

Self and world in lay interpretations of climate change

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Abstract

Purpose – This paper aims to report on an in-depth qualitative study that focuses on the convergence of the interpretive activities of knowing, living in and valuing the world in lay reasoning about climate change. Although awareness is growing that lay people interact with scientific knowledge about climate change in complex ways, relatively little is known about this interaction. Much quantitative research on public attitudes to climate change does little to draw out the cognitive and experiential processes by which lay people arrive at understandings of climate change.

Design/methodology/approach – Through narrative analysis of qualitative interviews, this paper examines lay rationalities of climate change as a process of not only knowing the world (epistemology), but of being oriented towards the world (ontology) and valuing the world (axiology).

Findings – The findings emphasise the extent of individual variation in lay interpretations of climate change, and their internal complexity. Almost all participants display differences in reasoning about climate change when considering their personal lives as compared to the wider, public world. Distinct accounts of self and world in lay rationalities are evident in the ways that participants imagine the future and express their feelings of culpability for and responsibility to act on climate change.

Originality/value – This paper argues that lay reasoning about climate science does not just engage ways of knowing the world but also ways of being in and valuing the world so as to open up multiple trajectories for comprehension.

Keywords Climate change, Epistemology, Ontology, Everyday life, Qualitative interviews, Axiology

Paper type Research paper

Introduction

As a biophysical phenomenon, anthropogenic climate change is constituted by a wide variety of mundane, everyday human activities. In a sociological sense, however, climate change is a concern primarily constituted by scientific knowledge, rather than by everyday experience (Hulme, 2009; Jasanoff, 2010; Urry, 2011; Wynne, 2010). This is to say that science has been “given sovereignty as social meaning” over climate change as a universal concern (Felt and Wynne, 2007, p. 58). The problem of climate change has been defined not by lived concerns, such as immediate threats to life and livelihood, but by scientific theory, experimentation and data collection that are presented as being independent of any specific social context. To be sure, this scientific activity asserts that the phenomenon of climate change may pose – indeed, is already posing – profound threats to everyday life, and that avoiding these threats requires significant changes to



everyday life. Yet, efforts to mobilise changes in everyday lives on the basis of climate science have consistently met with limited and more variable success than expected (Nisbet and Myers, 2007; Wolf and Moser, 2011).

Many scientists and policymakers understand variability in public responses to climate science as the result of uneven social distribution of scientific literacy. Yet, considerable social survey evidence suggests that it is more effectively explained by ideological, cultural, demographic and psychological factors (Brechin, 2010; Kahan *et al.*, 2012; Kvaløy *et al.*, 2012; Leviston and Walker, 2011; Lorenzoni and Pidgeon, 2006; Marquart-Pyatt *et al.*, 2011; Reser *et al.*, 2012; Tranter, 2011). As Jasanoff (2010, p. 240) explains:

[...] scientific facts bearing on the global environment never take root in a neutral interpretive field; they are dropped into contexts that have already been conditioned to produce distinctive cultural responses.

For example, Kahan *et al.* (2012, p. 1) drew upon a “cultural cognition thesis” to argue that variability in acceptance of climate science in their survey of public opinion was explained not by scientific literacy but by differences between “hierarchical, individualist” and “egalitarian, communitarian” worldviews.

A growing body of research on climate science communication is attentive to the role of social diversity in creating varied responses to climate science, especially in relation to mass media and political debate (Boykoff, 2011; Moser, 2010; Whitmarsh *et al.*, 2011). It has also paid attention to the particular difficulties involved in communicating prospective problems that are long-term, large-scale and non-linear in causality and resolution (Sheppard, 2012). Drawing attention to the role of semiotics, institutions, power relations and moral values in framing climate change issues, this research underpins approaches to climate science communication that are audience-centric, narrative, participative, dialogical and contextual (Moser, 2010). Such innovation challenges the cognitive-deficit approaches that dominated early decades of climate change communication. It does so by questioning the assumption that the aim of science communication is to overcome ignorance, by assuming that lay people are active rather than passive recipients of scientific knowledge and by acknowledging the tangled relationship between knowledge, values and behaviour (Bulkeley, 2000; Howell, 2013; Nerlich *et al.*, 2010; Wynne, 1991).

