Climate change discourses in use by the UK public: commonalities and variations over a fifteen year period

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ABSTRACT

The ways in which climate change is understood by members of the UK public, are considered across a fifteen year period spanning 1997-2011. Qualitative datasets from six separate projects are analysed to trace commonalities and variation over time in the conceptualisation of climate change as a physical, social and personal phenomenon. Ways of understanding are presented as a series of discourses. These relate to people's appraisal of climate science, the apprehension of climate change through informal evidence, and how climate is seen in relation to natural systems; as well as the means by which climate change is contextualised to social systems, to cultural and historical conditions, and with respect to daily life. Climate discourses across all domains are found to be relatively stable over time, though with subtle shifts in meaning and emphasis. Emergent trends include recent evidence of climate 'fatigue' and an increased tendency to question the anthropogenic component to climate change, but also the view that action on climate change has become normalised in recent years. Survey data are also used to explore the prevalence of identified ways of understanding, and to examine longitudinal changes in these. There is some evidence of decline in climate change concern and increase in scepticism over the past decade, though these trends are not pronounced. Cold weather events from 2009/2010 are interpreted by people as evidence of the veracity of climate change (more so than as disconfirming it). Cultural worldviews are found to underlie perceptions.

Findings are interpreted in the context of cultural theoretical and discursive frameworks. These present the opportunity to explain the recurrent, patterned and socially-shared nature of public perspectives, and the ways in which these are used both to understand climate change and to account for the actions of oneself and others.

The development of combined secondary and longitudinal qualitative analytic techniques is a central methodological concern of the thesis. The advantages and drawbacks, practicalities, and epistemological considerations of such an approach, are outlined in detail.

Table of contents

List of Figures

List of Tables

CHAPTER 1 INTRODUCTION

Climate change is a phenomenon extending into many areas of people's lives, now and in the future. Its effects will reach people directly such as through increased weather extremes, or indirectly such as via policies implemented to mitigate carbon emissions.

Public understanding of climate change is relevant, firstly, due to the onus which has been placed upon individuals to reduce their carbon footprints. Whilst a single individual's carbon emissions are negligible, collectively they are highly significant. In the UK, direct emissions alone – those from household energy use and personal transport – equate to around 42% of the country's total emissions (DTI, 2007); furthermore, consumption activities constitute significant additional impacts, especially where the UK's status as a net importer of carbon-intensive goods is considered (Jackson et al., 2007). The UK government has set a target of 80% reduction in greenhouse gas emissions from 1990 levels by 2050 (with a 34% target by 2020), formalised in the legally binding Climate Change Act 2008. Short of an unprecedented leap forward in low-carbon technology, it will be impossible for reductions of this order to occur without individual engagement in carbon reduction.

Whilst some researchers have argued that there are many barriers impeding such engagement (Lorenzoni et al., 2007a) nevertheless perceptions of climate change are important precursors to behaviour change (cf. Swim et al., 2010) especially in a political context where responsibility is located at the level of the individual (Malpass et al., 2007). For some people, a strong sense of personal responsibility acts as an imperative to action in the private and societal sphere (Dobson, 2003; Wolf, 2011) for example through attending to the carbon impact of everyday activities (Howell, 2011). Others though are less convinced – even resentful – about the emphasis upon individual involvement in tackling climate change (Platt and Retallack, 2009). Consequently, public perspectives on climate-significant behaviour – including in the context of how it is seen to relate to social structures and relationships – are an important component of the research focus of the thesis.

Another facet of public engagement is political: without public support for policies to address climate change, governments are unlikely to act, indeed are argued not to have done so in part from fear of electoral retaliation (Compston and Bailey, 2008). Climate change is thus a collective and societal problem, and will require citizens' political participation (or at least consent) for attempts to mitigate and adapt (Crompton, 2010). Judgements of acceptability of energy policies

may be determined by psychological factors (Steg et al., 2005), and support or opposition to renewable energy policy to be related to public perceptions about climate change (Devine-Wright, 2005). Many authors have also argued for a more participative democracy framework – wherein the public are treated as stakeholders – to inform climate governance (Bulkeley and Mol, 2003; Moser and Stein, 2010).

In a related way, decisions about what constitute unacceptable risks from climate change cannot be determined by climate science alone, and must be settled instead by socio-political processes (Lorenzoni et al., 2005). A case in point concerns the 'danger' posed by climate change. Although what constitutes dangerous climate change is essential to understand (Schneider, 2001)[1], defining this nevertheless requires a recognition of social and individual perceptions (Dessai et al., 2004): indeed, the Intergovernmental Panel on Climate Change (IPCC) has affirmed that what constitutes dangerous climate change is a value judgment beyond its remit (Watson et al., 2001).

In light of these considerations, public perspectives on how society should (or should not) respond to climate change are therefore an important component of the thesis.

A further reason why it is important to understand public perspectives, is to contribute to the design of communication about climate change. Pidgeon and Fischoff (2011) have argued that without insights as to the public's pre-existing beliefs, communication about the complexities of climate science have little chance of success; indeed, if poorly structured may even backfire.

A so-called 'deficit model' which presumes people to be uncritical recipients of factual information provided by experts has by now been shown to be limiting and counter-productive (Wynne, 1991; Irwin, 1995). Burgess and Harrison (1998) have argued that in the environmental domain, more inclusionary styles of communication are therefore needed in which the public's perspectives are valued, rather than simply seen as something to be shaped instrumentally (see also Irwin and Wynne, 1996). For the potential afforded to contribute to effective climate communication, a grasp of public understanding of climate change is therefore considered an important research focus for this thesis.

[1] The United Nations Framework Convention on Climate Change (UNFCCC), states its objective in Article 2 as being the "stabilisation of greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system". (This wording cited in Dessai et al., 2004.)

Public understanding of climate change: time sensitive research

A central impetus for the present work is the recognition that public perspectives on climate change are not static. Survey findings from the UK and elsewhere point to several trends in public perceptions in recent years. For example, there was a rise in awareness about climate change approaching the turn of the century; however, this has been accompanied by a more recent diminishing of concern (Pidgeon, 2010). It has been suggested that recent 'sceptical' trends may be associated with societal phenomena such as politicisation and the rising prominence of vocal climate sceptics (Pidgeon, 2010) and psychological processes such as cognitive dissonance and assimilation bias (Whitmarsh, 2011).

Understanding a temporal component to public understanding is important, because salient (mis)perceptions can alter over time: Bostrom and colleagues found that over a 15 year period in the USA, the previously commonplace conflation of climate change with stratospheric ozone depletion had almost vanished; by contrast, whilst many participants correctly cited energy use as a cause of climate change there had also been a rise in emphasis upon natural processes as a cause (Bostrom et al., 1994; Reynolds et al., 2010). However, aside from a small amount of work, mostly drawing on polling and/or survey data, attention to a temporal dimension to public understanding of climate change is almost entirely absent in the literature. In addition, whilst previous studies have revealed changes over time in some key measures, underlying stabilities or variation in the complex ways in which people understand climate change are yet to be understood. We may know, for example, that there has been a quadrupling in the period 2005-10 in the number of people in the UK who do *not* think the world's climate is changing (Spence et al., 2010) but it remains unclear why this change has occurred. In the case of Bostrom et al.'s work, it is reasonable to surmise that reduced association of climate change with ozone depletion has been due to a fading of the latter as a pertinent concern (indeed, younger people may not even be aware of it). However, why would people refer more frequently to natural causation, when the scientific consensus has solidified that anthropogenic causes are real and significant?

Original contributions of the thesis

The thesis aims to make an original contribution to knowledge, through drawing conclusions about the temporal dimension of public understanding of climate change over a fifteen year period. The analysis of a series of time-sensitive qualitative datasets aims to afford new insights

into how public understanding has developed – and, as importantly, remained consistent – in recent years.

A methodological contribution of the thesis, is the development of a novel approach for analysis of changes in public understanding over time. This methodology incorporates both (i) secondary, and (ii) longitudinal, qualitative analysis. Such an approach is original: few, if any, studies have used such a combined approach previously, and none in the field of public understanding of climate change.

