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*Public Understanding of Science* 2000; 9; 313

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# Common knowledge? Public understanding of climate change in Newcastle, Australia

Harriet Bulkeley

This paper argues that public understanding of climate change not only involves knowledge of its physical processes, but also encompasses wider issues concerning the relation between society and nature. It examines the conclusions of previous research, and assumptions made within the policy community concerning public understanding of climate change. It is argued that in each case, in accordance with the *information deficit model*, recorded levels of ignorance are seen as a barrier to effective public involvement in the policy process. This view is challenged by research findings from Newcastle, Australia. Public understanding of global environmental issues drew not only on scientific information, but also on local knowledges, values, and moral responsibilities. Further, respondents connected the issue to their communities, and suggested that individual action is morally sanctioned, despite concerns for the efficacy of such action and the lack of government or industry support. Where institutional realignment has occurred to provide renewable energy to householders, public involvement has been forthcoming. These findings suggest that rather than focus on the provision of information, policy attention should be directed to the social and institutional barriers that act to constrain public involvement in addressing global environmental issues.

## 1. Introduction

The injunction to think globally and act locally has become common currency in debates about the global environment. However, public knowledge about global environmental issues is commonly dismissed as illiterate, confused, and having little impact on behavior. Despite moves by policy practitioners and academics to stress that public knowledge is as valid as that generated through scientific inquiry for 'local' issues, there has been more reticence over applying such principles to the global environment.[1] For example, Eden argues that "we can usefully distinguish between the global and local environment because the former lends itself to scientific mediation whereas the latter is more open to public construction of ideas and, therefore, to policy input."[2] This paper seeks to address this divide through an assessment of public understandings of climate change in Newcastle, Australia.

Newcastle, a city of approximately a quarter of a million people centered on a large port at the estuary of the Hunter River, has a long history of economic dependence on the coal, steel and related industries. Recently, alongside shifts towards tourist and other service sector industries, the city council has backed energy efficiency and renewable energy initiatives in an attempt to shift the basis of energy industries in the region. The analysis in this paper is drawn from a survey of 56 questions. The questions covered a wide range of issues relating to climate change, and were a mixture of statement agreement/disagreement and closed categories

313

to select and open responses. Open questions asked respondents to comment on the issues in their own words, creating data in which the ways that people understand and interpret the issues presented to them can be explored. While falling short of the rich data sources created through allowing people to raise their own agendas and discursively consider issues within either an interview or focus group context, these questions generated a considerable amount of qualitative data, which is presented throughout this paper in its original format.

The survey was distributed to three schools in different socio-economic areas of Newcastle, and was given to all students in a particular year group at that school and their parents. University students (a third of whom were mature/part-time students) were selected across a range of subject areas (science, economics, and geography). From 500 surveys distributed during October 1996, 242 responses were received. Approximately 50 percent of the responses were from the under-18 age group (school students aged 11–12 and 16–18). Previous research has shown that young people are more concerned for environmental issues in general, and global environmental issues in particular.[3] This is frequently assumed to be because of their lack of everyday (economic) concerns or the prevalence of postmaterial values in the post-war generations, however research also indicates that concerns for environmental risks are tied to young people's fear for the future and alienation from society.[4] In their study of young people's understanding of global environmental issues in Europe and North America, Stanisstreet and Boyes found "that some orthodox ideas about these issues were already established by the youngest group. For example, the ideas that the greenhouse effect will cause changes in weather patterns and global warming were already well known to pupils aged 11/12 years."[5] Environmental understanding among this age group can be considered significant for research, not, as is often argued, because it might be carried as a coherent worldview into adult life, but because of its influence on the everyday practices of families.[6] However, using the same survey questionnaire for young people and adults can be problematic, as these groups have different types of vocabulary and meaning associated with words used in survey questions. This was addressed by conducting the questionnaire during lesson time, with the help of the class teacher, and answering questions and explaining unfamiliar terms. In addition, three focus groups were held with students aged 17–18, in order to explore in-depth some of the issues raised in the survey. Each focus group involved approximately ten students, was facilitated by the author, with an assistant recording the proceedings, and lasted for between 90 and 120 minutes. Transcripts of the focus groups were then coded according to significant themes raised in the literature and by the participants, from which some extracts are presented below.

In order to set the scene for this empirical research, the first section of the paper details research findings from previous studies that have examined public understanding of climate change. These studies conclude that there is considerable confusion and illiteracy concerning global environmental issues among the public, with few behavioral changes taking place.[7] For some, this suggests that further information and education is needed to overcome such confusion, and therefore encourage behavioral change, a position that is also held within the Australian climate change policy network.[8] However, recent research suggests that such an approach, where information is seen as the key to overcoming the gap between values and action, rest on a misconception of public responses to environmental issues.[9] This research challenges the assumption that public confusion, and an apparent gap between stated beliefs and actions, arises from a "deficit in public knowledge and understanding of environmental issues which needs to be 'filled' by expert knowledge."[10] An alternative framework is suggested, which emphasizes the ways in which public understandings of climate change are tied to larger questions of the relations between society and nature. In this light, the second section considers how public understandings of climate change were related in Newcastle.[11] Although there is considerable confusion regarding the scientific facts of climatic change among this

community, this does not represent a wholesale lack of understanding of global issues.[12] Public understandings draw not only on scientific information, but also on local knowledges, values, and moral responsibilities for future and distant environments and societies. Section three outlines the ways in which respondents interpreted their responsibilities towards the global environment. Although morally sanctioned, and seen as a valid means of achieving other goals, actions taken by individuals to reduce energy use for environmental reasons were thought to be largely ineffective in a context of inertia from influential institutions (business and government) in which people held little trust. However, where institutional realignment has occurred within the energy sector to provide renewable energy to householders, public involvement has been forthcoming. These findings suggest that a lack of information is not necessarily the most significant barrier to either public understanding or action with respect to the global environment. In conclusion, the need to move away from assessments of public knowledge towards analysis of public understanding is asserted. Further attention needs to be directed to the ways in which public involvement in greenhouse gas emissions reductions, and participation in the policy process, is being sought.