Although awareness is growing that lay people interact with scientific knowledge about climate change in complex ways, relatively little is known about this interaction (Wolf and Moser, 2011). Most quantitative research on public attitudes to climate change has done little to draw out cognitive and experiential processes through which lay people arrive at opinions on this topic (Nisbet and Myers, 2007). This research is often implicitly shaped by an unexamined realist epistemology that takes science as the reference point for judging the veracity of lay knowledge (Bostrom *et al.*, 1994; Reynolds *et al.*, 2010). Contrary to much unhelpful debate between “realists” and “constructivists”, to examine this epistemology is not thereby to question the veracity of scientific knowledge *per se*. It is, rather, to acknowledge what Wynne (2010, p. 289) calls the “epistemic ambiguity” created when scientific knowledge is brought into contact with forms of non-scientific knowledge whose social veracity is established on very different terms. In relation to the experiential, performative and tacit forms of knowledge associated with everyday life, this is to say that scientific claims only ever achieve a

The study

In shedding light on this epistemic ambiguity, the authors present an in-depth qualitative investigation of the interpretive frameworks that enable lay people to comprehend climate change. This study contributes to the small body of qualitative research on lay engagements with climate change that provides insight into the ways in which non-scientific knowledge of climate change is constituted. As [Wolf and Moser \(2011, p. 552\)](#) argue, in-depth, small-scale qualitative research is presently underutilised in investigations of how “pre-existing cultural worldviews [...] influence people’s uptake, understanding, interpretation of and response to climate change information”. Accepting that people do not passively receive information about climate change, but actively engage with it through what are described here as interpretive frameworks, this study focusses on how knowledge about climate change is integrated into the ways in which lay people see the world and live their lives. While this idea of interpretive frameworks overlaps with the discussion of “cultural worldviews” introduced above, the authors add analytical depth to this discussion by considering lay engagements with climate change as inherently dynamic, contingent and emergent, thereby resisting the assumption that people view climate change through pre-determined and relatively stable lenses or filters. The approach is thus hermeneutical ([Ezzy, 2002](#)): this study explores the capacity of entrenched ways of making sense of the world to shape the meanings attached to climate change, and in the capacity of the meanings of climate change to shape new ways of making sense of the world.

Focussed on a small but diverse sample of individuals in the Australian state of Tasmania, this study explores the multidimensional and narrative character of lay interpretations of climate change. Everyday acts of reasoning about climate change are treated here as being simultaneously epistemological, axiological and ontological. That is, these acts of reasoning encompass questions about how to know, value and live in the world. In so doing, the authors draw on Aristotelian theories of practical reasoning that resist modern dualisms between emotion and reason, mind and body and theory and practice ([Davison, 2001](#); [Bernstein, 1972](#); [Dunne, 1993](#)). That is, lay rationality is regarded here as an intellectual capacity that is inherently value-laden and inseparable from the worlds of social practice in which it is formed and expressed. This approach differs from the majority of research on public understanding of climate change, which, in keeping with the authority of climate science as the arbiter of social meaning, focuses on epistemological or cognitive processes. While a substantial body of research has considered the role of affect or emotion in public engagement with climate change ([Leiserowitz, 2006](#); [Roeser, 2012](#); [Stoll-Kleemann et al., 2001](#); [Weber, 2006](#)), it typically places emotion as outside of and acting upon the sphere of reason, with science assumed to be the archetypal expression of reason. While some studies have noted the importance of moral claims in public engagements with climate change ([Bulkeley, 2000](#); [Weber and Stern, 2011](#)), and the role of values more generally ([Howell, 2013](#); [Wolf et al., 2013](#)), the convergence of epistemological, axiological and ontological processes

implicated in these claims has rarely been considered. As [Jasanoff \(2004, p. 2\)](#) explains:

[...] the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it. Knowledge and its material embodiments are at once products of social work and constitutive of forms of social life.

In what follows, the methods and context of this study are described, before presenting a narrative analysis of lay interpretations of climate change.

Methods

Operating within the methodological framework of hermeneutics ([Ezzy, 2002](#)), in-depth, semi-structured interviews were conducted with 11 lay people studying at the University of Tasmania and living in the city of Hobart. The aim of the interviews was to investigate the following research question: How do people make-meaning about climate change, and how does this interpretive process shape the ways that people inhabit, value and know the world?