As part of the methodology employed, the thesis will identify modes of public understanding of the personal, social and scientific aspects of climate change using a discourse analytic approach. A discursive methodology has itself has been little used in the public perceptions of climate change literature – the construction of findings in these terms is therefore considered to constitute an important contribution in itself. This is intended to build upon previous studies through the derivation of new scope and detail.

The objectives of the qualitative methodology employed in the thesis are as follows:

a) to integrate data from multiple projects, via secondary analysis, to enable the identification of discourses which are over-arching and commonplace; that is, which occur across two or more different research projects;

b) to compare data from multiple projects, to enable the detection of changes in discourses over time.

Alongside several secondary datasets from previous time periods, the thesis also employs primary qualitative data gathering (focus groups carried out in 2010) which is designed to contribute to these objectives. A contribution of this primary research is to appraise public understanding at a significant moment in time: following the much-publicised UN Climate Change Conference in Copenhagen during December 2009 at which "the stakes were uniquely high" for climate negotiations (Dimitrov, 2010) and also following the anomalously cold winter of 2009 (Seager et al., 2010) which some have argued may have affected public perceptions (Poortinga et al., 2011; Joireman et al., 2010).

Following the analysis of these qualitative data, the next phase of the research then makes use of quantitative survey methods, to further analyse longitudinal components of public understanding. The objective of this work is to detect change over time in measures of public perceptions; this will include the re-use of measures from previous studies, which have not hitherto been replicated.

Drawing on both repeated and novel survey items, conclusions will also be drawn concerning the relative salience of characteristic ways of understanding climate change at one particular time point (early 2011).

The thesis aims finally to integrate the qualitative and quantitative research to draw conclusions about the characteristics of public understanding of climate change, and the ways in which these have remained stable or altered over time.

Research questions

The overarching research question for the thesis is: **How has public understanding of climate change altered, and how has it shown continuity, over the period 1997-2011?**

The two component parts to this question are:

- Which commonplace ways of understanding climate change exist across unrelated research projects (i.e. how are perceptions stable over time)?
- Which trends, variations or differences in ways of understanding climate change, are identifiable by comparison across research projects (i.e. how have perceptions changed over time)?

For the purposes of carrying out analyses, the main research question is divided into three separate domains; from this, three domain-specific questions are derived:

- How is climate change understood as a *physical* phenomenon, and what changes and continuity are observed in this over time?
- How is climate change understood as a *social and societal* phenomenon, and what changes and continuity are observed in this over time?
- How is climate change understood as a *personal* phenomenon, and what changes and continuity are observed in this over time?

Finally, constructs derived from the qualitative analyses, and the most recent data obtained (survey data from 2011), are used to answer the following research question:

- At the present time (2011), how widely-held are the main ways of understanding climate change, as identified across the 1997-2010 period?

CHAPTER 2 SCIENTIFIC AND SOCIAL CONTEXTS

This chapter briefly introduces climate change as a scientific concept, outlining the historical contexts and current status of climate science.

I consider subsequently the relevance of the social sciences for climate change research, particularly in terms of the value of investigating public understanding.

2.1 Natural scientific contexts

The science of climate change

This thesis is concerned with the ways in which climate change is understood by non-expert individuals. As such, the study's concerns are not with climate science *per se*. Nevertheless, it is useful to outline some historical and scientific contexts that foreshadow the importance placed upon climate change at the present time.

Historical contexts

The science of climate change can be traced to pioneers such as Jean-Baptiste Fourier, John Tyndall and Svante Arrhenius in the nineteenth century (Uppenbrink, 1996; Edwards, 2001; Hulme, 2009) who were interested in how atmospheric carbon dioxide (CO_2) gave rise to a 'greenhouse effect', and in explaining ice ages. It was not until the mid-twentieth century, however, that seminal work by Charles David Keeling showed that *anthropogenic* CO_2 was accumulating in the atmosphere in an exponential manner (the so-called 'Keeling Curve'). This work was to prove highly influential in providing impetus to the practice of climate science (Andresen and Agrawala, 2002; Nisbet, 2007).

The Intergovernmental Panel on Climate Change (IPCC)

It is now almost a quarter of a century since, in 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC) in response to growing international concern

about human influence upon the global climate. From its inception, the IPCC has been required to "walk the tightrope" of being scientifically rigorous and yet politically acceptable (Agrawala, 1998:621). In the intervening period, climate change has become among the most important, complicated, contested, and controversial phenomena facing the world today.

The IPCC is seen by many (including the 2007 Nobel Prize committee) as the foremost authority on climate science (Kerr and Kintisch, 2007; Bray, 2010; Tonn, 2007), as pivotal in demonstrating a scientific consensus at least about the basic matter of human impact upon climate (Oreskes, 2004), and as having influenced publications across a wide range of disciplines (Vasileiadou et al., 2011). This is not to say that the findings or the processes of the IPCC are uncontroversial: Yearley (2009) for example has drawn attention to institutional biases (such as the dominance of key disciplines), problems with its peer review process (lack of suitable peer reviewers outside the IPCC) and the arguments made by other critics who argue dependency on research funding drives the nature of reporting. As Hulme (2009:98) notes, experts have also resigned from the IPCC because they disagreed with consensus statements.

The IPCC itself does not tend to talk of 'consensus'[2], instead utilising a standardised set of terms for expressing levels of 'likelihood' of outcomes and 'confidence' in the science. For example, a 'virtually certain' outcome is considered one with an over 99% probability of occurrence; 'very high confidence' refers to at least a 9 out of 10 chance of a piece of underlying science being correct. A wide diversity of scientific claims and future projections are subject to expert appraisals in this manner. Examples include the assertion that there is 'very high confidence' that human activities have led to globalised warming; that the rate of increase in greenhouse gases during the industrial era are 'very likely' (>90%) to have been unprecedented in more than 10,000 years; and that it is 'very likely' that human activity has contributed to sea level rises (IPCC, 2007). As to the impacts of these changes (and many others), the IPCC judges with 'very high confidence' that recent warming is strongly affecting terrestrial biological systems (such as bird migration); with 'high confidence' (8 in 10 chance) that by 2020 between 75 and 250 million people in Africa will be exposed to increased water stress due to climate change; and with 'high confidence' that human health risks due to heatwaves and wildfires will increase. Many other potential impacts, together with levels of likelihood, are appraised in the IPCC's Fourth Assessment Report (IPCC, 2077).

[2] The term is used only once in the summaries for policy makers, in respect of a technical point relating to dynamic ice flow processes – and here to assert a lack of consensus.

Studies of consensus among scientists

Given the complexity of climate science, there remain many areas of controversy and disagreement. In recent years a number of studies have however attempted to clarify at least the degree of consensus among (climate) scientists on some basic matters. The drivers of these studies are not always stated explicitly, however are likely connected with the ferocity with which critics of climate science have attacked it (Nerlich, 2010) and the persistence of media portrayals of doubt about an anthropogenic component to climate change (Kuha, 2009; Boykoff and Boykoff, 2004). For the present thesis, these studies are also useful to review for a perspective on the prevailing areas of consensus (and dissensus) in climate science.

In a qualitative study of 928 abstracts of refereed articles from 1993 to 2003, Oreskes (2004) attempted to ascertain the extent to which the literature supported the IPCC's "consensus position" (her term) that human activities were responsible for the majority of observed warming over the last 50 years: Oreskes found that 75% of these papers either explicitly or implicitly endorsed this position, with all of the remaining 25% expressing no position, for example being concerned with methods or paleoclimate. She concluded that "remarkably, none of the papers disagreed with the consensus position" (Oreskes, 2004:1686).

Other studies have also gauged the degree of consensus among scientists through reviewing publications. Anderegg et al. (2010) analysed a database of 900 climate researchers and their publications. These authors argued that up to 98% of the researchers most actively publishing "support the tenets of anthropogenic climate change outlined by the IPCC" (Anderegg et al., 2010:12107), and that researchers who were unconvinced by anthropogenic climate change had lower levels of expertise[3]. Again, the focus of this work was around affirmation or dissent about whether climate change had a significant anthropogenic component.