## 2. Misunderstanding global environmental change

Although there has been much recent attention devoted to public responses to environmental issues in general, research that focuses on the issue of climate change in detail is less common. The predominant form of analysis centers on occasional questions in national opinion polls, although recently Dunlap and colleagues have conducted a more thorough international comparison of public responses to global environmental issues.[13] This survey included items based on several small-scale, in-depth studies that have used a mixture of qualitative and quantitative analyses, and reached a similar conclusion: That the public have a limited understanding of climate change.[14] One such study was conducted in the United States by Willet Kempton and colleagues using a mixture of ethnographic and survey techniques. The research showed that laypeople's understandings of the processes of global warming were being framed in terms of four concepts—stratospheric ozone depletion, tropospheric pollution, local weather and photosynthesis—with which respondents were familiar.[15] Another was based on detailed survey research conducted at the Massachusetts Institute of Technology (MIT).[16] These researchers argue that public confusion about climate change is evident in: the mixing of greenhouse effect, global warming, weather and climate change references; the prevalence of 'stratospheric ozone depletion' cross-referencing in terms of chlorofluorocarbons (CFCs), holes in the atmosphere, and skin cancers; and in misplaced priorities in identifying causes and effective mitigation strategies. Such misunderstandings are often held in conjunction with accurate beliefs. For example, the majority of those surveyed pointed to the role of automobiles as a cause of global warming. However, this is dismissed as a "relatively isolated fact... neither caused nor supported by an appropriate mechanistic view of the role of Carbon Dioxide."[17] For the researchers at MIT, the inconsistencies in lay mental models were due to a lack of understanding on the part of the public of the two simple facts of global warming: That carbon dioxide will be primarily responsible for any global warming that does occur; and that the major source of this carbon dioxide is burning fossil fuels.[18] Attempts to communicate the risk of global warming should therefore "stress these two simple facts and their implications."[19]

The conclusion of the MIT study, and similar research, on the need to foster public knowledge about the physical processes surrounding climate change in order to effect action, accords with what Macnaghten and Jacobs describe as the "dominant view of sustainable development", where people "are presented as individual agents acting 'rationally' in response to information made available to them."[20] According to this information deficit model of

public responses to environmental issues, the public needs to be given more knowledge about environmental issues in order to ensure that they take action.[21] This is clearly illustrated in the Australian government's approach to public participation in climate change policy:

> "Information and education programs...can foster broad community understanding of climate change issues. This understanding is prerequisite for informed community and individual action to reduce greenhouse gas emissions and adapt to climate change, as well as building community support for actions initiated by governments."
>
> *National Greenhouse Strategy, Commonwealth of Australia, 1998*[22]

Moreover, the lack of public understanding of climate change attracts significant attention from all sides of the policy debate:

> "There isn't a very good understanding of the issue in the community, it's confused with ozone depletion, which leads to a perception that the problem has been solved, people don't understand the connections. The connections between turning on the light switch and a coal-fired power station."
>
> *Greenpeace (a), Interview, May 1996*

> "The community, I don't think, feel all that close to greenhouse as an issue. I mean they are obviously much, much closer to local issues than global issues. And people are not...that well informed about greenhouse. I very often hear greenhouse mixed with ozone layer depletion as issues . . . It doesn't seem to me that people relate to greenhouse as a potential environmental issue."
>
> *BHP Ltd., Newcastle Environment Committee, Discussion, November 1996*

Throughout the Australian climate change policy network, the scientifically determined nature of the risks that climate change poses, and the illiteracy of the public over those risks, is emphasized, albeit with different policy prescriptions, either to justify educating or to ignoring the public. The apparent lack of public concern for the issue is attributed to their lack of knowledge of its risks, due to the complexity and global scale of the issue, the extent of publicized scientific uncertainty and confusion, and its irrelevance to their daily lives.[23]

In this view, (global) environmental risks are assumed to be discrete entities, available only through expert knowledge and prediction. In turn, information about risk, given through expert definitions and communicated to the public, can engage people in action. In this approach, public understandings of the environment are conceptualized as *world-views* that constitute "quite separate and fundamentally different way(s) of seeing the world...[that are] hermetically sealed within particular interlocking beliefs, values, attitudes and behaviors."[24] In this approach, the contextual dimensions of environmental concern are ignored so that public perceptions are seen as stable, coherent, and consistent and to exist within individuals, rather than being located within the inter-subjective contexts of institutions and discourse.[25] Achieving a sustainable society is therefore seen as involving individual changes in attitude and the adoption of a coherent and stable *environmental world-view*. However, "it has been well documented that increasing awareness and concern among citizens may not translate into effective behavioral changes, due to a variety of cognitive and structural barriers, and this is specially the case with global-level problems."[26] Blake argues that three types of obstacles, which mediate the relation between individuals and pro-environmental action, can be identified: those pertaining to individuality (largely cognitive), responsibility (evaluation of personal role), and practicality (ability to act).[27] In their exploration of public understanding of global environmental issues in the Surselva region of Switzerland, Jaeger et al. conclude that knowledge about climate change is a less important factor in determining behavior than social networks and rules sanction and enable mitigating actions.[28] The key to overcoming an

apparent value-action gap between what people say they are concerned with and the behavioral changes they enact, is unlikely, therefore, to lie only in the provision of further information.[29]

