

Public Engagement with Climate Change

(a draft chapter for Climate Change Science and Policy)

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1. Introduction to Public Engagement with Climate Change

What sort of social research provides the best foundation for climate change policy? In this chapter, I suggest that “public engagement with climate change” offers a useful conceptual framework for synthesizing older findings, planning new investigations, and guiding social policy. First, I describe the public engagement perspective and relate it to other sorts of social research on climate change. Then, using the Intergovernmental Panel on Climate Change as an example, I show how public engagement fits existing policy priorities and fills an important, unrealized need for information. Finally, I draw examples from the research literature to illustrate how the public engagement perspective might be useful in crafting social policy.

1a. Social research on climate change

By definition, anthropogenic climate change is caused by human behavior. The things we do as we go about our lives result in the emission of greenhouse gases, changing the composition of the earth’s atmosphere in a way that significantly alters the climate over time. Any policy intended to prevent or mitigate climate change must account for complex and unpredictable social systems as well as natural ones. Some natural scientists now admit that the chief source of variance in their models is the unpredictability of human behavior.¹ The sociologist Brian Wynne has even coined a term—*indeterminacy*—to distinguish this type of variance from the *uncertainty* inherent in imperfect measurements and incomplete models of the natural world.² Crafting sound policy requires a reduction of the indeterminacy in climate models; reducing indeterminacy requires a more complete knowledge of the social systems that influence climate

change. There is no way to avoid this. Even if the technological “solutions” seem clear, we—as a society—must still make a political commitment to research and development, and we—as citizens—must ultimately embrace the results, together with the changes they wreak in our lives.

Social research on climate change is not new.³ Researchers working in the traditional social science disciplines of sociology, psychology, political science and economics have produced many concrete and seemingly practical findings. For example, a venerable body of psychological research suggests that *understanding* isn’t a collection of disconnected facts – instead, people use ‘mental models’ of the natural world⁴ to figure out how climate change works, and what it means to them.⁵ On the other hand, sociologists have repeatedly demonstrated that trust, or lack of trust, can sometimes be more important than scientific understanding in shaping how citizen groups relate to government agencies.⁶ The tension between these two findings illustrates the limited usefulness of disciplinary social research to climate change policy. To make use of these two well-established findings, we must understand how trust and understanding affect each other, and when it is most important to consider one, the other or both. Unfortunately, researchers working within a discipline don’t usually offer guidance on how to “export” their key ideas, like the sociological idea of trust and the psychological idea of mental models. Researchers who attempt to “import” ideas from another discipline must struggle to make those ideas work in an alien intellectual context, yet there is really no other choice. On their own, individual pieces of social research on climate change are like dots in a pointillist portrait of the social world⁷ – satisfying bits of knowledge that reveal little about the whole picture. Interdisciplinary work allows the viewer to step back and see how the dots, seen altogether, convey shape and meaning.

1b. The Public Engagement Perspective

Appeals for interdisciplinary research are also nothing new. More to the point, it is not clear that interdisciplinary social research on climate change, *per se*, avoids the pitfalls of disciplinary research. Vibrant interdisciplinary research communities have emerged up around the study of mass communications and risk analysis (both addressed in other chapters of this book). Like the traditional disciplines, though, these research programs draw their strengths and weaknesses from framing assumptions that limit their usefulness to policy-makers. Risk analysis assumes that that people and groups perceive climate change primarily in terms of risk, rather than (for instance) moral responsibility. Researchers studying mass communications typically assume that mass media are highly influential, and consequently devote more time to dissecting patterns in the media than they do examining the meaningful repercussions of those patterns. Of course, no research program is free of assumptions – but what research program, or what sort of research, is most compatible with the increasingly urgent need for intelligent social policy on climate change?