Direct surveys of (climate) scientists have also been carried out. Doran and Zimmerman (2009) asked scientists with varying involvement with climate science to respond to two questions; one concerning whether global temperatures had risen, fallen or not changed since pre-industrial levels, the second asking whether 'human activity is a significant contributing factor in changing mean global temperatures'. They found that 97.4% of the most actively involved climatologists (75 of 77 researchers) answered in the affirmative to the second question.

[3] Whilst this work does suggest that researchers with most expertise are most supportive of the IPCC position, a criticism of circularity can be directed: a criterion for being an 'expert' was contributorship to the IPCC.

More detailed survey work has been undertaken by Bray (2010) and Bray and von Storch (2010). These researchers used an extensive range of questions and utilised 7-point Likert-type scales (rather than yes/no answers) to ascertain scientists' views. This work reveals that in many areas, the nuances of scientific consensus about climate change are less clear-cut. Although Bray (2010) found that around 85% of both IPCC and non-IPCC climate researchers are convinced that most recent and near-future climate change can be attributed to human activity, the proportions expressing absolute certainty (i.e. at the 'strongly agree' end of the scale) were less than 50%. As to the threat from climate change, 35% of respondents gave the strongest response ('very much') to the question "How convinced are you that climate change poses a very serious and dangerous threat to humanity?", and a further 28% were at the 6-point mark (less than 10% were below the mid-point).

As to whether IPCC reports constituted 'consensus', a key finding of Bray's (2010) work was also that, on many matters, dissensus was more likely to be related to the view that the IPCC was seen as *underestimating* the impacts of climatic events. For example, around a third of respondents claimed the IPCC underestimates impacts from sea-level rise and extreme events, with smaller minorities claiming the IPCC *overestimates* such impacts.

From wider climate science debates to a reasonable thesis position

What can be asserted with confidence from the work of the IPCC and the various studies of scientific opinion, is that there are in fact very high levels of agreement that human activity has contributed, and will continue to contribute, to global climate change. It is clear also that an extensive range of consequences are projected, many of these representing major threats.

I adopt the convention in this thesis, therefore, that human influences upon the climate are significant and potentially dangerous. Legitimate controversy exists still as to the speed, severity and implications of climate change – but the basic reality and importance of an anthropogenic component is not among them.

2.2 Social and cultural contexts of climate change

Climate change as a social construct

Whilst natural scientific work is central to climate change as a contemporary concern, the case has now been made by a number of authors that the notions of climate and climate change are also fundamentally social constructions. This is to say, the very idea of 'climate change' is mediated through social experience and does not simply arise from an empirical reading of objective reality (Jones, 2002; Pettenger, 2007). As Onuf (2007:xiii) suggests, that the complex phenomenon of climate change is even able to be reduced to simple and powerful rhetoric, belies its being a social construction and not simply a value-neutral collection of facts. Hulme (2009:14) too makes the case that climate change has an inescapable social dimension: "[a]s well as describing a physical reality, climate… can also be understood as an imaginative idea – an idea constructed and endowed with meaning and value through cultural practice"; Yusoff and Gabrys (2011) also consider the place of 'imagination' in constructing ideas about climate (change), drawing on arts and literature sources to do so.

Pettenger (2007:241) argues that because climate is often seen as being part of nature, then how nature itself is understood is central to perceptions of climate change. She argues indeed that climate change is unlikely to be effectively addressed until humans radically change their socially-constructed understandings of nature. Others have argued that climate change should be seen in the context of the immorality or profligacy of contemporary society (Wilk, 2009:265; Urry, 2010).

By contrast, Stehr and von Storch (1995) suggest that it is the time-scales of climate variation which have substantial influence upon the character of climate change as a social construct. They suggest that in most societies' histories, short-term changes (i.e. climate variations and weather events within an annual cycle) have been highly significant. As a consequence, they contend, contemporary society has come to be biased in attending to weather extremes as signals of climate change, whilst disregarding longer-term weather patterns.

Paterson and Stripple (2007) note that despite much rhetoric about climate change being a global phenomenon, it has in fact tended to be understood in terms of the interests of individual nation states and economies (i.e. whether action or inaction will be to a nation's benefit or not). Various forms of policy rhetoric permeate debates around climate change, such as 'ecological modernisation' – a reliance on market mechanisms – and 'civic environmentalism' – that holds that radical reform of industrial societies is required (Backstrand and Lovbrand, 2007).

Climate change may be understood in emotive ways – as 'catastrophic', 'chaotic' or 'urgent' (Risbey, 2008), in terms of a quasi-religious disaster entailing "doom, death, judgements, heaven and hell" (Hulme, 2008:11), or as a recurrence of cultural ideas about the end of nature (Yearley, 2006). It may by contrast be seen to be grounded in the more ostensibly everyday, such as modern expectations of comfort like air conditioning and home heating (Shove et al., 2008; Wilhite, 2009).

The case has now been made for an anthropology of climate change (Crate and Nuttall, 2009; Henning, 2005), a sociology of climate change (Lever-Tracy, 2008) and a psychology of climate change (Gifford, 2008; Swim et al., 2011) – indicating the capacity for climate change to be seen comprehensively from a number of disciplinary standpoints.

The implications of the different means by which climate change is construed has recently been asserted in a *Nature Climate Change* commentary. Hulme (2011:178) points out that the heavy bias to date on climate change's interpretation via the natural sciences, with the social sciences (bar economics) seen as secondary, "matters profoundly" because this influences the framing of what the climate change 'problem' is and how it is to be 'solved':

> As a result of the IPCC's heavy lean on natural sciences and economics, the dominant tropes in climate policy discussions have become 'improving climate predictions' and 'creating new economic policy instruments'; not 'learning from the myths of indigenous cultures' or 're-thinking the values of consumption'.

Disciplinary approaches to understanding climate change: relevance for the present thesis

The examples above illustrate that climate change is able to be understood in a wide variety of ways. The emphasis of the thesis is upon *public* understanding of climate change; as such, ideas from across the social sciences will provide important insights into the character of public understandings and the wider contexts in which they are situated. In essence this study aims to be an inter-disciplinary one: a diverse range of sources will be used to inform its approaches and findings.

The thesis will consider a range of ways of conceptualising climate change – for example, from the view that climate change is a scientific question, to the idea that it has now become a personal and behavioural phenomenon.

A structure for outlining the dominant means by which climate change is understood, will be derived in part from the literature review concerning public understanding. The ways in which

participants themselves portray climate change will then be used to draw conclusions about what are the nature and components of public discourses, and how these have varied over time.

CHAPTER 3 LITERATURE REVIEW

The literature review is divided along several lines – methodological, conceptual/theoretical, and disciplinary – for the purposes of outlining previous research findings and approaches relevant to the thesis.

I begin with an overview of survey research and opinion polling relating to levels of awareness and beliefs about climate change, including how these have changed over time (section 3.1). I then turn to key qualitative research which has been carried out into public understanding of climate change over the past two decades (section 3.2).

Sections 3.3 reviews some central ideas and approaches arising from the discursive and social representations research traditions, especially as have been applied to climate change. Implications from these studies for the research approach of the present study are considered.

Section 3.4 reviews risk perception work examining people's perspectives on climate change and other environmental issues. I particularly emphasise work from the 'cultural theory' tradition which sees individual risk perceptions in terms of underlying worldviews. In section 3.5 I consider some sociological and anthropological approaches relevant to the present study. Research concerning climate scepticism and 'barriers' to engagement is reviewed in section 3.6.

Finally, in section 3.7 I draw together conclusions from the literature review, and use these to propose the research questions of the thesis.

3.1 Awareness of and knowledge about climate change

Basic awareness of climate change

For the past decade or so, levels of awareness of climate change in the UK have been very high: recent surveys by DEFRA (DEFRA, 2002; DEFRA, 2007) found that 99% of people had heard of 'climate change' and/or 'global warming'. Awareness of the specific term 'climate change' also increased over the 2002-7 period: the earlier DEFRA survey found 78% of people had heard of 'climate change', rising to 99% by 2007. Similarly, Gallup (2011) found that by 2010, 97% of UK respondents said they knew 'something' or 'a great deal' about climate change.