Furthermore, far from being stable and unitary, public understanding of environmental issues are "fragmented and contradictory" and are used to convey a multitude of meanings concerning the relations between society and nature.[30] The analysis by Kempton et al. found that understandings of the issues at stake were based on fundamental moral and religious views on the relation between nature and humanity, the rights of other species, humanity's right to change or manage nature, and our society's responsibility for future generations.[31] Beck sees public understandings of environmental issues as a sphere within which to reflect on the reflexivity of modernity.[32] For Beck, public concerns and understandings of risk are not generated within coherent worldviews, rather they arise in the wake of expert dissent concerning the nature of risk, and reflect increased public skepticism concerning the ability of the institutions of modernity to contain and manage risk. Wynne has criticized Beck's original account as focusing too heavily on the role of experts in communicating the realities of risk to the public.[33] Wynne suggests that public understanding of risk should be seen as taking place through everyday social practices that occur within discursively constructed and institutionally embedded relations of trust, dependency and agency between individuals, communities, science, industry, and governments. Recent work in this genre, including a shift in this direction by Beck, suggests that any account of public understanding of environmental issues should take into consideration the social and institutional contexts through which discursive understandings of physical and social relations are constructed, and within which actions are enabled and constrained.[34] In order to move away from an information deficit model of public understanding and action, a more holistic approach is needed that considers how familiar people are with expert discourses of global environmental change and seeks to examine how this issue is tied to larger questions of the relations between nature and society. The next section considers the extent of public knowledge about climate change in Newcastle, Australia, its causes, and the complex ideas of risk and trust that such discourses reveal.

## 3. Climate change—common knowledge?

HB (moderator): So has anybody heard about the greenhouse, what are the things you've heard?

> Ch: Everything! . . . (Laughter) . . . About the ice caps melting, sea levels rising, the climate changing. . .
>
> *Merewether High School, Year 11, November 1996*[35]

Climate change was an issue with which both focus group and survey participants were familiar. As also found internationally by Dunlap et al., the majority of survey respondents in Newcastle felt that climate change was happening now and that it would continue to do so in the future.[36]

However, opinion polls have demonstrated that the confusion found in the public mind in the U.S. between different global environmental issues also occurs in Australia.[37] For example, according to recent market research a third of the public agree with the statement that "global warming is caused by a hole in the earth's atmosphere."[38] In the Newcastle survey, 35 percent concurred with this opinion. At first glance the confusion alluded to by members of the policy-community appears to be rife, confusion that was readily admitted by focus group participants:

> Sa: I must. . . I get a little bit confused between them, the global warming, the hole in the ozone layer, and the greenhouse effect, I am not exactly sure what all of them are, but I know that it's bad. . . for the environment.

**Table 1.** Belief in climate change.

| Response* | Do you think the greenhouse effect is happening now? (%) | Do you think the greenhouse effect will happen in the future? (%) |
|---|---|---|
| No | 0.8 | 0.4 |
| Probably not | 1.6 | 1.6 |
| Not sure | 23.0 | 22.5 |
| Almost definitely | 27.5 | 27.5 |
| Definitely | 45.1 | 45.9 |
| No answer | 2.0 | 2.0 |
| Total | 100.0 | 100.0 |

* This question, as with others in the survey, is phrased in keeping with the predominant means of describing climate change in Australia.

[...]

Sa: I think generally that the warming up of the environment, something to do with Antarctica they say that the sea level is going to rise, because all of that will just melt...am I getting the wrong answer?

A: Yeah...

HB (moderator): You seem to be nodding a lot...I just want to make sure that we get down that you agree with them, do you agree with what you've heard?

A: Like the hole in the ozone layer...isn't that where all the UV rays come through and what's the difference with the greenhouse effect? I'm a little bit confused there.

St, G, and D: (agree)

C: The hole in the ozone layer, global warming, and the greenhouse effect, like is the hole in the ozone layer all part of the same thing? That's all a bit confusing.
*Merewether High School, Year 10a, November 1996*

Confusion and illiteracy over the facts of climate change was also fairly common in survey responses to the general question of what people had heard about the issue:

That it's bad, it's linked to the hole in the ozone layer, it's caused by humans damaging the enviro (cutting down trees, CFCs etc.) and the earth is gradually getting hotter (school student).

Air pollution and loss of forests have contributed to factors that have caused changes in conditions in the atmosphere and ozone layer that have caused the greenhouse effect (parent).

The ozone layer around the earth has holes, some very large, which allow outer gases into the earth's atmosphere warming the earth (parent).

In these survey comments and focus group discussions, confusion is not the result of the substitution of one global environmental issue with another; rather discursive elements from various issues are combined to explain the climate change problem. Many people did, however, also base their interpretations on discourses commonly seen in expert interpretations of climate change:

That without [the greenhouse effect] we'd be freezing. And it's going to destroy the earth (school student).

> Global warming, climatic changes, polar ice caps melting, heat trapped due to $CO_2$ (parent).

Most surprising however, was the number of people for whom the problem appeared entirely different. The issue was not of holes in the atmosphere, warming of the world and melting of distant ice caps, but instead one concerning the social and ethical dimensions of climate change:

> That if we don't stop wasting energy we will die (school student).

> It is a major problem for the world's environment (parent).

> Simply that industry and society in general are doing more harm than good (parent).