I contend that “public engagement with climate change” is the idea around which such a research program could be, and is being, built. “Engagement⁸” implies connectedness, and it is easiest to think about public engagement with climate change in terms of connectedness—the different ways that people “connect with” climate change. Obviously, this includes how they *think* about climate change (what they know, what they decide to learn), but it also includes how they *feel* about it, and how their thoughts and feelings lead them to *act* in ways that, from their perspective, are connected to climate change. This last point deserves special emphasis: peoples’ reasons for connecting with climate change, and the meaning that climate change has for them,

are a *finding*, not a framing assumption, of public engagement research. As a result, most public engagement research also considers the cultural and institutional structures through which individual people connect with climate change—the social contexts that help give their engagement meaning.

Public engagement, as an idea, has recently become very popular among people who are interested in the role of science and technology in society.⁹ In fact, “public engagement with science” is sometimes seen as the successor to “public understanding of science.” The relationship between these two perspectives is historically and conceptually complicated, but two differences are important to articulate here. First, most research on public understanding¹⁰ has focused on what people know and think about particular science topics—only one of the aspects of public engagement. In this sense, public understanding is a part of public engagement research. Second, research on public understanding usually assumes that understanding particular aspects of science will be useful¹¹ to people or to society; it does not often specify, much less investigate, *how* those particular understandings are useful.¹² One of the most important roles of public engagement research is to test the assumptions that underlie research on public understanding.

Given all of the available sources of expertise, what reason is there to think that policy-makers will pay attention to public engagement research? In the next section, I will demonstrate that policy-makers have a well-established interest in public engagement, but that the corresponding need for information about public engagement has not yet been filled. Then, in the third and final section, I will use examples from the literature to demonstrate how public engagement research can be useful to policy-makers.

II. Looking for Public Engagement in the Third Assessment Report

To substantiate my assertion that policy-makers are already interested in public engagement with climate change, I examined the Third Assessment Report¹³ of the Intergovernmental Panel on Climate Change (IPCC) for material on public engagement. The IPCC was established by the World Meteorological Organization and the United Nations Environmental Program in 1988. Since then, it has produced three comprehensive Assessment Reports, each of which was intended to document and synthesize the accumulated research on the causes and impacts of climate change, and to analyze mitigation options. Although the IPCC does not set climate policy for any nation, its consensus-driven reports are intended to be reference manuals for national and international climate change policy. Thus, one would expect any topic of major policy concern to make an appearance.

Because the prominence of the phrase “public engagement” is a recent phenomenon, it is not surprising that the third assessment report never refers to it specifically. On the other hand, many words and phrases associated with public engagement (e.g., education, understanding, awareness) appear frequently. It is in discussions about education that the IPCC most clearly reveals its interest in public engagement. To understand how education relates to public engagement, consider that the IPCC defines the word education broadly, using it to refer to all manner of activities that promote learning about climate change, as well as activities that affect attitudes, intentions or adaptive capacities. In other words, the IPCC’s definition of education includes many different ways of changing how people connect with climate change—many ways of affecting public engagement.

The word “education” is used in several different contexts throughout the report. In places, education is offered as a recommended course of action.¹⁴ Elsewhere, education is

interpreted to be the cause of some observed condition.¹⁵ In particular, a *lack* of education is cited as a cause for things maladaptive actions, such as the failure of floodplain residents to seek insurance, or poor adaptive capacities in general.¹⁶ By far the most common, however, are the references to education as a *policy option* – one possible strategy for mitigating human-induced climate change. For example, the authors of the third assessment report suggest that “measures for reducing the severity of health threats include health education programs, health care facilities, sewerage and solid waste management.”¹⁷

The fact that education is frequently proposed as a policy option suggests that research on public engagement, particularly intervention-oriented research, would fit smoothly into an existing area of policy concern. Of course, this argument would disintegrate if these references to education were *already* grounded in careful, practically oriented social research. Unfortunately, one of the most striking features of the Third Assessment Report’s treatment of education is the degree to which claims are made without any evidence of substantiating research. With few exceptions, uses of education in the Third Assessment Report are not accompanied by citations or in-line text referring to previous work. Often, the value and effectiveness of education is taken for granted, without concern for how, when and to whom the “education” is delivered. For example, the authors of the Third Assessment Report note that “politically, environmental consciousness can be promoted by environmental education,”¹⁸ an assertion that borders on tautology. In fact, the only place where the IPCC *does* reference empirical research on public engagement is a shaded box, separate from the main text, describing the “Public Education Component of Poland Efficient Lighting Project.”¹⁹ The IPCC’s need for solid, reliable information on public engagement, established by the many references to education, clearly has yet to be filled.