Beyond this high level of basic awareness, however, there is much variation in how much people report knowing. Whilst 61% say they know either 'a lot' (16%) or 'a fair amount' (45%) about climate change, over a third (38%) say they know little or nothing (DEFRA, 2007). Figures for levels of self-reported knowledge have in the past been slightly higher for equivalent questions asked of 'global warming', reflecting the research finding that terminology is important in gauging awareness and knowledge (Whitmarsh, 2009a).

Belief in reality and anthropogenic causation of climate change

Whilst basic awareness may have increased in recent years, nevertheless the perceptions that climate change is a phenomenon occurring at the present time, and furthermore one caused by human actions, have decreased since the middle part of the last decade.

The proportion of people who 'personally think that the world's climate is changing' dropped, from 91% in 2005 to 78% in 2010 (Poortinga et al., 2006; Spence et al., 2010). Whilst the decline in those affirming this view is from a very high 91% in 2005, nevertheless the number of people answering 'no' to this question has almost quadrupled, from 4% in 2005 to 15% in 2010.

Some evidence also points towards a parallel decline in acceptance of an anthropogenic component. Polling by Downing and Ballantyne/MORI (2007) found that 46% of respondents believed climate change to be mainly caused by humans, 9% that it was mainly natural, and 41% that it was a mix of both. More recent research however by Spence et al. (2010) found that only 31% now believed climate change to be mainly/entirely caused by human activity; 18% felt it to be mainly/entirely caused by natural processes; with around half (47%) believing it partly caused by both. Whilst the 2002/6 and 2010 surveys did not use completely equivalent questions, these data nevertheless point to a significant movement over time towards seeing climate change more as a 'natural' phenomenon – with around twice as many people affirming a view that climate change is 'natural' over a five year period[4].

Such a shift in public perceptions may be seen as paradoxical, given the growing consensus of climate science on these matters (IPCC, 2007). One explanation advanced is the idea of uncertainty 'transfer' between different conceptual domains (Spence et al., 2011a). This entails

[4] It should be noted that the matter of whether climate change is natural or human caused is also sensitive to question wording. Other survey research has suggested that a majority of the UK public do accept that climate change is human-caused, or at least has a relevant human component. For example, polling by the BBC/World Public Opinion (WPO) (2007) found 78% of UK respondents agreed that 'human activity is a significant cause' of climate change.

more legitimate uncertainty (e.g. climate impacts over long timeframes) becoming conflated in people's minds with that which is in actuality more certain; however, the evidence for this – especially in terms of a process unfolding over time – is at present somewhat speculative (e.g. Spence et al. argue for uncertainty transfer based on correlations between uncertainty types at one time point). Equally, explanations offered for declining concern in terms of contemporary events – especially with respect to recent scientific controversies and cold weather events (Griggs and Kestin, 2011; Perkins, 2010) – whilst plausible-seeming, have yet to receive empirical support (a partial exception for the so-called 'Climategate' controversy in the USA is Leiserowitz et al., 2010).

Beliefs and knowledge about causes of climate change

In the UK, levels of knowledge and acceptance of specific anthropogenic influences are found to vary according to whether people are prompted via a list of possible causes. As Upham et al. (2009) discuss, when prompted, most people can identify deforestation and CO_2 emissions as contributors. DEFRA (2002) for example found that most respondents identified CO_2 emissions (71%), emissions from transport (65%) and emissions from power stations (56%) as causes of climate change, where these were presented as possibilities.

However, when *not* prompted with possible causes, understanding appears lower – or at least of a different character. Whitmarsh (2009a) found that the most common response to the question 'What do you think causes climate change/global warming?' related to the general idea of 'pollution' (23% of respondents) with a further 15% citing causes relating to ozone depletion. Around 10% of respondents gave responses relating to other human causes (e.g. factory emissions, fossil fuel consumption) with only 6% citing carbon dioxide or carbon emissions[5].

As Whitmarsh (2009a) notes, the high numbers of people citing pollution and ozone depletion points to conflation of climate change with other environmental issues. However, whilst this study finds 1 in 7 people consider ozone depletion to cause climate change, it should be noted that the data for this study were gathered in 2003; an association is likely to have declined since this time (as Reynolds et al., 2010, have demonstrated in the USA). Nevertheless, in the UK, Giorgi et al. (2009) have suggested that among individuals less interested in climate change, such a conflation still persists.

[5] Although other responses which are not necessarily incorrect, included blame of other people/ countries, ethically-oriented responses (e.g. overuse of resources), and 'greenhouse gases'.

However understood, acceptance of a human component to climate change is important – not least as a precondition for accepting the necessity of action on climate change. Empirical research shows that accurate knowledge about the causes of climate change is an important predictor of behavioural intentions as well as support for climate policy measures (Bord et al., 2000; O'Connor et al., 1999).

Despite the findings of these studies, the effects of knowledge – of a self-reported variety at least – are nevertheless not always clear-cut: Kellstedt et al. (2008) have reported that those who were more 'informed' felt *less* personally responsible and had *lower* levels of concern about climate change[6].

Beliefs and knowledge about impacts of climate change

A number of studies have noted that the impacts most associated by people with climate change, relate to weather-related phenomena. Especially among British respondents, the most frequently mentioned associations[7] appear to be with weather (e.g. changed rainfall patterns), seasonal change, and increasing temperatures (Lorenzoni et al., 2006). Similarly, where asked directly about impacts ('What impacts, if any, do you think climate change may have?') Whitmarsh (2009a) found that over 60% of responses referred to what she termed 'generic impacts' (for example, temperature increase, sea-level rise or changes to weather) rather than local or human-specific impacts. Survey work by DEFRA (2002) also found that weather-related phenomena were strongly associated with the impacts of climate change.

It is hard to draw conclusions about whether people's views on the impacts of climate change have altered over time – given that directly comparable questions about impacts do not appear to have been asked at different time periods – however it is of note that there was a drop in levels of agreement between 2005 and 2010 in the UK concerning climate change being perceived as a risk to people. Whereas in 2005, 77% of respondents agreed (28% of these strongly) that 'there are risks to people in Britain from climate change' by 2010 this had dropped to 66% agreement (19% of these strongly agreeing) (Poortinga et al., 2006; Spence et al., 2010). This decline may be

[6] This study has however been criticised by Roser-Renouf and Nisbet (2008) on the basis of the self-report measure used.

[7] in response to the survey question "which three things, if any, come to your mind when you hear the phrase 'climate change'"?

connected to the overall decline in acceptance of the veracity of climate change, but nevertheless points to the issue also being seen as less of an immediate concern over this time period.

Importance of climate change as an environmental and social concern

There do appear to have been changes over time with respect to levels of general concern about climate change – though even here comparisons are difficult to make due to different question wordings in use.

In the mid-1990's, levels of concern (measured by whether people were 'worried' about climate change) stood at around 35% (DETR, 1997) this rising to a level of 80% by 2002 (combined totals of people either 'very' or 'fairly' worried) (DEFRA, 2002). Levels of concern remained substantial until very recently: in 2010 over two-thirds (71%) reported being either 'very concerned' (28%) or 'fairly concerned' (43%) about climate change; only 8% said they are not at all concerned (Spence et al., 2010). Some evidence does however point to a decline in concern over the past few years. Whilst in the UK in 2008, the proportions considering climate change to be 'very serious' or 'somewhat serious' were 56% and 28% respectively, these had moved to 40% and 35% by 2010, according to the Pew Research Center (2010), representing a steady decline over this period.

Equally, by the measure of whether climate change is considered to be among the most serious problems facing the world, research has pointed to a decline over the period 2007-2009, in parallel with an increase in importance placed upon the global economic downturn (Eurobarometer, 2009). Eurobarometer noted that whilst in the early part of 2008 three-quarters of EU respondents (75%) considered climate change to be a 'very serious problem' this had declined to 63% by the second part of 2009. That this occurred during the financial crash of 2008, may be equated with the 'finite pool of worry' hypothesis: Weber (2010) has argued that because people have only limited capacity for worry, the greater concern about other issues such as the worldwide recessions which took hold in late 2008, effectively replaced concern about environmental issues (see also section 3.4 on risk perceptions).