Informed by the philosophical tradition running through the work of Heidegger, Merleau-Ponty, Gadamer and Ricoeur, a hermeneutic approach enables the dynamic processes through which people comprehend climate change to be understood as interplay between interpretation and experience, cognition and embodiment ([Ezzy, 2002](#)). Lived realities and beliefs about climate change are created and recreated through the ever-evolving contexts of people's lives, and are made sense of through narratives. Narrative analysis, used in this study within the framework of hermeneutic methodology:

[...] emphasises that the nature of an event or belief is not to be found in the event or belief itself, but in the relationship of the event or belief to a broader interpretive framework or narrative ([Ezzy, 2002, p. 95](#)).

A similar approach was utilised by [Wright *et al.* \(2012, p. 1472\)](#) in their study of the way responses to climate change are shaped by an ever-changing sense of self: "Indeed, understanding how we as individuals create narratives of ourselves and our behaviour is central to theorising how humanity can engage with an issue as critical as climate change".

Acknowledging that interviewing has been underutilised, to date, in research on lay encounters with climate change ([Wolf and Moser, 2011](#)), the style and focus of interview questioning was informed by both quantitative and qualitative research on public understanding of climate change and developed over the course of four pilot interviews not included in the analysis. In particular, recent quantitative social research on Australian attitudes to climate change ([ABS, 2012](#); [Leviston and Walker, 2011](#); [Reser *et al.*, 2012](#); [Tranter, 2011](#)) provided important context for the design and analysis of interviews. This approach demonstrates the ways in which qualitative and quantitative studies of public understanding of climate change are complementary. In doing so, the authors make visible the process of reasoning that lies behind the findings revealed by survey instruments. Interviews of between 35 and 60 minutes each were conducted between July and August 2012 by the first author, according to an informed consent protocol based on protection of anonymity and confidentiality, and approved by the Tasmanian Social Sciences Human Research Ethics Committee (H001255). Participants were recruited through combined purposive and

convenience sampling. Advertisements were placed around the campus and circulated within the first author's student and teacher networks. As is characteristic of intensive, small-scale studies, the aim of sampling was not to be representative or to achieve statistically significant findings. This sampling strategy is therefore partly non-random. It was intended to achieve a small sample from within the student population, but with relative diversity both demographically and in terms of discipline of study.

The sample includes approximate gender balance, a variety of disciplines of study and life experiences. Participants range in ages from 19 to 68, but the sample is predominantly made up of Australian-born 19- to 24-year-olds who do not have children. This research is exploratory. But, the diversity of individual interpretations found in a sample of relatively narrow scope is striking and demonstrates the relevance of small-scale studies that explore individual experience. The bias and limited scope of the sample are compensated for by textured narrative analysis of each individual's unique and complex combination of knowledge claims, value judgements and life orientations in their interpretations of climate change. The responsive, dialogical nature of questioning and analysis at the individual scale enables an explanatory power that complements larger-scale, descriptive studies (Wolf and Moser, 2011).

Hermeneutic methodology presents semi-structured interviews as a dialogical opportunity (one co-produced by interviewer and interviewee) to generate narratives that do not unfold in a predetermined or standardised process. While a schedule of broad questions based on pre-theorised themes ensured comparability between interviews and relevance to the research question, the order and framing of questions was strongly influenced by participants (Mason, 2002). During pilot interviews, it was found that broad questions not directly framed in terms of climate change nor in terms of concepts of knowledge or attitudes – for example “How do you feel about the future?” – provided contextual material that was vital in analysing narratives related to climate change. Questions such as “What is the first thing you think of when you hear the term climate change?” allowed participants opportunity to frame climate change on their own terms, rather than on the terms of the researcher.

With permission from participants, interviews were audio-recorded and transcribed in full by the first author. Each interview is treated as a narrative whole in which material was analysed as an expression of an underlying interpretive process. To explore points of convergence and divergence between individuals, transcripts were also coded inductively and deductively, using open and axial coding, so as to identify themes and patterns embedded in interview dialogue (Ezzy, 2002). The findings are presented by first analysing the narratives of three participants, demonstrating the “diverse [...] epistemic trajectories” (Wynne, 2010, p. 301) evident in lay interpretation of climate change. A further three narratives are then introduced to explore a disjunction between self and world that was evident in the majority of interviews. Only 6 of 11 narratives are presented in detail here, to allow for sufficient complexity of analysis. However, as elaborated in the discussion, this analysis encompasses overarching themes evident in most of the 11 interviews.