III. The Practical Appeal: Two Applications of the Public Engagement Perspective

Because the public engagement perspective is new, and a relatively large amount of social research on climate change precedes it, the first crucial task for researchers studying public engagement with climate change is *synthesis*: they must seek out, juxtapose and reconcile findings from conceptually distinct research programs. In this section, I outline two cases in which different strands of social research can be synthesized productively under a public engagement framework. By framing each example in terms of a question with obvious policy implications, I show how the public engagement perspective fills in the gaps left by other models and offers a more promising platform for research and policy.²⁰

3a. What do people need to know about climate change, and why?

Just as the authors of the Third Assessment Report attributed undesirable behavior to insufficient education, a great deal of policy and popular media rhetoric has focused on the lack of public awareness or understanding of climate change.²¹ This “deficit perspective” was also the driving idea behind many years of research, but its usefulness as a foundation for policy has increasingly come under fire.²² From the public engagement perspective, the question “what should people know?” must be paired with “what difference does it make?” If we accept the principles of the UN Framework Convention on Climate Change, the issue for engagement research becomes “what knowledge predisposes and enables people to act in ways that forestall dangerous anthropogenic climate change?”*

* This question, too, is only a piece of the engagement puzzle, but this relatively modest expansion enables me to show in a small space how existing research can be synthesized in a thought-provoking manner.

Some researchers, working in the tradition of cognitive psychology, have suggested that people think of climate change in terms of air pollution, while others have suggested a more general model of environmental harm.²³ Sociologists Bord, O'Connor and Fisher found that the air pollution model was prevalent, and that it was predictably associated with misconceptions about the causes and consequences of climate change.²⁴ Thus, a person who thinks of climate change in terms of air pollution might erroneously attribute both to the same causes (including sulfur oxides and particulates like soot) and expect the same consequences (such as discernibly discolored and foul-smelling air). These misconceptions seem freshly important in light of communications research, which found correct knowledge of climate change *causes and consequences** to be the best available predictor of a person's intention to take action on climate change issues.²⁵ Unfortunately, risk analysis research conclusively shows that people across the political and demographic spectrum are unlikely to be aware of the critical *health* consequences of climate change.²⁶ Finally, research done at the intersection of psychology and economics suggests that people choose projects they see as health-related over projects that they see as environment-related, regardless of the high value people assign to environmental projects when they are presented alone.²⁷

When these bits of research, drawn from five different fields of social science research, are assembled, they provide a more interesting picture than the simple assumption that more knowledge produces more responsible action. Although it is not certain how they would interact in an experimental situation that tested all of them, specific policy recommendations are already implied by their synthesis: to promote positive action on climate change, policies should foster the spread of a new mental model of climate change, one that distinguishes it from visible air

* As opposed to, for example, correct knowledge about the accumulated scientific evidence for the existence of climate change, or a schematic understanding of carbon sinks and solar forcing.

pollution while emphasizing its most important causes and consequences, particularly public health consequences. Exactly *how* this should be done is another question, and one that requires a better understanding of how people develop their ideas about climate change—another aspect of public engagement.

3b. What resources influence perceptions of climate change, and to what end?