Nevertheless – and perhaps counter to this idea, given that Western economic problems persist – some of the most recent data available at the time of writing (Eurobarometer, 2011; fieldwork June 2011) has found that concern has rebounded from these levels. In 2011, 68% again saw climate change as 'very serious'. Furthermore, by a separate measure, around half of Europeans (51%) considered climate change to be among the world's most serious problems (up from 47% in 2009) with 20% of respondents seeing it as the single most serious problem facing the world (up from

17% in 2009) – indeed, more people considered climate change to be the single most serious global problem than did 'the economic situation' (20% versus 16%). In the UK, 18% are reported to see climate change as the single most serious international issue; and 44% as being among the most serious.

It is worth stressing that climate change, by this recent data, is still considered more important than a global economic downturn, international terrorism, armed conflicts, increasing world population and the proliferation of nuclear weapons (Eurobarometer, 2011; 2009). Only 'poverty, lack of food and drinking water' is considered more often to be the most serious problem facing the world today.

Despite the suggestion therefore that concern about climate change is waning (Weber and Stern, 2011) it may be more accurate to say that it is subject to *fluctuation* over time – and to note that even relative to other critical issues it is still seen as important. Also, as Upham et al. (2009:30) have noted, it is important not to rely on measures of public concern at any one time, as this may reflect immediate responses to topical news or recent experience. Certainly the tendency for measures of public concern to vary – whether in line with particular events or more unsystematically – points towards a need for greater research attention to longer-term trends and durability in public understanding, as in the present thesis.

Beliefs concerning lifestyle change and government action

Whilst over two-thirds (69%) of UK respondents agree that (in general terms) we should 'protect the environment even if it slows growth and costs jobs' (Pew, 2010) where acting to address climate change is contextualised in a personal way, findings are somewhat different. This same survey finds that in the UK, people are evenly split on willingness to pay: 50% agree that 'people should be willing to pay higher prices in order to address global climate change' versus 46% who disagree. Longitudinal data for these items are limited, but the 50% agreement obtained in 2010 for the personal willingness measure, was slightly lower than Pew's figure of 53% obtained in 2009.

Other research too has attempted to gauge people's perceptions on the need for societal and personal action, with relatively recent data suggesting that support for action on climate change remains widespread. The BBC/WPO (2007) found that over two-thirds (70%) of people were of the opinion that 'it is necessary to take major steps starting very soon' to tackle climate change,

with a further 25% saying that 'it is necessary to take modest steps over the coming years'[8]. Again, support declines somewhat where such 'steps' are contextualised at the personal level, although most BBC/WPO respondents still supported higher energy taxes and acknowledged the need for lifestyle and behaviour change.

Influence of sociodemographic factors

Consistent findings in respect of sociodemographic factors include that men report being more aware of both causes and impacts of climate change; self-reported knowledge also tends to vary with social grade (Upham et al., 2009; DEFRA, 2007). Other consistent findings are that women tend to be more worried about climate change and environmental issues in general (Eurobarometer, 2009; Barnett and Breakwell, 2001; McCright, 2010). Conversely, men are (slightly) more likely to express the opinion that the seriousness of climate change has been exaggerated (Eurobarometer, 2009); in the UK men also score more highly on a multi-dimensional scepticism scale, with those in older and younger age brackets also being less concerned about climate change (Whitmarsh, 2011).

Overall, however, it is important not to overstate many of these sociodemographic characteristics: as DEFRA (2007:3) points out in summary to their extensive UK study of attitudes and behaviour across a range of environmental domains including climate change: "there were no really marked differences in attitudes towards the environment between different sex, age, and social groups".

Clearer findings are obtained in respect of political ideology. Pronounced associations between political affiliation and views about climate change are found in the UK (Whitmarsh, 2011), across Europe (Eurobarometer, 2009) and the USA (Dunlap and McCright, 2008): those with right-of-centre (conservative) views are more sceptical and less concerned about climate change, than those with left-of-centre views.

Some revealing work on the relationship between political affiliation and climate change beliefs over time, has been conducted by Dunlap and McCright (2008) based on tracking data from the polling company Gallup. These authors have shown that there has been a widening gap between the perceptions of Democrats and Republicans on the issue of climate change since the late 1990's.

[8] The full survey item asked "As you may know there is some discussion these days about whether it is necessary to take steps to reduce the impact of human activities that are thought to cause global warming or climate change. Would you say that you believe that…"

Republicans have at all stages of polling reported lower levels of belief that climate change has already begun, seen the scientific consensus as weaker, and considered climate change to be less of a threat within their lifetime and more likely to be caused by natural processes. However, it is the growing *difference* between these two constituencies which is particularly noticeable. Whilst in 2001 70% of Democrats and 53% of Republicans believed climate change to be more due to human activities than natural changes; the respective figures by 2008 had widened to 72% and 40%; this pattern is repeated for all types of perceptions measured.

In explaining these trends, Dunlap and McCright (2008) have suggested that in the USA, climate change has become an increasingly partisan issue and that voters have largely followed the respective cues of elite voices and activists affiliated with their party. Whilst there is not at the present time evidence to suggest that a similar political polarising process has occurred in the UK, the Dunlap and McCright research may be taken to suggest that divergent narratives of climate change can exert a powerful influence upon people's climate change perceptions according to their worldviews.

Synthesis of findings from polling and survey data: implications for the present study

It is clear from over fifteen years of polling and survey work, that public perceptions of climate change have not remained static. Levels of awareness about climate change have risen since the early 1990's. However, contrary to the growing scientific consensus about both the veracity of and anthropogenic influence upon the climate, in recent years there has been a decline in public acceptance of these matters. Levels of concern and the relative importance ascribed to climate change have not followed a clear trend – upwards or downwards. This leaves open the question as to whether UK public attitudes in this domain have fluctuated within the bounds of natural variability (i.e. randomly or according to polling methods used), or whether particular circumstances have lead to these movements.

In the latter part of 2009 and early 2010 in particular, contemporary events may have affected people's perceptions: an unusually cold winter was accompanied by media stories casting doubt upon the conduct of climate science. However, whilst a number of authors have made possible (and plausible) connections between these events and public perceptions (e.g. Spence et al., 2011a; Schmidt, 2010; Perkins, 2010) there has been little or no empirical evidence to support direct linkages.

In line with the main research question of the thesis, quantitative survey data will be generated for the present study, to provide a dataset able to be compared to previously-administered surveys from 2002 and 2003, and to examine the possible influence of contemporary events. The replication of survey items (some of which have been administered only once previously) will permit longitudinal insights to be gained into the changing nature of public understanding up to the early part of 2011.

Qualitative data will also be used to consider whether there have been shifts in the ways in which climate change is conceptualised across the time period 1997-2010 – and in ways which may provide insights into the trends as identified above. It will be of interest, for example, to ascertain whether there has been a change in how climate change is understood as a natural or human-caused process, and how people have understood the status of climate science over this time period.

Whilst the survey data reviewed above points to a changing pattern of public perceptions of climate change, nevertheless for the most part these do not reveal the more in-depth nature of public understanding – including how climate change is contextualised to everyday life and society. The literature review therefore now turns to a range of qualitative research which has been carried out, with a view to identifying dominant research themes and clues as to their temporal dimension.

3.2 Qualitative studies (I): Thematic research

Within this part of the literature review, I consider qualitative research which has been carried out into public understanding of climate change. For the most part, these studies are from the UK, however I also review some influential work from Europe and the USA.

This section is restricted to what I have termed qualitative 'thematic' work – that is to say, research driven by the identification of key themes in public perceptions, rather than a particular analytic approach – though I acknowledge that the studies reviewed in fact span a variety of theoretical and disciplinary orientations. Other work which is particularly relevant to the discursive and social representations research tradition, will however be considered in section 3.3.

The studies reviewed below are considered in a broadly chronological manner – the objective being to trace change over time both in research objectives and the findings of studies.

Early work: appraisal of climate change knowledge

Some of the earliest work into public perceptions of climate change, was that by Kempton (1991, 1997) who conducted semi-structured interviews with members of the public in New Jersey, USA, to generate 'cultural models' considered to constitute "conceptual models of the fundamental ways in which the world works that are shared by most of the people in the culture" (Kempton, 1997:14).