For some respondents, therefore, the risks that climate changes posed were not only seen as discrete scientifically determined entities, but were fundamentally connected to the relationship between nature and society. Confusion between different global environmental processes could be interpreted not as representing a wholesale misunderstanding of the issue, but different understandings of it. As Thompson and Rayner argue, "rather than simple confusion of climate change and stratospheric ozone depletion, it may be that the distinction between them is not salient to a public that is concerned with human insult to the atmosphere or even the general environment. For many people, the climate change issue is perceived as part of a wider problem concerning humankind's disturbed relationship with nature. In this sense, climate change and ozone depletion are the same thing: they are members of the category of environmental insults deriving from industrial society."[39] This coalescence of global environmental issues into one 'problem' was also found in market research done by Greenpeace, as one interviewee explained:

> It is not actually global warming, it is basically global change issues all rolled into together—global warming, ozone depletion, tropical rainforest destruction. So they do recognize, but it hasn't reached a level of outrage yet. They know about it but they are not prepared to jump up and down about it like they did about nuclear testing, that's for sure. Similarly they don't understand it, now whether that matters or not, I am not sure... And they didn't recognize the connection between electricity and global warming. That was the most startling, well the most clear cut result, was that they reacted almost as if we were lying to them when we said... that electricity was the main source... So I think that is the big stumbling block, they think it is cars and factories.

> *Greenpeace (b), Interview, December 1996*

Public views of climate change are embedded in a number of different issues that are understood as part of the same problem. As suggested in the quotation above, there is concern among members of the policy network that the public may be unable to differentiate the appropriate measures for action or the potential impacts of the problem. According to the information deficit model that pervades the policy network, this in turn reduces the levels of public concern and action.[40] How people connected the global issue of climate change to their lives is crucial in this respect. In order to explore the extent to which such connections were made, the survey asked respondents to indicate whether there were any activities in either their personal behavior or in the community that contributed to climate change (Table 2).[41] Respondents were more inclined to suggest that activities in their local communities (geographically interpreted) were contributing to the problem than their own behavior.

More than half the respondents commented on what the causes within their local community might be, including such processes as:

**Table 2.** Individual and community contributions to climate change.

| Response | Individual contributions (%) | Community contributions (%) |
|---|---|---|
| No | 15.2 | 3.3 |
| Not sure | 31.1 | 29.5 |
| Yes | 50.4 | 63.9 |
| No answer | 3.3 | 3.3 |
| Total | 100.0 | 100.0 |

Cars, furnaces at BHP (burning coal etc.) (school student)[42]

Use of cars, burning of coal for electricity (parent).

Cars, coal is mined, power stations (university student).

Car drivers, aerosols, open fires etc. (university student).

These comments were coded, and the proportions of each type of response are shown in Table 3. Industrial sources and traffic were the most frequently mentioned, followed by power generation and burning of fossil fuels. These findings are broadly similar to previous results from the United States and Australia.[43] However, causes associated with ozone depletion, such as CFCs and aerosols, were only mentioned in 3.4 percent of all comments, significantly fewer than in the research by Read et al., where 20 percent and 26 percent respectively cited CFCs and aerosols as contributing to global warming, or in the study by Dunlap, where majorities in the six nations surveyed indicated that aerosols were a significant cause.[44] This suggests that, despite confusion over the facts of the physical processes involved in climate change, respondents were aware of the roots of the problem in their local area.

**Table 3.** Community contributions to climate change.

| Causes | Mentioned (%) |
|---|---|
| Industry | 43.0 |
| Traffic | 24.9 |
| Power generation | 10.1 |
| Burning fossil fuels | 6.0 |
| Other* | 5.5 |
| Pollution | 3.4 |
| CFCs/aerosols | 3.4 |
| Everything | 2.5 |
| Waste | 0.8 |
| Not sure | 0.4 |
| Total | 100.0 |

* Including urban development, farming, individuals, deforestation and population growth.

Commenting on their own contributions to climate change, respondents cited a broadly similar range of sources:

Driving to school (school student).

Playing my computer (school student).

Use of car, good living, e.g. electricity (university student).

These comments were also coded, and the results are shown in Table 4. As found in other research, using cars was the most frequently cited contribution that respondents felt they made to climate change, references to aerosols and CFCs were again minimal.[45]

**Table 4.** Personal contributions to climate change.

| Response | Mentioned (%) |
| --- | --- |
| Traffic | 33.5 |
| Burning fossil fuel | 25.8 |
| Using electricity | 12.2 |
| Try to avoid | 8.2 |
| Consumption | 6.0 |
| Way of life | 5.0 |
| Waste | 4.4 |
| CFCs and aerosols | 2.2 |
| Not sure | 2.2 |
| Pollution | 0.5 |
| Total | 100.0 |

The production and use of energy was seen as a potential community or individual cause of the climate change problem, although the connection between climate change and energy was less well established than the connection with car use. Although respondents in Newcastle did not identify domestic energy use as the prime cause of emissions of greenhouse gases, they did connect the issue to local processes and individual activities. This suggests that confusion over the facts of the issue do not indicate a lack of understanding of the causes of climate change.

Interestingly, for some respondents, the climate change problem was one to which general consumption—everything, their whole way of life and their community—was seen to contribute even just through 'existing' (Tables 3 and 4), and respondents expressed concern at the possibility that they might be damaging the environment:

I avoid it as much as possible, but I mean I still have to get around the place, usually by a motorized vehicle! (school student).

Of course, I live in the world so it is bound to help (school student).

My existence contributes—driving a car, clearing land to own a home (parent).

Most likely there is something that I don't stop and think about (parent).

When discussing the causes of the climate change problem in one of the focus groups, the theme that it was intimately connected to modern life was re-iterated:

HB (moderator): What was written down, does someone want to start?[46]

C: Humans.

HB (moderator): You said Humans, did anyone else write down humans. . .

Z: Yes.

S: Yes, I did too. . .

HB (moderator): What did you mean by Humans?

C: I don't know, like everything. . . vehicle pollution.

Ch: Using electrical goods, burning rubbish. . .

B: The modern lifestyle.

R: Yeah, like. . .

B: The whole lifestyle, using cars and. . .

R: Convenience goods.