Climate change as lived narrative

A 2011 Australian survey of over 5,000 people found that when asked “Do you think that climate change is happening?”, 23 per cent of participants responded negatively.

However, when given more variegated choice on a similar question, only 11 per cent responded in this way, with 44 per cent attributing climate change to natural causes and 45 per cent attributing climate change at least partly to human causes (Leviston and Walker, 2011, pp. 6-8). In this context, it is noteworthy that 8 of the 11 interviewees accepted the existence of anthropogenic climate change, with two accepting the existence of climate change but expressing uncertainty as to its causes and one convinced that any changes in climate are purely natural. The sample's relatively positive response to scientific claims about the existence of anthropogenic climate change is most likely explained by established links between acceptance of climate science and both youth and tertiary education in Australia (Reser *et al.*, 2012; Tranter, 2011). However, this generalised finding of acceptance of climate science masks a great deal of diversity and complexity in how individuals make sense of climate change in their lives.

The most stark contrast in engagements with climate science is exhibited by Josh and Thomas. Josh is a 24-year-old law and international relations student who grew up in Hobart and who values his family and friends, his university studies, volunteer work, travel and political engagement. The global frame of reference afforded by his studies, travels and civic life dispose Josh to accept without question the internationalist premise of the scientific and policy regime of which the Intergovernmental Panel on Climate Change (IPCC) is a key part (Sarewitz, 2011). Indeed, Josh actively seeks out IPCC reports and feels "ill to think that people are willfully blind to what specialists in this area are telling them". Josh's epistemological certainty in the existence of anthropogenic climate change is joined seamlessly to axiological certainty that the consequences of climate change are bad and that individuals and societies have a duty to reduce their contribution to this problem. This certainty constitutes climate change as an unequivocal reality in Josh's life, a reality that "plays into every other issue", such that "you can't ignore it, ever". In keeping with his experience of the unbounded, diffuse character of climate change, Josh considers that every aspect of his Australian life contributes to climate change:

[...] everything that I consume is produced using a process that requires carbon pollution [...] to understand what I'm doing to influence climate change I have to extrapolate that out for every single thing I've ever eaten, everything I've ever owned.

While such a systemic sense of his personal involvement in causing climate change could be assumed to be disempowering, Josh displays a powerful sense of his individual agency. Scientific claims about the causes of climate change govern his reasoning as a consumer, leading him to purchase second-hand clothes and books and local produce, to use public transport and to minimise his power and water consumption. Yet, Josh does not reduce his collective responsibilities to acts of private consumption, taking similar care over his electoral choices and political affiliations. Positioning climate change as "the primary global concern", Josh is in no doubt about the need for governmental regulation to avoid further climate change: "my fear isn't that the government wants to put a tax on carbon, my fear is that we won't tax it enough". Emotive concern that not enough will be done to mitigate climate change leads Josh to be "pessimistic" about the future of the world because he considers climate change to "potentially endanger [...] the survival of us as a species". It is worth asking, then, how Josh also retains a sense of personal agency in the face of such pessimism. The answer seems to lie in this statement:

“For my own future I feel positive”. The ontological distinction between self and world evident here is central to the majority of interview narratives, and will be revisited shortly.

Thomas, Tasmanian by birth and in his early 20s, also shares with Josh an interesting alliance between his area of study and his interpretation of climate science. Studying journalism and history, Thomas values what he sees as the historical progress of modernity, especially in military and technological achievement. This valuing is not simply abstract. Giving expression to a passion for cars, Thomas several times links abstract themes about modern progress and individual freedom to his embodied experience of automobility:

[...] if we can live a bit more efficiently that's great, and as I said if we can do it without making any sacrifice, that's true progress. If we have to [...] go back to whereby I have to either pay huge, huge money so I can drive my very nice seven-year-old Caprice V8 [...] that's not progress, that's regress, because you're losing independence of travel, for instance. I like to be independent. I like to make my own choices.