Whilst it might be expected that such 'cultural' models would span matters such as social relations, nevertheless the narrower emphasis in this research was upon the integration of climate change perceptions with (seemingly) related environmental issues. Participants were argued to have related climate change to four prior concepts: ozone depletion, air pollution, plant photosynthesis (e.g. that deforestation reduced oxygen available to breathe), and seasonal/geographic temperature variation.

From these findings, it was concluded that public understanding was "seriously at variance with the scientific models of global warming" (Kempton, 1991:185); the research was furthermore one of the first studies in the public understanding literature to note that people tended to confuse weather with climate. This said, the research is limited for its knowledge deficit interpretation: Kempton's concern seems mainly to have been with whether climate change was accurately understood by people and to propose corrective measures to replace 'inappropriate' cultural models.

Other early work also compared members of the public's knowledge with experts' understanding. Bostrom et al. (1994; research carried out in 1992) similarly reported that public understanding of climate change "suffer[s] from several basic misconceptions" (Bostrom et al., 1994:968) and argued that explanations given by people of the physical mechanisms underlying climate change were "inconsistent and incomplete". 95% of participants confused climate change with stratospheric ozone depletion, and were largely unaware of the role of anthropogenic carbon dioxide as a cause of climate change. They also conflated weather with climate, including the view that the 'greenhouse effect' literally referred to a hot and steamy climate. Participants did however have a better understanding of the effects of climate change, which these authors noted were closer to expert understanding (e.g. around 90% mentioned temperature increases and changes to precipitation).

A follow-up study by these authors some 17 years later, found that in 2009 respondents to a survey showed increased comprehension of climate change causes (Reynolds et al., 2010).

Conflation with ozone depletion was rarely mentioned, and energy use was much more frequently cited as a cause of climate change. These respondents however also referred more often to natural and historical/geological processes underlying climate change. The authors therefore expressed concern that many people remain unaware that climate change is primarily due to increased concentrations of carbon dioxide in the atmosphere as a result of the burning of fossil fuels.

Work in the USA by Henry (2000) also identified several patterns in the way public visitors to the Smithsonian Institute talked about climate change. Again, a conflation with ozone depletion was identified, as well as an integration of ideas about pollution with the concepts of climate change. A tendency to interpret climate change via weather was also observed. In addition, it was found that some study participants were sceptical about climate change, because they considered human activity to be too insignificant to be influential. Comparable work carried out in Sweden at the end of the 1980's also found that participants confused ozone depletion with climate change and noted a lack of knowledge about climate change among research participants (Lofstedt, 1991).

In these early studies, there appears overall to have been an emphasis upon knowledge extent and accuracy. This emphasis perhaps reflects the time period, in terms of a research interest in how well people understood what was essentially a novel environmental phenomenon – but arguably is also revealing of an earlier science communication paradigm in which the detection and remedying of knowledge deficits were more of a concern than at the present time (Bauer et al., 2007). In this, therefore, the findings of these studies reflect their research paradigm as much as the character of public understanding at this time.

Early work: perceptions of environmental and societal dimensions

In contrast to this work, one of the earliest UK studies into the public's understanding considered the relationship between perceptions of climate change and other environmental issues – but also attended in some detail to societal and ethical dimensions.

As part of the Europe-wide ULYSSES project[9] (Darier et al., 1999a,b; Darier and Schule, 1999) focus groups were carried out in 1997-8 in the North of England. Research participants were reported to have a strong tendency to believe that the weather had already changed, especially that it had become more variable in recent years (Darier et al., 1999a). Even in these early focus groups, there were manifestations of scepticism: Darier et al. (1999a) indeed refer to 'scepticism' as one of

[9] short for **U**rban **L**ifest**Y**les, **S**u**S**tainability, and Integrated **E**nvironmental A**S**sessment

four identified responses to expert presentations on climate change, finding that participants referred to limitations of science practice – such as measurement errors, flawed predictions, and changing scientific opinion – as well as natural climatic variability.

Darier and Schule (1999) reported that UK participants were concerned about climate change, although did not discuss it as an isolated issue, seeing it instead in the context of related environmental problems. The researchers in addition drew attention to participants' interpretation of climate change in respect of moral and ethical issues, such as relating to global equity. Participants located 'blame' for climate change to industrialised countries; they were, however, pessimistic about the prospects for societal action. This was not least because of mistrust of political institutions and processes (in respect of which Darier et al., 1999b, again use the term 'scepticism'). In considering the place of individual responsibility in the wider context of climate change, Darier et al. (1999a,b) note that participants were often 'ambiguous' in their responses: whilst expressing concern in the abstract, in a pragmatic sense climate change was not seen as a pressing issue.

Research at around the same time by Bulkeley (2000) in Australia (fieldwork undertaken in 1996) also considered climate change in a more expansive manner than solely in terms of people's factual knowledge basis. Bulkeley argued that public understanding of global environmental issues (including climate change) drew not only on scientific information, but also ideas about moral responsibilities and local contexts. Whilst a conflation was again identified between ozone depletion and climate change, Bulkeley nevertheless suggested that confusion about the facts of climate change did not prevent people linking the problem with their everyday lives: people expressed a sense of responsibility for the global environment and for future generations, and stated a willingness to act on this, despite the sense that their efficacy was seen as constrained by economic, industry and governmental systems.

Climate change perceptions in 2000: variations and consistency by belief types

Some four years later, research carried out in the UK and Italy by Lorenzoni (2003; fieldwork undertaken in 2000) also drew attention to questions of personal and societal responsibility, as well as people's appraisal of climate science.

Lorenzoni convened homogenous focus groups, based on participants' belief types derived from a previously distributed survey: group membership depended on whether participants did/did not believe climate change to be important, and did/did not believe there to be an anthropogenic

component. Lorenzoni found that participants who neither believed climate change to be important nor in human causation ('denying' individuals) qualified their beliefs in the context of past events of a geological timeframe (e.g. previous ice ages), the uncontrollability of climate, doubts about the reliability of climate change information, and past scare-mongering (Lorenzoni, 2003:216-7). However, 'engaging' participants *also* expressed confusion regarding the validity of evidence for climate change and its human component (despite having been selected, in part, on the basis of survey measures of acceptance of anthropogenic contribution).

Despite some differences in perspectives by group, therefore, many underlying similarities in modes of interpretation were present. In all groups, climate change was understood in the context of scientific uncertainties and biases in information provision, with respect to personal experiences (e.g. the weather), in the context of other environmental issues, and with respect to the interaction between personal actions and structural conditions. Indeed, members of the public involved in Lorenzoni's research displayed similar perceptions not only across typologies, but also with the themes from previous studies, both within and beyond Europe. Whilst drawing attention to some of the (expected) differences between participant groups, Lorenzoni and Hulme (2009:390) argue, based on the 2000 empirical work that:

> All groups articulated their views using a variety of discourses and narratives, drawing upon their experience, beliefs, views and observations… Most… acknowledged a human contribution… most considered it an intractable problem… Climate change was perceived to be distant.

Climate change understanding as dissonance and denial

A different set of implications about public understanding, was derived from focus group work undertaken at around the same time as the above work by Stoll-Kleemann et al. (2001), and separately by Norgaard (2006a,b). These authors in different ways introduced the notion of 'denial' into the literature on climate change perceptions.

Norgaard (2006a,b) used ethnographic and interview data from fieldwork in Norway, to argue that lack of action on climate change was a function of 'socially-organised denial'. Norgaard's study included eight months of participant observation of inhabitants of a small town between 2000 and 2001: one of the few studies into public understanding of climate change that can be considered truly ethnographic.

Norgaard noted that conversations about climate change were rare, and where they did occur were characterised by awkwardness and uncomfortable emotions. She reported community members

expressing feelings of helplessness and guilt; one participant explicitly stated that "people want to protect themselves" in their response to climate change; another that they "don't allow themselves to think so far ahead" (Norgaard, 2006b:386). She argued that people used emotion management techniques to deal with fear and helplessness, such as by *deliberately choosing* not to think about climate change. It was suggested that whilst serving an immediate protective purpose, this nevertheless worked against achieving social change.