*Merewether High School, Year 11, November 1996*

For the members of this focus group, and for some survey respondents, there appeared to be no one particular cause of climate change, and certainly not one that they would communicate only through describing the physical processes involved. Instead, the climate change problem was linked to their communities and lifestyles, placing their own experiences and knowledges as central in their understanding of what the problem actually was. Confusion, doubt, and a degree of illiteracy concerning climate change science did not prevent focus group participants from locating this global issue in their backyard:

HB (moderator): Is there anything that you think happens around Newcastle?

L: All the cars. . .

M: Car pollution.

J: Then there's BHP.

D: There's a lot on Kooragang island, it's all industrial. . . basically all the coal is pretty much there.

*Merewether High School, Year 10a, November 1996*

R: I think, well, if you look in Australia in a particular area, like if you look at industry it would be really bad, then you look at another area then it would be different. Like Newcastle isn't just one big industrial site.

HB (moderator): What do you think?

V: Yeah, I think the cars and industry.

Ch: I think people should take responsibility. . .

R: I think that people use things for convenience. . . an easier way to do something, like the car to get to somewhere, or. . . (laugh). . . just the difference between roll-on deodorant and spray-on deodorant, it's that kind of thing for me. So, you know, it's just what they feel more comfortable with.

*Merewether High School, Year 11, November 1996*

For some respondents and participants, the causes of climate change risk were not known in terms familiar to the expert communities through which such issues are usually defined. Instead, they articulated a more holistic understanding of the climate change problem and in particular its base within the everyday practices of life in Newcastle. While this is not to argue that all of those involved in the research project construct the issue of climate change in this way, it is to suggest that focusing on what people know about climate change science may lead to misconceptions of public understandings of the causes of global problems.

However, experiences and local knowledges do not replace the scientifically mediated second-hand non-experience that Beck argues forms the basis for public understanding of risk.[47] Rather, the two co-exist as people struggle to negotiate a sense of meaning from

global environmental issues.[48] Although respondents indicated in the survey that they were indifferent (34.8 percent) or positive (38.2 percent) about the information they received, they invested little trust in the institutions who provided them with most information—the media, friends and family—while suggesting that the information that they most trusted came from the authoritative knowledge institutions—education and science. These findings concerning the relations people described with expert knowledges should not be read as signaling an unreflective acceptance and trust of these institutions.[49] Participants in the focus groups described the complex ways in which they dealt with expert knowledge about climate change:

HB (moderator): What do you think about the information you hear about greenhouse?

R: There's so many theories...

B: Lots of ideas, but some overlap, you hear the same sort of points here and there and you believe that kind of stuff...

Ch: Some of the government and industries, like even if... they can work out that there is a problem, and because it might cost them the dollars they...

R: Cover it up.

*Merewether High School, Year 11, November 1996*

HB (moderator): What do you think of the stuff that you hear, do you think it is reliable?

E: I pretty much take it for granted because they say, like, scientists have discovered this or that... so you kind of...

M: You can't believe the news...

L: A lot of the news is exaggerated, sensationalized, ... well they do with most other things, so you think then maybe they do it with environmental issues too.

E: But then you believe the scientists because they're involved too, and they know so much more than you, so you can't really dispute it.

L: Yeah.

D: Yeah, because they have like interviews with the scientists and... they don't just say show a picture...

L: Sometimes they have the environmental groups and sometimes you just think, maybe they're slightly changing the facts to get their point across because they want everyone to believe them.

*Merewether High School, Year 10(a), November 1996*

Despite the inadequacies, uncertainties, and bias prevalent in the information they received about climate change, participants recognized their dependence on expert knowledge for their realization of climate change risks. A lack of expressed doubt about received climate change information and the knowledge institutions of society should not be taken as signaling a lack of reflection.[50] Instead, it suggests that reflection is not a result of increasing cognizance of scientifically delimited, physical risk, but encompasses social issues, such as dependency and trust in expert institutions, which comprise public understandings of risk. In order to negotiate a sense of meaning from global environmental issues, focus group participants drew on expert analysis and their own knowledges and beliefs:

HB: [You] pick out the common sort of facts and... try and decide...

Ch: I think you can tell something but...

B: Yeah that's right, unless we're studying it we can't know for sure, obviously. You've just got to pick and choose what you want to believe, depending how you feel.

O: I really don't think that the normal person, like a normal person who watches the news every now and again, reads the occasional newspaper, I really don't think that they have got any reliable source of information. Because... I mean the news, the media, the public media is basically just propaganda... (laughter) no, no, just listen... then we've got the radical news, as everyone was saying, from Greenpeace and stuff, so it's pretty difficult to just basically get the facts and evaluate them.

HB (moderator): Well, what do you think, do you think there's an alternative resource of information people could use?

B: Education—it's the only reliable source.

Ch: If you want to find out what it is, *it's not going to tell you what to decide...*
            *Merewether High School, Year 11, November 1996 (emphasis added)*

G: It's usually really biased they have scientists... they don't have real scientific people, they have people at extremes...

HB (moderator): Some people think that makes it hard to make decisions.

G: I don't decide just because some scientists say...

HB (moderator): So how do you decide which side you believe?

G: I guess it's just personal belief, *you believe what you want to...*

Sa: I would just try and weigh up, you know, not just rely on one source, but try and find out information from a variety of sources and then... try and find what they have in common, and what the overlaps are. Yeah, because there is so much confusion...

C: The overlap is the stuff that you are more likely to believe because it is coming from so many different areas that it sounds like that bit must be true because everyone is saying it.
            *Merewether High School, Year 10a, November 1996 (emphasis added)*

In each group the struggle between whom and what to believe is readily apparent. A struggle that leads participants to suggest that climate change knowledge is not simply a matter of accepting facts, but of belief.[51] Believing in climate change risks and assigning responsibilities for addressing them is a process in which local knowledges, values, and scientific information are simultaneously used to create legitimate understandings. In these understandings, not only are the physical risks ascribed to climate change given credence, but also the relations between nature and society, experts and the public, which such risks encode, are made central.[52] An analysis of what people know about the physical processes surrounding climate change is not sufficient to explain how they relate to the issue, and place it in their day to day lives. A full examination of public understandings of climate change demands recognition of the values, morals and responsibilities that are voiced in relation to society and nature.