Thomas' scepticism of the climate science consensus seems lodged not in scientific claims but in his antipathy to environmentalists: it is as much axiological as epistemological. He broadcast this antipathy at the start of the interview, providing the interviewer with a number of articles he found on a Facebook page called “I bet we can get 10,000 people who think the Greens are wankers”. Thomas experiences climate science as an ideology motivated by dangerous social values rather than by objective knowledge. Finding climate science to be a direct repudiation of his own social values, Thomas demonstrates an impassioned response to what he experiences as a direct threat to his way of life: “To me, some of the scientists, I feel, just need a good kick in the teeth”. Equating climate scientists and environmentalists and characterising their ideology as “ecofascist”, Thomas interprets climate science as politically unjust:

[...] environmentalists basically go around criticising ordinary people's way of life and saying that their way of life is superior because they are supposedly saving more penguins from being homeless and if you don't follow their way of life then you're a carbon criminal.

Subsuming climate science within environmentalism, Thomas resolves the apparent contradiction of his affirmation of the history of modern progress and his rejection of modern science that has been central to this history. Despite viewing himself an empiricist – “I'm a man who likes numbers [...] from numbers one can then draw a perspective” – Thomas does not rebut the scientific claims of environmentalists with alternative scientific claims. Instead, he draws on his family history to justify the view that climate change is not caused by humans:

My father, his family has been here since the 1830s and my father was almost a victim of the 1967 bushfires that raged through the southern area of Tasmania. After the '67 bushfires raged through [...] there were years of drought and years of decent rainfall. We've just had probably about three years of decent rainfall and we're probably going to have another two years of decent rainfall and probably four or five years of drought. To me [climate change] it's cyclic.

Josh and Thomas exemplify extremes within the sample. Comparing their narratives with that of Ellen demonstrates the uniqueness of the interpretive process through which people arrive at their opinions about climate change. Ellen is a 22-year-old law and history student, and while sharing with Josh the view that climate change is the

result of human activity and a potential source of severe environmental and social impacts, she is closer to Thomas in her reliance on embodied knowledge and in her relative disinterest in climate science:

I just understand that the changing temperatures is [sic] a result of the increased CO₂ emissions in our world, but [...] my, like, scientific understanding of it is quite limited, it's more like a belief based understanding of it [...] I would think that global warming is caused by humans, not because of any, like, scientific data, but more because just from my own observation of, you know, how humans live. Obviously, you can see our impact on the world so much more than any other species.

Ellen draws on her experiences with the Tasmanian environment, and describes being on the summit of the mountain overlooking Hobart:

I can just see all these houses and things like that, you know like the zinc smelters [...] what humans have done as part of their existence just seems so pervasive and so, just such a big impact, such a visible impact.

Like Josh, Ellen links concerns about climate change with small, everyday actions, such as “turning power off and walking places and trying to live quite energy efficiently”. However, unlike Josh, her motivation in such practices is not primarily related to climate change. Reporting that “to me [climate change is] important, but it's a periphery”, Ellen explains that her day-to-day choices reflect the fact that she has “been brought up to not have too much of an impact on the environment, regardless of climate change”.

Ellen describes an emotive, axiological response to climate change as it is applied to the rest of the world:

I feel like [climate change is] really indicative of like human greed and, yeah, I think it's like [...] it kind of makes me a bit angry at the human race for living in such a way without really thinking about consequences.

But at the same time, in relation to herself, Ellen clearly demonstrates the sense that contributing to climate change is an inevitable part of everyday life and defends her lifestyle, explaining that “you have to pick about what you are going to not compromise on and I just think that it's inevitable that I'm not going to compromise on other things”. Here, Ellen displays a similar ontological distinction between her own life and the rest of the world to Josh.

Self and world

The narratives above make clear the epistemological and axiological complexity involved in the challenge of interpreting climate change. In this section, the ontological complexity implicated in this challenge is explored, by focussing on an overarching theme evident in the majority of interviews, although, as with the previous section, the authors report on only three so as to allow space for individual narratives to be elaborated. This ontological complexity centres on how participants experience climate change as a problem lodged “out there” in the world, rather than “in here” in their lives, even though most participants acknowledge their personal contribution to climate change. Bearing out the importance of this dissociation of self and world, a number of studies have suggested that climate change is experienced by many people as an abstract problem with little salience to everyday lives (Moser, 2010; O'Neill and Nicholson-Cole, 2009). Discussions about knowledge-action, value-action and

attitude-behaviour gaps in public understandings of climate change (Lorenzoni *et al.*, 2007; Stoll-Kleemann *et al.*, 2001) similarly indicate the existence of multiple frames of reference in lay engagements with climate change.