Stoll-Kleemann et al. (2001) also argued that denial was prevalent among members of the public, drawing on evidence from a series of Swiss focus groups. By contrast to Norgaard's 'sociology of denial', these researchers spoke of a 'psychology of denial' in which participants, it was argued, "found it too difficult to accept that any personal sacrifices would be worth the social gain", and referred to lack of government action as an "excuse" not to believe that individual change will be effective. Overall, Stoll-Kleemann et al. (2001:107) argued that participants "erected a series of psychological barriers to justify why they should not act".

Since this work was carried out, ideas about denial and cognitive dissonance have become widespread[10] and, arguably, part of the received wisdom about popular perceptions of climate change (cf. Washington and Cook, 2011). It is striking, however, the extent to which the studies of Stoll-Kleemann et al. and Norgaard contrast with the aforementioned qualitative research. Whilst all of the research carried out in this corpus of work dates from the early 1990's to the beginning of the 21st century, nevertheless very different conclusions are reached as to what is represented by the public's understanding of climate change. What could explain these differences?

First, it seems unlikely that the difference in research findings reflects a difference in time period: it is implausible to imagine that public understanding could have moved from a position of factual ignorance to denial in the space of only a few years. Second, it seems unlikely that the contrasts observed stem from cultural differences. Whilst there are undoubtedly distinctions to be made between North American perspectives on environmental issues and European ones, nevertheless these studies do not divide clearly along those lines.

Instead, it seems more reasonable to suggest that the dissimilar views of public understanding arrived at by these early researchers are reflective more of the different disciplinary and theoretical traditions from which the research was approached, than of underlying changes in the nature of public understanding. Such may be expected – however this complicates any attempt to draw

[10] The Stoll-Kleemann et al. (2001) paper has been cited over 100 times, commonly to assert the finding that 'denial' is a popular response to climate change.

general conclusions about how climate change was conceptualised at the particular time at which early research studies were conducted.

Climate change perceptions in 2002: risk and responsibility

A different approach again to conceptualising public understanding of climate change was used as part of a programme of research into risk issues and public engagement[11] during 2002 (Bickerstaff et al., 2006). The part of this research which considered climate change, drew on focus groups from four sites across the UK; these discussions were designed so that nuclear power and climate change were considered within each group, first separately and then together as risk issues.

In contrast with other risk issues considered, climate change was reported to be distinct on account of its being construed as spatially and temporally distant (Bickerstaff et al., 2006:12); in this way it contrasted with the perceived risks from the other issues (nuclear power, GM crops, mobile phone masts, human genetic testing).

As in the earlier research projects, however, the researchers found that views on scientific uncertainty permeated discussion of climate change. They also found that responding to climate change was discussed in terms of moral obligations and 'duty' – indeed these notions were found to be more apparent in the case of climate change than in any of the other risk cases. It was suggested that ideas of personal duty were articulations of an internalisation of political rhetoric which had been developing around behaviour change and personal responsibility (Bickerstaff et al., 2006:37); though it was also observed that participants tended to emphasise what people *ought* to be doing rather than what they *are* doing. In this, the research resonates with Darier et al.'s (1999a,b) earlier findings concerning normative versus pragmatic views on personal and collective responsibility.

Climate change perceptions and experience of flooding: data from 2003

Questions of responsibility for addressing climate change, were also a major focus of the research of Whitmarsh (2005); this study also considered the extent to which climate change was seen by

[11] Formally, the programme was titled "Understanding Risk: Public Perceptions, Trust in Institutions, and Stakeholder Participation in Public Policy".

people as a personal risk – including whether those who had experienced flooding interpreted this as a consequence of climate change.

Contrary to expectations, Whitmarsh found that climate change and flooding were seen as separate issues – even by flood victims, who were reported to be as sceptical as non-victims about the reality and causes of climate change. Nevertheless almost all interviewees referred to sensory evidence of climate change, such as perceived changes to rainfall and more extreme weather, and tended to conflate climate change with ozone depletion and other environmental problems; in this Whitmarsh's findings again reflect those of some of the earliest perceptions work by Kempton (1991) and Lofstedt (1991). As in Lorenzoni's (2003) work, Whitmarsh also found that many interviewees emphasised that the media – whilst being a primary source of information about climate change – was also considered to be 'alarmist', 'hysterical' and 'scaremongering' about the issue. Uncertainty about climate change (including with respect to perspectives on the science) was found to be commonplace.

With respect to climate-relevant behaviour, Whitmarsh's findings also echo those of previous studies. She found that participants asserted a moral obligation to act pro-environmentally, as well as reporting intrinsic satisfaction obtained from doing so. Whitmarsh (2009b) nevertheless drew out distinctions from her research between intent-orientation and impact-orientation of climate-relevant behaviours (i.e. those 'intended' to mitigate climate change versus those which more objectively could achieve this): it was argued that people tended to emphasise 'environmental' actions such as recycling, whereas actions more closely connected with personal energy consumption (e.g. driving or conservation of energy in the home) tended to be overlooked.

Understanding Risk: Climate change and energy choices in 2007

Some of the most recent public perceptions research in the UK, was undertaken in 2007 (cf. Butler and Pidgeon, 2009) – in part a continuation of the 2002 research comparing risk cases (Bickerstaff et al., 2006) as described above.

A key finding to emerge from a series of nine focus groups in which climate change was considered, was that behaviours related to climate change and energy use (such as leaving one's television on standby) had become located at the individual level and were now 'moralised'. Butler (2010) reported that moral judgements were made by participants within discussions, according to whether certain behaviours were performed or not. The notion of 'responsibilisation' (Rose, 1996) was considered to have manifested in the group discussions, whereby normative ideas about

individual responsibility (to act in a proper manner in respect of climate change) arose in the contexts of participants' own lives. Participants connected small actions such as recycling to wider questions such as acting to protect future generations. They also, however, struggled to reconcile this moral responsibility with the viewpoint that such actions had negligible impact in respect of the far wider (international and societal) problem of climate change. Participants were forced, Butler (2010:187) argues:

> to reconcile a depiction of the climate change issue as caused by individual decisions with experiences of living in an interconnected global world where practices are inter-related and where distinct individual responsibilities are in actuality murky and unclear

Further work arising from this research addressed the relevance for study participants of media reporting on climate change. Butler and Pidgeon (2009) argued that ongoing public uncertainty about climate change, including the view of its being a 'natural' process, had much to do with how climate change was depicted in the media. Focus group participants were found frequently to assert that the media was a source of knowledge for them about climate change, and where uncertainty was expressed this often was connected by participants themselves to the tendency of the media to present two 'sides' to the story (cf. Boykoff and Boykoff, 2004). Butler and Pidgeon suggest that this effect may have been particularly heightened at this time (mid-2007) following the broadcasting of a 'sceptic' documentary ('The Great Global Warming Swindle') which received widespread publicity.

Synthesis of findings from qualitative thematic work

Despite the different time periods, research objectives and methodologies, locations and participants, there are a striking number of similarities in the findings of the studies considered above.

A focus of many of the studies since the early 1990's, has been on the awareness and beliefs held by participants concerning the reality and causation of climate change. In earlier work there was a tendency for public perspectives to be seen in the context of climate change as an objective scientific issue – with public perspectives compared to those of experts. Subsequent studies, however, have also emphasised the means by which knowledge is situated in connection to wider concerns.

As well as reflecting a development of the research into public understanding of climate change, this shift in focus is also likely to be related to a wider move from 'information deficit' studies of public understanding of science towards more nuanced studies of experience and expertise (cf. Collins and Evans, 2002). The underlying sense from some of the earliest to the most recent studies, however, is that the public's perception that climate science is contested or uncertain has persisted over time.

The means by which climate change is conflated or integrated with other environmental issues has been a consistent theme. In particular, association between climate change and ozone depletion, air pollution and deforestation emerges repeatedly. Whilst it is likely that conflation with ozone depletion has diminished over time, nevertheless the overlap between climate change and other (perceived to be related) environmental phenomena is recurrent.