## 4. Taking responsibility

The vast majority of survey respondents (79.5 percent) felt that something should be done about climate change, findings echoed in surveys conducted by such diverse organizations as the Australian Coal Association and Greenpeace Australia.[53] In offering reasons why action should be taken ahead of scientific certainty, or why Australia should take steps ahead of the international community, respondents articulated concerns for future generations and for the non-human world:

> Of course, do we want the world to be overheated for the next generation? (school student).

> People should do something about the greenhouse because the world would be polluted and nature will die (school student).

> We have to think of the future of our children (parent).

> Something should be done now before it is too late (university student).

A range of institutions and people—from the local community to business and government—were seen as having a role to play in reducing greenhouse gas emissions. In general, respondents were also positive about the roles individuals could, and should, play in addressing environmental issues in general, and climate change in particular. Over two-thirds of respondents (68.4 percent) felt that even in the face of ineffective or irresponsible action towards the environment on the part of governments and industry, the individual should still take responsibility for the environment. On the specific issue of climate change, 55 percent of respondents disagreed that there was nothing the individual could do to about the issue.

Approximately 21 percent of those surveyed indicated that they had reduced their use of energy over the past five years for environmental reasons, though these actions were also often justified in terms of saving resources and their economic sense. Although pro-environmental behavior was seen as socially acceptable and morally sanctioned, these actions were also justified by a range of other goals that individuals could satisfy. When asked to indicate whether they felt they could take action to address climate change, the majority of respondents (51 percent) suggested that they could while a significant minority (21 percent) felt unable to either think of or do anything. Although sometimes slightly confused, respondents listed actions the individual could undertake at a number of scales, from their own consumer decisions (such as recycling, reducing energy used in the home, using renewable energy, and driving less), to trying to effect change at the community level and to lobbying government to take action on their behalf. However, there was significant comment about whether personal actions, which by and large were seen to address minor sources of greenhouse gas emissions, could contribute to the alleviation of a global problem. Some respondents felt that such individual actions could have a significant effect on ameliorating the climate change problem:

> Everyone can help by doing simple things like recycling and car pooling (school student).

> On an individual level all people can do something, even if only voting for the politicians who want to do address the issues (university student).

while the majority questioned the efficacy of such individual actions:

> This wouldn't be much good unless a majority followed suit. There doesn't seem to be much that the individual can do (school student).

I am sure many people would be able to think of things but only a small percentage would actually bother doing them because they think that such a small effort won't help (school student).

I can't personally close large industry! (university student).

Focus group participants also raised the problem of the efficacy of individual actions, and their discussions echoed the complexity of the issues described above. On one hand the individual was seen to have a responsibility for morally sanctioned pro-environmental behavior, while on the other hand, such actions remained isolated from any community or institutional context. The effect of such actions was seen as marginal:

HB (moderator): Do you think it is really up to people do something about greenhouse if they want to?

E: I think it... if we all do things they turn out to have an effect, I mean, where as if like, I don't know but everyone just can't believe oh, if I do something it's not going to work...

J: Yeah that it's not going to make a difference.

D: If you do, you feel like morally you sort of save yourself, you know, I've done my bit, I have made my contribution, I feel happy in myself that I did something good...

E: And if everyone thought that then we'd all do it...

HB (moderator): Do you think that people in your community do feel, sort of morally, that they should do something?

D: Probably not, I do, I do myself but like, I don't know...

E: They don't think about it a lot.

D: I know a lot of my mates don't think that way...

E: You don't think about it until it's brought up, until you're actually involved in something. Like this, I haven't thought about this for a while and then it comes up.
*Merewether High School, Year 10b, November 1997*

C: I don't think we really know much about what we could do to industry to make it cleaner, for the environment all the pollution and all the stuff that gets belched out, so that's the stuff we don't really know about.

B: We don't sort of have any control over industry, because it is all left up to government to do...

Sa: It has to change though, everybody has something they can do. Like, 'cause, the government can't say, you must recycle that's just ridiculous, that's up to the individual, but then with the industry governments really have to intervene there.

C: I was just going to say, I think that everybody needs to be made aware before anything can really happen, I think that the government has a big responsibility to tell people, so that people know.

HB (moderator): What do you think, do you think that if people were aware they would do something?

B: I don't know, I'm not sure. I am more pessimistic I think it depends how expensive
it is, if people are aware it helps but still it depends on. . . I think everyone is selfish,
if it hurts them they won't.

ST: I think it depends on the person, what sort of person you are.

*Merewether High School, Year 10a, November 1996*

These extracts indicate that the extent to which individuals see themselves as able to
address their moral responsibilities for the environment is conditional on a range of institutional
factors over which they have little or no control. This conclusion lends support to other research
findings in Europe.[54] For example, Harrison et al., found that in Nottingham and Eindhoven
"less than 10 percent of the samples. . . thought that individual actions like. . . reducing
household energy consumption, or reducing the use of the car were likely to be effective
ways of tackling. . . major global and local environmental problems."[55] Similarly, Macnaghten
and Jacobs found in research undertaken in Lancashire that while "many people felt that it was
'up to them' to change and improve their world" most also argued "that they could only create
change at a very local level through individual action."[56] Far from being a problem only of a
lack of information, the gap between public understanding and action about climate change is
created by a range of institutional factors, including the perceived efficacy of people's actions
in the face of global issues.