Shifts in public understanding and public engagement are often attributed to the influence of mass communication media, particularly television. Like the deficit perspective on understanding, this attribution has recently been challenged by research in several fields. The sociologist Bruce Lewenstein points out that many institutions participate in “public communication of science and technology,” and highlights the previously neglected role of community organizations, non-governmental organizations, and public health agencies.²⁸ Lewenstein also challenges other researchers to consider commercial industry as a purveyor of science and technology information—through advertisements, promotions and consumer products, rather than explicitly educational activities. Falk, Brooks and Amin, writing from the perspective of educational research, pick up where Lewenstein left off.²⁹ In a detailed telephone survey, they assayed the relative importance of different sources of science information, and found that several sources of science information ranked ahead of television, including schools, books, magazines and personal experiences. Stamm, Clark and Eblacas, in sociological work already mentioned above, tested the correlations between the use of particular resources and respondents’ knowledge about the causes and consequences of global warming, and found that conversations with family and friends made the most difference in distinguishing between those who could identify the correct causes and consequences of global warming and those who could

not.³⁰ Mass media, such as television and newspapers, were almost ubiquitous³¹ as sources, but their use was not correlated with more accurate knowledge.

All of this research suggests that mass media such as television may be less important determinants of public engagement with climate change than is generally thought. Evidence favoring the role of interpersonal communication resonates with findings from other research on public engagement with science, where the importance of social networks is widely acknowledged.³² Some research even suggests that informal networking may provide organizations, as well as individuals, with their most important and efficient channels of information about topics such as global warming³³ (this conclusion will probably come as no surprise to those in the business world). For policy-makers, the public engagement perspective suggests a shift away from a strict focus on mass media, and a concerted investment in intervention strategies that utilize existing social networks to foster the spread of constructive engagement with climate change.

Conclusion

There is a clear and pressing need for social research to inform the next generation of climate change policy. In the preceding pages, I have argued that disciplinary social science is not well suited to meet this need, but a research program on public engagement with climate change is. I have also suggested that policy-makers already acknowledge the relevance of public engagement research in existing policy documents, though they do not necessarily call it that. Finally, I have tried to show that existing research becomes more useful—more policy-relevant—when synthesized under a public engagement framework. To the extent that these claims are true,

public engagement with climate change is a crucial topic for climate change policy, and will only become more so in the future.

¹ e.g., Niles, J. O., Brown, S., Pretty, J., Ball, A. S. and Fay, J.: 2002, Potential carbon mitigation and income in developing countries from changes in use and management of agricultural and forest lands. *Philosophical Transactions of the Royal Society* **360**, 1-19.

² Wynne, B.: 1992, 'Uncertainty and environmental learning', *Global Environmental Change* **2**, 111–127.

³ Over twenty years ago, two social scientists (Robert Chen and Elise Boulding) and a natural scientist (Stephen Schneider) challenged a set of prominent researchers to apply their disciplinary expertise to the “so what” question of climate change: “so what if climate changes?” Happily, several of the respondents went beyond their original mandate and drew attention to the *causal* relationships between behavior and climate change. The resulting book represents one of the earliest attempts to connect disciplinary social research to the problems of climate change: Chen, R. S., Boulding, E. & Schneider, S. H.: 1983, *Social Science Research and Climate Change*. Reidel, Publ., Boston, MA.

⁴ As with much of cognitive psychology, mental models research focuses on patterns in the ways that people act, answer questions and interpret the world, and argues that these patterns cannot be explained without reference to something in the mind – a hypothetical cluster of interconnected information called a *schema* or *mental model* that incorporates many types of relationships between words and concepts. In the words of psychologist Walter Kintsch, this cluster of information “works, on the one hand, like a perceptual filter, in that it admits material consistent with itself but blocks irrelevant materials, and, on the other hand, it serves as an inference machine, in that it fills in the gaps that are inevitably found in the actual stimulus material.” To illustrate his explanation, Kintsch describes how a person, hearing the word ‘mint,’ would learn from contextual cues that the mint in question was a building, not a flavor. Kintsch, W.: 1998, *Comprehension: A paradigm for cognition*, Cambridge University Press, Cambridge. See also: Stevens, A. L. and Gentner, D.: 1983, *Mental Models*, Lawrence Erlbaum Associates, Hillsdale, NJ.