Much of this existing research emphasises dissociation between knowledge and values on the one hand and practice on the other. The analysis presented here, in contrast, explores ways in which the ontological dynamics of everyday life may establish distinct domains of practice, such as public and private, in which apply different normative criteria (Davison, 2001). The authors illustrate below how most participants constitute climate change ontologically in two quite distinct ways, producing two very different lived realities. The resultant disjunction in lived experience is characterised as being between that of self and world. Apparent contradictions between personal attitudes and behaviours, on the one hand, and social values and duties, on the other, are resolved when everyday experience is no longer held to standards of consistency and uniformity characteristic of scientific epistemology. It is argued here that such epistemological contradiction is rendered tenable in everyday life through the maintenance of multiple ontological frames of reference.

Amelia is 20-years-old and studying sociology and journalism. Like Josh and Ellen, she accepts claims that climate change is caused by human action. Despite the fact that climate change is thus brought within the realm of human agency, Amelia has no sense that social and political action will address and resolve climate change issues. Her outlook is bleak: “I just see [climate change] as turning into the end of the world, the end of humans [...]”. This view means that, because of “climate change and stuff”, she “really [doesn’t] have much hope for future generations”. Yet, although she dismisses the possibility of a solution to climate change, she regards her own life as having little to do with the bleak future she imagines: “I don’t think that it’s [climate change] going to affect my life too much”. This radical separation between collective and personal futures is founded upon a process of ontological interpretation by which Amelia is able to support a “dismal” view of the future of the world, without this view having a direct impact on her life. The principal mechanism of this separation is temporal. That is, she has hope for her own future “because the problems don’t seem as [...] immediate”. This is not to say that Amelia does not accept that her everyday life contributes to the global problems of climate change. Amelia accepts that many of her routine, everyday actions contribute to climate change. But, having accepted that society is incapable of addressing climate change, she feels freed of any personal responsibility. Thus, although she recognises that “the way we’re living now is just totally unsustainable”, she does not feel obliged to change the way she lives: “I’m more selfish than, you know, thoughtful about the environment. I’m not saying it’s good, but that’s how I am”.

Even though he is slightly sceptical that humans are the principal cause of climate change, Joseph, a 20-year-old law and economics student who grew up in Tasmania, sees it as a serious problem that demands political action. He also understands that the way he lives his life is contributing to atmospheric carbon dioxide. But, “as for the actions of one person having any real effect – I don’t think they do”. Whereas for Amelia, the principal mechanism of dissociating self and world is temporal, for Joseph, it appears to be geographical, a matter of scale, although he also thinks it is “too late” to do anything about climate change. As a result, Joseph does not “get in a car and think of the carbon component attached to driving to university. I just think it’s one of those normal everyday things that you do”.

Similarly to Amelia, Andrew engages with climate change as a “very long-term, abstract” issue; and like Joseph, he is unsure of the extent to which humans are causing climate change. Andrew, a 36-year-old Master of Information Systems student who grew up in Sweden, accepts the need for “some global agreement” on climate change, but does not voice a sense of responsibility to change his everyday behaviours so as to address this concern: climate change is “going to be someone else’s problem”. While attributing responsibility for acting on climate change to political actors, Andrew explains that he does not consider climate change in his voting or political affiliations. This is because he prioritises “more immediate concerns” that he can get “emotionally involved” in, rather than the abstractions of climate change. While Andrew considers that “modern human beings” are no longer living sustainably and that nature is seen as an “endless resource that can be exploited for the benefit of humans”, he deflects his responsibility: “I am so preoccupied with my own issues that I don’t have this ambition of saving the world”.