One attempt at plugging this gap and "getting dollars out of people's pockets,"[57] has been
made by an energy distribution company, EnergyAustralia. In 1996 they ran a pilot scheme
in Newcastle, called 'Pure Energy,' where consumers could pay more for energy produced
from sustainable sources. It enables consumers to choose the amount of energy supplied from
renewable sources, and charges a premium for doing so. For example, if renewables formed
a quarter of the energy supplied to the householder, the extra cost would be A$12 over three
months, or A$1 a week. What is more, the revenue raised from the scheme is fed back into
the development of further renewable power sources.[58] The scheme was initially driven by
the need to comply with new legislation in New South Wales, which requires that distributors
reduce emissions of greenhouse gases, and has proved a runaway success:[59]

HB: So, how are you finding the trial of green power going in Newcastle?

EA: We have got over 400 people signed up now, out of a market of 50 000, and that
is in response to a single mail-out. That is approaching one percent of the market out
of a single piece of direct mail—that's probably remarkable by any standards in terms
of a direct mail response. I think last week was the first week we got no calls about
it, and that is since August, so that is a very strong persistence. . . So it seems that
it is something that has got a very strong resonance in people's minds. . . primarily it
seems that that personal reaction has been a very strong driver. People want to do
something.

*EnergyAustralia, Interview, December 1996*

Pure Energy is offered to customers as their personal greenhouse response, suggesting to
people that they "can make a difference." [60] An EnergyAustralia representative explained the
rationale behind the scheme:

It's energy, which. . . produces no greenhouse gases in its generation and you can use
it in your own home and therefore your use of energy is not contributing. Particularly
in the environment that we're in, with. . . a sense that people that are concerned about
the issue don't see much being done. . . a couple of years ago, almost everyone [told]
you that they are concerned about the greenhouse effect, and then if you follow(ed)

it up with, well what should we do about it, they would say, well, the government should do more, it's a government problem and they should fix it, and in the meantime we will continue to drive our motorcars and use our electricity in a profligate way and not recognize that that's actually the problem.... Starting a couple of years ago there was a shift to, well the government doesn't seem to be doing a lot and if there was a possibility for me to do something I'd be interested. I would be willing to pay some more money, or do something, you know, people who separate their garbage for recycling, it is a cost factor on their time. People are willing to do it because, they don't get any direct benefit out of it, but they see that longer-range benefit...that is for our future, for our children and for the rest of the planet and [say] I will take some costs now because I think I should do that. So we are looking for a whole range of possibilities to tap that market, and in hard commercial terms that is what we are doing, looking for ways to get dollars out of people's pockets.

*EnergyAustralia, Interview, December 1996*

The idea has been a success, not just for EnergyAustralia but throughout New South Wales. Similar initiatives have been launched by rival companies, so that green energy of one kind or another is now available statewide, and there has been a parallel increase in investment in renewable energy sources and increased interest in renewables from local and state governments.[61] This suggests that once institutional structures are in place, some people (consumers) are willing to act in accordance with their stated values. The problem appears to be not one of knowledge, but of belief in the efficacy of action and of trust in the willingness of other actors, in particular government and industry, to take their share of the responsibility.[62] Although green energy schemes have effectively given individuals the sense of participation in a shared effort, whether such initiatives can foster renewed trust in governments and industry to act to reduce emissions of greenhouse gases is debatable. Indeed, by encouraging community responses, governments and industry can shift the burden of responsibility to concerned individuals. Moreover, such schemes rely on the ability of people to pay for their environmental concerns, effectively excluding those who can not afford to express their beliefs in the market place. Without attention to the other kinds of institutional barriers that mediate the relation between people and energy use—including, for example, land use patterns, housing stock choice, landlord/tenant arrangements, capital outlay for energy efficiency—further action on the part of the public to reduce emissions of greenhouse gases seems unlikely. Some initiatives, such as the Energy Smart homes project in New South Wales, are beginning to address these types of problem, though it remains to be seen how much progress can be made through such piecemeal efforts.[63]

## 5. Conclusion

Across the Australian climate change policy network there is concern that public ignorance and illiteracy about global environmental issues is leading to misinformed views, apathy, ill-considered calls for government action, and little change in personal behavior. This view of the relations between public knowledge, values, and action accords with what has been described as an information deficit model: Ignorance about climate change is preventing appropriate public action. In order to create public support for government policies, and individual behavioral change, more information concerning the correct understanding of the problem must be given to the public. Previous research findings have tended to support this model, emphasizing the extent of public confusion about the physical processes of climate change and arguing for better information so that the public becomes familiar with scientific discourses concerning the

issue. This paper has emphasized that such confusion should not, necessarily, be interpreted as representing misunderstanding of the issue, but a different understanding of it in which the discrete characteristics of different, scientifically defined, issues are seen as part of the same problem—the relationship between society and the (global) environment. Rather then being an isolated concern, climate change is seen as emblematic of the nature of environmental problems: the relations between society and nature, experts and the public, and local and global communities.[64] Through conceiving public interpretations of global environmental issues as illiterate and ill-informed, policy and research communities may misunderstand public concerns. There is a need, therefore, to move from a narrow conception of public knowledge towards recognition of the complex, fluid, and contradictory nature of public understanding of global environmental issues.