⁵ Bostrom, A., Morgan, M. G., Fischhoff, B., and Read, D.: 1994, ‘What do people know about global climate change? I. Mental models’, *Risk Analysis* **14**(6), 959-970. Also: Berk, R. A. and Schulman, D.: 1995, ‘Public perceptions of global warming’, *Climatic Change* **29**, 1-33.

⁶ See, for example: Irwin, A.: *Citizen Science: A study of people, expertise, and sustainable development*, Routledge, New York.

⁷ The exception might be economics – which, at risk of pushing the metaphor too far, takes a broader view but suffers from color-blindness. As the IPCC puts it: “a [macroeconomic] model does not explain processes, such as learning, habituation, value formation, or the bounded rationality observed in human choice.” P 46, Intergovernmental Panel on Climate Change (IPCC): 2001b, *Third Assessment Report: Climate Change 2001 – Mitigation (Working Group Three Report)*, Cambridge University Press, New York.

⁸ Psychologists, political scientists and sociologists have also put the word “engagement” to use in different contexts. Although this adds to the potential for confusion, it is also a distinct advantage of this framing, as it offers researchers within each tradition a certain amount of conceptual purchase on the “public engagement with climate change.”

⁹ For a social researcher’s perspective, see: Lewenstein, B.: 2003, Editorial, *Public Understanding of Science* **12**, 5–6. For a natural scientist’s perspective, see: Leshner, A. I.: 2003, ‘Public engagement with science’, *Science* **299**(5609), 977. For a historical analysis of the transition from “public understanding of science” to “public engagement with science,” see: Pitrelli, N. (2003). The crisis of the “public understanding of science” in Great Britain. *JCOM* **2**(1): <http://jcom.sissa.it/focus/foc020101.html>.

¹⁰ Many types of research have gone, more or less comfortably, under the heading of “public understanding of science.” This section refers to one historically dominant strand of research that still occupies a prominent place in popular as well as academic debates. For a thorough discussion of the different types “public understanding of science” research, see either of the two following treatments: Wynne, B.: 1995, ‘Public Understanding of Science’, in Jasanoff, S., Markle, G. E., Petersen, J. C. and Pinch, T. (eds.), *Handbook of Science and Technology Studies*.

SAGE Publications, Thousand Oaks, CA, pp. 361-388. OR Irwin, A. and Michael, M.: 2003, *Science, Social Theory and Public Knowledge*, Open University Press, Philadelphia, PA.

¹¹ Many rationales have been given. For one classic discussion, see: Thomas, G., & Durant, J.: 1987, Why should we promote the public understanding of science? *Scientific Literacy Papers*, **1**, 1-14.

¹² For an institutionalized example of this, see: National Science Board: 2002, *Science and Engineering Indicators 2002*, National Science Foundation, Washington, D.C.

¹³ Intergovernmental Panel on Climate Change (IPCC): 2001, *Third Assessment Report: Climate Change 2001*, Cambridge University Press, New York.

¹⁴ e.g., “Decision makers should be educated or encouraged to use scientific information that may lead to reduction in losses from natural disasters...” Intergovernmental Panel on Climate Change (IPCC): 2001b, *Third Assessment Report: Climate Change 2001 – Mitigation (Working Group Three Report)*, Cambridge University Press, New York, p. 474.

¹⁵ E.g., “Total municipal withdrawals in the United States, for example, are falling largely as a result of increasing prices, conservation education provided by water utilities, and increasing use of water-efficient appliances.” Ibidem, p. 210.

¹⁶ Ibid., pp. 210, 36/223, 621, 8/897, 223, respectively.

¹⁷ Ibid., p. 68.

¹⁸ Ibid., p. 639.

¹⁹ Ibid., p. 420.

²⁰ It is important to acknowledge that *all* of the research referenced here was performed in industrialized nations. This accurately reflects a real weakness of social research on climate change, and one that will need to be addressed in future work.