Conclusion

The analysis presented here focusses on the convergence of the interpretive activity of knowing, inhabiting and valuing the world in lay rationalities of climate change. Despite the small and relatively narrow sample of (predominantly young and Australian-born) university students, the authors have found considerable diversity between individuals in relation to the ways in which they interpret climate change as a social and as a personal concern. As demonstrated in the narratives of Josh, Thomas and Ellen, significant differences have been identified between individuals whose declared opinions on climate change would be found identical by many social survey instruments. Conversely, the authors identify commonalities between those who would be separated using such instruments. The research presented here also reveals significant multiplicity within the narratives of single individuals. The study’s focus on the process of making sense of climate change, as opposed to any “inputs” and “outputs” of this process (such as perceptions, attitudes and beliefs), exposes the dynamic nature of public understanding of climate change.

Cognitive-deficit explanations of public understanding of climate change, which continue to exert influence over scientific and policy institutions, despite being strongly critiqued (Jasanoff, 2010; Moser, 2010; Wynne, 2010), present public understanding as static rather than dynamic. These explanations represent lay resistance to climate science as stemming from ignorance, and do not account for lay responses other than those of acceptance or rejection of climate science.

In contrast, this analysis shows that lay responses to the scientific constitution of concern about climate change are active, variegated and complex. For a start, scientific knowledge is not the only form of knowledge relevant to lay reasoning about climate change. The interview participants, for example, draw upon historical, cultural, economic and political knowledge in explaining their views about climate change. More importantly, however, lay responses to climate change bring together diverse knowledge claims with largely implicit values and embodied ways of being. In the terms used in the above analysis, this is to say that scientific arguments are contextualised by the epistemological, axiological and ontological dimensions of lay reasoning. This multidimensional interpretation of apparently stable and unequivocal scientific facts creates multiple trajectories of comprehension; what Wynne (2010) describes as

“epistemic ambiguity”. The existence of this ambiguity helps to explain both the extent of diversity between individuals and the extent of diversity within one individual’s comprehension of climate change.

The analysis has focussed, in particular, on ambiguity in lay reasoning about climate change created by ontological dissociation between a lived, personal reality and a social, political reality. This dissociation was observed in the significant majority of the 11 interviews. For example, a number of participants interpret climate change as leading to a destructive global future, while remaining optimistic about their own future. This reveals dissociation between lived contexts in which participants feel they have agency and worldly contexts in which they feel disengaged and powerless. Most participants interpret climate change as a problem that will inevitably become more serious due to wider economic, political and social forces. They nonetheless feel that their personal contribution to climate change through their lifestyles is inevitable. While acknowledging personal culpability, their sense of social disempowerment in the face of the momentum of the changing climate simultaneously increases their sense of individual agency by, freeing them from a sense of personal responsibility to reduce their everyday contribution to climate change. This finding clearly has wide relevance beyond issues of public understanding of climate change, going to questions about the experience of the individual self in contemporary societies: questions at the centre of debates in social theory (Bauman, 2001; Giddens, 1991; Taylor, 1992).

In keeping with the exploratory nature of this study, the findings open up questions for future inquiry. The uniqueness and internal complexity of individual interpretations of climate change found in all participants in this research attests to the value of in-depth studies that take seriously the contextual and processual character of lay rationalities of climate change (Wolf and Moser, 2011). While much research on public understanding of climate change focuses on the conclusions at which people arrive, this study bears out the value of insight into the process by which these conclusions are reached. This is not to deny the importance of extensive surveys of public attitudes about climate change, nor the need for public dissemination of climate science. The approach taken here is informed by survey findings, but informs the future design of such instruments by drawing attention to the complex interplay of ideas, values and experiences in public interpretation of climate change. Equally, the authors are not suggesting that all members of the public, or all of the participants in this study, have an adequate comprehension of climate science. The research findings indicate, however, that dialogical approaches to science communication that pay respect to the diverse values, aspirations and knowledge contexts of lay people will be more effective than undifferentiated, didactic and one-way strategies that seek to overcome ignorance (Wynne, 2010; Whitmarsh *et al.*, 2011).

Making explicit how the process of lay reasoning encompasses not just epistemological reasoning, but also axiological evaluation and ontological perception, this study investigates some of the ways in which scientific knowledge is reconstituted in everyday life. One of the important ways in which climate science is reconstituted by lay people is through ontological distinctions between self and world. Recognising this distinction sheds new light on apparent contradictions within the views of individual lay people that are presently dismissed by many researchers as evidence of confusion or hypocrisy.

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