Research findings from Newcastle suggest that confusion over the facts of climate change does not prevent people linking the problem to causes within their daily lives. In Newcastle, public understandings of global environmental risks involve local knowledges, personal values, and scientific information. In these understandings both the social relations surrounding the issue and the physical risks of climate change are important. Despite the scientific uncertainty and claims and counter-claims that have surrounded the issue of climate change, survey respondents and focus group participants continued to place faith in science and education as the most reliable sources of climate change information. This was not done without reflection. Participants expressed doubt and skepticism about the climate change knowledge that they received, but recognized their dependence on expertise. In order to negotiate an understanding of global environmental issues within these constraints, they drew on other sources of (moral) authority to decide what was good, right, and believable. These included senses of responsibility for the global environment and future generations, which people were prepared to act upon despite a perceived lack of efficacy. Actions were considered worthwhile because of their internal legitimacy and morality, and the other environmental/economic ends they could achieve such as saving resources and money, despite their inefficacy in addressing major sources of greenhouse gas emissions. These, in turn, were seen as controlled by the system of governments and industry over which people had next to no control and with which they had little engagement.[65]

Given these conclusions, it is clear that attempts to involve the public in decision-making about the global environment that focus solely on the provision of information in order to effect behavioral change are likely to meet with little success. Rather, as the example of renewable energy initiatives in New South Wales illustrated, it is changes to institutionalized networks of social and economic relations that can enable individuals to act to mitigate global environmental problems. However, without further action from the institutions that manage the vast majority of greenhouse gas emissions, such initiatives are likely to be seen as futile, if worthy, attempts to address the problem and could serve to effectively privatize responses to the actions of few concerned, well-off, individuals. In order to effect greater public involvement in emissions reductions, other institutional barriers will have to be addressed, such as provision of capital for energy efficiency and land use patterns, through processes which recognize public understanding of the issues at hand. Instead of regarding communication about global environmental issues as a one-way flow of information needed to fill a void in public knowledge, these findings suggest that attempts to enable such institutional change will gain from taking public understanding of the issue, and the social relations it embodies, into account.

Public participation in the environmental policy process is no panacea.[66] It is, however, an important means through which to consider how local and global agendas can be addressed simultaneously.

**Acknowledgments**

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25 K. Burningham and M. O'Brien, "Global environmental values and local contexts of action, *Sociology*," 28 no. 4 (1994): 913–932; Blake (1999) outlines the psychological approach that underpins this perspective (in "Overcoming the 'value-action gap' in environmental policy: tensions between national policy and local experience," pp. 264–265). He argues that while the social and institutional dimensions of public understandings of environmental issues are increasingly considered within this genre, he suggests that it remains largely focused on how individual views are formed and held, rather than offering any perspective on how (social) institutions enable and constrain action.

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35  In quotes from focus groups each line starts with the initial of the respondent's first name, HB (moderator) represents the author.

36  Dunlap, " Lay perceptions of global risk: public views of global warming in cross-national context."

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38  *The Sydney Morning Herald*, 26.11.97, "PM out of step on greenhouse," *SMH*, Sydney. This is less than the 56 percent recorded by Environment Protection Agency, NSW in *Who cares about the environment? A benchmark survey of the environmental knowledge, skills, attitudes and behaviour of the people of NSW* (Sydney, Environment Protection Agency, Prepared by Keys Young, 1994).

39  Thompson *et al.*, "Risk and Governance Part 1: the discourses of climate change," pp. 152–3.

40  Blake, "Overcoming the 'value-action gap' in environmental policy: tensions between national policy and local experience;" Burgess *et al.*, "Environmental communication and the cultural politics of environmental citizenship;" Macnaghten *et al.*, "Public identification with sustainable development: investigating cultural barriers to participation."

41  Some respondents immediately answered this question as if 'contribute' were a positive act. Read *et al.*, "What do people know about climate change? 2. survey studies of educated laypeople," also found this type of response, which they interpret as a lack of public understanding of the question. However, a more sensitive analysis might conclude that such a question provokes a feeling that respondents should be doing something.

42  The BHP steelworks dominates the industrial skyline of Newcastle and has been a mainstay of the economy over the past century. It is set to close by 2000.

43  Read *et al.*, "What do people know about climate change? 2. survey studies of educated laypeople;" Greenpeace, Interview May 1996; Henderson-Sellers, "Australian public perception of the Greenhouse issue;" *The Sydney Morning Herald*.

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46  When discussion was slow participants were encouraged to write ideas down on cards and then discuss them.

47  Beck, *Risk Society: towards a new modernity*.

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50  Wynne "May the sheep safely graze? A reflexive view of the expert-lay knowledge divide," p. 50.

51  Beck, *Risk Society; towards a new modernity*, p. 28.

52  Macnaghten *et al., Public perceptions and sustain-ability in Lancashire*;" Wynne, "May the sheep safely graze? A reflexive view of the expert-lay knowledge divide."

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55  Harrison *et al.*, "Rationalizing environmental responsibilities: a comparison of lay public in the UK and the Netherlands," p. 225.

56  Macnaghten *et al.*, "Public identification with sustainable development: investigating cultural barriers to participation," p. 16.

57  EnergyAustralia, Interview, December 1996.

58  EnergyAustralia, 8.8.96, Pure Energy option a national first, media release, Sydney, EnergyAustralia.

59  *Electricity Supply Act* (Sydney, NSW Government, 1995a); *Energy Services Corporations Act* No. 95 (Sydney, NSW Government, 1995b).

60  EnergyAustralia, 1996, Pure Energy, publicity material (Sydney: EnergyAustralia).

61  Green energy is currently a tiny proportion of the total energy market, however the rate of investment in renewable energy has been rapid and public uptake of such schemes enthusiastic.

62  Bulkeley, *Valuing the Global Environment: publics, politics and participation*.

63  Environs Australia, Interview, December 1996; 1999, http://www.peg.apc.org/?councilnet/mea.html.

64  Hajer, *The politics of environmental discourse: ecological modernization and the policy process*.

65  Hinchliffe, "Locating risk: energy use, the 'ideal' home and the non-ideal world."

66  Blake, "Overcoming the 'value-action gap' in environmental policy: tensions between national policy and local experience;" B. Hayward, "The greening of participatory democracy: a reconsideration of theory," *Environmental Politics*, 4 no. 4 (1995): 215–236.

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