptable influence of values in science communication²⁷.

A new paradigm for the way forward

Instead of trying to prevent the “co-mingling” of scientists with activism, we believe it is essential to highlight ways for scientists to effectively engage in science communication that maintains scientific credibility and trust in science and allows scientists to fulfil their roles as both scientists and citizens⁷. One way is making scientists’ value judgements, such as prioritizing societal safety from climate change, transparent to the audience². For instance, research has found that scientists who disclose their commitment to public health are perceived as more trustworthy²⁸. With the growing implications of climate change for human health and safety, the responsibility of a climate scientist as a ‘physician of the planet’ could be judged by the ethical value of ‘do no harm.’ A recent study found that scientists who endorse ‘environmental stewardship’ as part of their duty are more likely to engage in activism, similar to those who believe that ‘objectivity’ and ‘impartiality’ are not compromised by activism²⁹. Furthermore, as with health risks, studies show that scientists are among the most trusted messengers for conveying the implications of their research to the general public³⁰.

Another strategy is to formulate scientific conclusions by transparently interpreting objective facts through the lens of shared public democratic values identified prior to conducting the study (e.g., through a public referendum or opinion surveys)¹⁴. And since democratic societies are often not uniform but rather pluralistic in their values, another solution is to

ensure that this value pluralism is reflected in the representation of the scientific community.

More discussion and research is needed to define the boundary between acceptable and unacceptable influence of values in science³⁶. However, clearly defining acceptable and unacceptable influence of values in science would reduce concerns about scientists overstepping boundaries and misusing their position. Consequently, the moral obligation of scientists would transition from being “apparent,” as Büntgen describes it, to a moral responsibility assigned by society, policymakers, and the academic community based on shared values more akin to that described by Walsh³.

By framing research outcomes consonant with predefined shared democratic values, and listening to society’s concerns, expectations, and ideas, we believe climate scientists can engage in open and inclusive dialogues with society, with the explicit goal of inspiring action³. It is essential that both science and society be involved in this process, as (re)defining the boundaries between acceptable and unacceptable influence of values in science and associated roles and responsibilities of science and scientists is inherently an ideological exercise³¹. Perhaps the most important realization, however, is that resolution is not the goal. Dialogue should be ongoing and constantly evolving as we develop new knowledge, make new discoveries, confront new challenges, and address new social structures in our shared pursuit of a better world.

Christel W. van Eck  , Lydia Messling  & Katharine Hayhoe ^{3,4}

¹ Amsterdam School of Communication Research, Amsterdam Roeterseilandcampus, Nieuwe Achtergracht 166, 1018 WV Amsterdam, The Netherlands. ²Freelance researcher, Lydia Messling Consulting, Coventry, UK. ³Texas Tech University, Lubbock, TX, 79409, USA. ⁴The Nature Conservancy, Arlington, VA, 22203, USA.

 e-mail: c.w.vaneck@uva.nl

Received: 10 June 2024; Accepted: 30 September 2024;