²¹ Revkin, A. C.: 2006, April 23, Yelling 'Fire' on a Hot Planet. *The New York Times*.

²² For example, Slovic notes: “For example, early studies of risk perception demonstrated that the public’s concerns could not simply be blamed on ignorance or irrationality. Instead, research has shown that many of the public’s reactions to risk... can be attributed to a sensitivity to technical, social, and psychological qualities of hazards that are not well modeled in technical risk assessments...” Slovic, P. (1997). Trust, Emotion, Sex, Politics, and Science: Surveying the risk-assessment battlefield. In M. H. Bazerman, D. M. Messick, A. E. Tenbrunsel & K. A. Wade-Benzoni (Eds.), *Environment, Ethics, and Behavior: The psychology of environmental valuation and degradation* (1 ed., pp. 277-313). San Francisco, CA: The New Lexington Press, p. 279. See also Miller, S.: 2000, *Public Understanding of Science at the Crossroads*, Paper presented at the Science Communication, Education and the History of Science, London.

²³ Bostrom, A., Morgan, M. G., Fischhoff, B., and Read, D.: 1994, ‘What do people know about global climate change? I. Mental models’, *Risk Analysis* **14**(6), 959-970. See also: Read, D., Bostrom, A., Morgan, M. G., Fischhoff, B. and Smuts, T.: 1994, ‘What do people know about global climate change? II. Survey studies of educated laypeople’, *Risk Analysis* **14**(6), 971-982.

²⁴ Bord, R. J., O’Connor, R. E., and Fisher, A.: 2000, ‘In what sense does the public need to understand global climate change?’, *Public Understanding of Science* **9**, 205-218.

²⁵ Stamm, K. R., Clark, F., and Eblacas, P. R.: 2000, ‘Mass communication and public understanding of environmental problems: The case of global warming’, *Public Understanding of Science* **9**, 219 - 237.

²⁶ Leiserowitz, A. A.: 2005, ‘American risk perceptions: Is climate change dangerous?’ *Risk Analysis*, **25**(6), 1433-1442.

²⁷ Ritov, I., & Kahneman, D: 1997, How people value the Environment: Attitudes versus economic values, In M. H. Bazerman, D. M. Messick, A. E. Tenbrunsel & K. A. Wade-Benzoni (Eds.), *Environment, Ethics, and Behavior: The psychology of environmental valuation and degradation* (pp. 33-51). San Francisco: The New Lexington Press.

²⁸ Lewenstein, B. V.: 2001, ‘Who produces science information for the public?’ in Falk, J. H. (ed.), *Free-Choice Science Education*, Teachers College Press, New York, pp. 21-43.

²⁹ Falk, J. H., Brooks, P. and Amin, R.: 2001, ‘Investigating the role of free-choice learning on public understanding of science’, in Falk, J. H. (ed.), *Free-Choice Science Education*, Teachers College Press, New York, pp. 115-132.

³⁰ Stamm, Clark & Eblacas: 2000, op. cit.

³¹ It is entirely possible that the universality of respondents’ reliance on newspapers and television, and the lack of resolution that the researchers’ achieved with regards to the *ways* in which respondents used these media, disguised

a very real effect. This does not, however, detract from the correlation between the use of personal connections and accurate information about climate change.

³² See, for instance: Lambert, H. and Rose, H.: 1996, 'Disembodied knowledge? Making sense of medical science', in Irwin, A. and Wynne, B. (eds.), *Misunderstanding Science?* Cambridge University Press, Cambridge, pp. 65-83. Also, see: Wakefield, S. E. L., Elliott, S. J., Eyles, J. D., & Cole, D. C.: 2006, 'Taking environmental action: The role of local composition, context and collective,' *Environmental Management*, **37**(1), 40-53.

³³ Pelling, M.: 2004, *Social Capital and Institutional Adaptation to Climate Change (Working Paper)*, Economic and Social Research Council, London.