Published online: 05 October 2024

References

- Proctor, R. *Value-free science?: Purity and power in modern knowledge* (Harvard University Press, 1991).
- Douglas, H. *Science, policy, and the value-free ideal* (University of Pittsburgh Press, 2009).
- Walsh, L. *Scientists as prophets: A rhetorical genealogy* (Oxford University Press, 2013).
- Elliott, K.C. *Values in science* (Cambridge Elements: Philosophy of Science, 2022).
- Büntgen, U. The importance of distinguishing climate science from climate activism. *Nat. Clim. Action* **3**, 36 (2024).
- Kotcher, J. E., Myers, T. A., Vraga, E. K., Stenhouse, N. & Maibach, E. W. Does engagement in advocacy hurt the credibility of scientists? Results from a randomized national survey experiment. *Environ. Commun.* **11**, 415–429 (2017).
- Messling, L. *How can climate scientists engage in policy advocacy and preserve their scientific credibility and independence?* Doctoral dissertation (University of Reading, 2020).
- Boykoff, M. & Oonk, D. Evaluating the perils and promises of academic climate advocacy. *Clim. Change* **163**, 27–41 (2020).
- Cologna, V., Knutti, R., Oreskes, N. & Siegrist, M. Majority of German citizens, US citizens and climate scientists support policy advocacy by climate researchers and expect greater political engagement. *Environ. Res. Lett.* **16**, 024011 (2021).
- van Eck, C. W. The next generation of climate scientists as science communicators. *Public Underst. Sci.* **32**, 969–984 (2023).
- Friedman, R. S. Civil Disobedience by Environmental Scientists: An Experimental Study of its Influence on the Impact and Credibility of Climate Change Research. *Environ. Commun.* **18**, 451–464 (2024).
- Dablander, F., et al. Climate change engagement of scientists. *Nat. Clim. Chang.* <https://doi.org/10.1038/s41558-024-02091-2> (2024).
- Douglas, H. & Elliott, K. C. Addressing the reproducibility crisis: A response to Hudson. *J. Gen. Philos. Sci.* **53**, 201–209 (2022).
- Schroeder, S. A. Democratic values: A better foundation for public trust in science. *Brit. J. Philosophy Sci.* **72**, 545–562 (2021).
- Benestad, R. E. et al. Learning from mistakes in climate research. *Theor. Appl. Climatol.* **126**, 699–703 (2016).
- Resnik, D. B. & Elliott, K. C. Value-entanglement and the integrity of scientific research. *Stud. Hist. Philos. Sci. Part A* **75**, 1–11 (2019).
- Undorf, S., Pulkkinen, K., Wikman-Svahn, P. & Bender, F. A. M. How do value-judgements enter model-based assessments of climate sensitivity? *Clim. Change* **174**, 19 (2022).
- Cologna, V., Baumberger, C., Knutti, R., Oreskes, N. & Berthold, A. The communication of value judgements and its effects on climate scientists’ perceived trustworthiness. *Environ. Commun.* **16**, 1094–1107 (2022).
- Capstick, S. et al. Civil disobedience by scientists helps press for urgent climate action. *Nat. Clim. Change* **12**, 773–774 (2022).
- Kause, A. et al. Communications about uncertainty in scientific climate-related findings: a qualitative systematic review. *Environ. Res. Lett.* **16**, 053005 (2021).
- Budescu, D. V., Por, H. H., Broomell, S. B. & Smithson, M. The interpretation of IPCC probabilistic statements around the world. *Nat. Clim. Change* **4**, 508–512 (2014).
- Shaw, C., Hellsten, I., & Nerlich, B. Framing risk and uncertainty in social science articles on climate change, 1995–2012. In *Communicating Risk*, 208–228 (Palgrave Macmillan UK, 2016).
- Van der Linden, S. L., Leiserowitz, A. A., Feinberg, G. D. & Maibach, E. W. The scientific consensus on climate change as a gateway belief: Experimental evidence. *PLoS One* **10**, e0118489 (2015).
- Head, L. & Harada, T. Keeping the heart a long way from the brain: The emotional labour of climate scientists. *Emot. Space Soc.* **24**, 34–41 (2017).
- Abdo, H., et al. Open letter to leaders of the UK political parties. Retrieved from https://www.lse.ac.uk/granthaminstitute/publication/uk_party_leaders_letter_june2024/%22%20%20%22_new (2024).
- Oreskes, N. What is the social responsibility of climate scientists? *Daedalus* **149**, 33–45 (2020).
- Holman, B. & Wilholt, T. The new demarcation problem. *Stud. Hist. Philos. Sci.* **91**, 211–220 (2022).
- Hicks, D. J. & Lobato, E. J. C. Values disclosures and trust in science: A replication study. *Front. Commun.* **7**, 1017362 (2022).
- Finnerty, S., Piazza, J. & Levine, M. Scientists’ identities shape engagement with environmental activism. *Commun. Earth Environ.* **5**, 240 (2024).
- Cologna, V. & Siegrist, M. The role of trust for climate change mitigation and adaptation behaviour: A meta-analysis. *J. Environ. Psychol.* **69**, 101428 (2020).
- Gieryn, T. F. Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists. *Am. Sociological Rev.* **48**, 781–795 (1983).

Acknowledgements

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: C.W.v.E. was supported by the Dutch Research Council [grant number VI.Veni.221S.065]. L.M. and K.H. received no financial support.

Author contributions

C.v.E., L.M., and K.H. developed the idea for the rebuttal jointly. C.v.E. and L.M. wrote the initial draft. C.v.E., L.M., and K.H. contributed significantly to subsequent revisions. The order of authors reflects the extent of their contributions.

Competing interests

The authors declare no competing interests. Hayhoe’s opinions are her own and not necessarily reflective of the positions of her employers, The Nature Conservancy and Texas Tech University. She is also the proprietor of a non-publicly-traded entity, ATMOS Research.

Additional information

Correspondence and requests for materials should be addressed to Christel W. van Eck.

Reprints and permissions information is available at

<http://www.nature.com/reprints>

Publisher’s note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

© The Author(s) 2024