The extent to which climate change is considered a proximal and relevant personal concern also emerges repeatedly in the qualitative research literature. In general, studies have found that climate change is *not* seen as something relevant in space and time. Even where studies have investigated people's direct experience of flooding, climate change has not been viewed as causative or giving rise to personal action (cf. Whitmarsh, 2008)[12]. By contrast, climate change *is* perceived as immediate with respect to people's interpretation of it in terms of the weather.

Particularly in more recent studies, there has been an emphasis upon the role of individual behaviour and in understanding public perspectives on responsibility. This has been in terms both of 'actionable' responsibility (entailing obligations to act: Eden, 1993; Bickerstaff et al., 2008) and responsibility in terms of loci of 'blame' for the original problem of climate change. Some authors have argued in terms that appear to suggest that an awareness of a behavioural dimension is a more recent and/or dynamic process: for example, Butler (2010) talks of 'moralisation' of everyday behaviour, and Bickerstaff et al. (2008) of the 'internalisation' of political rhetoric by individuals – though such a change over time is not generally argued for explicitly or evidenced in the data themselves.

Interestingly, the notion that people may be sceptical about climate change receives attention even in earlier studies – in the UK, Darier et al. (1999a,b) refer with varying connotations to research participants being 'sceptical'. Even here then, it cannot be said from a review of qualitative work that public scepticism is an especially recent phenomenon. This is despite recent quantitative work

[12] Note however that more recent survey research provides some evidence to the contrary (Spence et al., 2011b).

which has emphasised scepticism as a growing and/or recent problem (Whitmarsh, 2011; Dunlap and McCright, 2008).

In summary, where attempting to draw conclusions about changes in public understanding over time from an overview of qualitative studies, substantial caution should be exercised. First, the variation in types of findings reported has much to do with the different research paradigms and objectives applied over time. Second, a shift in the manner in which public understanding of science research has been conducted may influence findings over time. Third, given that qualitative work for the most part is concerned with presentation of depth and richness of data, rather than attaching relative weight to one perspective or another, it is hard to infer how public understanding may have altered in any general sense. Fourth, the thematic similarities across studies, point to important overlaps in findings between research projects and over the past two decades.

It is in light of these difficulties in comparing studies through time, that the particular research approach used in the present thesis is adopted. Because it is highly problematic to draw conclusions about trends in public understanding of climate change based on the *reported* findings of qualitative studies, instead some of the original datasets themselves will be revisited and re-analysed as part of a qualitative longitudinal analysis. As will be explained in further detail in the Methodology chapter, data from five extant studies described above (cf. Darier et al., 1999a,b; Lorenzoni, 2003; Bickerstaff et al., 2006; Whitmarsh, 2005; Butler and Pidgeon, 2009) will be re-examined to inspect for change in public understanding over the period 1997-2007. This time period will also be extended to 2010 through the gathering of new primary data.

3.3 Qualitative studies (II): Discursive and Social Representations research

I now turn to a wider, interdisciplinary body of discursive and social representations work, which offers further insights into the ways in which climate change, and related environmental issues, have been conceptualised: in general terms; with respect to media portrayals and the language of communication; in the field of politics and activism; and lastly in terms of public understanding.

The work reviewed in this section is broadly considered to be 'discursive' – that is to say, is concerned with modes of interpretation which are situated and identifiable in language and talk. For the purposes of the literature review, I consider here also social representations research, although distinctions are made between this tradition and discourse analytic research.

The work which has been carried out within these research approaches is important to review here: firstly, because climate change discourses in wider society constitute a broad context for public discourses; and secondly, because a central part of the research carried out in the thesis draws on the theory and practice of discourse analysis. The use of a discourse analytic approach, as outlined below, is argued to be an appropriate and productive means by which the detail and complexities of public understanding can be identified, through a close inspection of the language and ideas which are used by people when discussing climate change.

The field of discourse studies is diverse and the research reviewed in this section reflects this. For the analyses in the present thesis, however, a narrower framework of theory and practice will be drawn upon. I argue for this specific approach towards the end of this section of the literature review, as well as presenting a definition of discourse appropriate to the present study.

Environmental discourses and language use

It is an important premise of the thesis that the ways in which language is used can shape people's perceptions of climate change. As Harre et al. (1999:ix) have argued:

> an understanding of environmental phenomena can be greatly enhanced by investigating the nature and uses of one of the main tools employed in exploring environmental matters. Language not only reflects and records but also shapes, distorts and even creates realities.

These authors have proposed that environmental narratives are identifiable across many domains: for example, environmentalist literature often draws upon a story of humanity which has succumbed to pride and excess leading to destruction of the natural world, with the planet as a consequence needing to be 'saved' from the harm being visited upon it.

Harre et al. also talk of the many metaphors applicable to nature and the environment, such as nature as a manifestation of the divine, the world as a machine,[13] or as a giant organism (especially in respect of Lovelock's 'Gaia hypothesis'). They argue that there is a continual conflict between metaphors setting humans apart from the environment and those seeing them as integral parts of the wider ecosystem. Narratives may draw on moral arguments asserting an obligation to protect the environment. They may also draw on the concepts of science, for example concerning balance and equilibrium in natural systems, and – particularly relevant in the case of climate change – projected harm from temperature increases.

[13] "first as a clock, then as a kind of steam engine and more recently as a computer" (Harre et al., 1999:93)

Climate discourses through history and in the present

Ideas of climate have been potent throughout human history and across cultures: climate and climate change are not twentieth century or even modern ideas. Hulme (2008:5) argues that climate has always had ambiguous meaning in human society, and is bound up with national identity (e.g. in the case of the UK: Golinski, 2007). Hulme argues furthermore that the contemporary association of climate change with fear (and apocalypse, catastrophe etc.) has in fact recurred throughout history.

O'Neill and Nicholson-Cole (2009) also note that fearful representations of climate change are widely used by the media, campaigning organisations, the government, and even in children's stories. Dorries (2010) too argues that 'discourses of fear' are used as calls to action, and to stress that climate change is a political and cultural issue; these are able to be traced, Dorries argues, to the "terrifying prospects" that science has to offer for the planet's future (Dorries, 2010:889).

The language of climate change

A series of recent studies have argued that climate change as a contemporary social issue, has now acquired a pertinent language of its own, which serves to frame debates about how to address it whilst simultaneously drawing on potent myths and metaphors.

Nerlich and Koteyko (2010) suggest that the imagery and language used in specialist financial circles have portrayed responses to climate change in capitalist and entrepreneurial terms. In a related study, Nerlich and Koteyko (2009) draw attention to the phrase 'carbon indulgence' as an example of linguistic creativity in climate change discourse – used to draw parallels between carbon offsetting and the notorious medieval practice of seeking absolution through purchasing redemption.

Nerlich (2010) also considers the attacks on climate science following the leaking of climate scientists' email correspondence in late 2009. The name itself attached to the event by many – 'Climategate' – was argued to convey the impression of wrongdoing, politicisation and cover-up. Nerlich found that commentators also used religious metaphors to undermine the credentials of climate scientists and climate campaigners, portraying them for example as 'fundamentalists', and an 'unchallengeable priesthood' that perpetuate a 'mind-bending cult'.

Climate change and media discourses

One of the areas where a large amount of research has been carried out into language use in respect of climate change, is that concerning media reporting. Whilst media discourses in themselves may be considered of limited relevance for understanding public perspectives, nevertheless it is likely that there may be parallels. In addition, as one of the main sources of information about climate change (Butler and Pidgeon, 2009) media representations are likely to influence public understanding.

Carvalho and Burgess (2005) have identified three distinct types of emphasis in media reporting over time (that they term 'circuits') in UK broadsheet newspapers between 1985 and 2003. In the early period (to 1988) these authors argue that the discursive construction of climate change emphasised the consensual and reliable character of climate science, but that it was only following Margaret Thatcher's influential speech to the Royal Society in 1988 that climate change began to be portrayed as a major risk for human security and to enter the domain of political reporting. This, they suggest, was then a trigger for ideological differences across different newspapers' reporting to come to the fore: a sceptical position was found to emerge in some newspapers, with others emphasising dangers and a political imperative for action.

Other discourse analytic work examining media portrayals of climate change has been carried out by Segnit and Ereaut (2008) and Ereaut and Segnit (2006). Whilst only attending to the change in discourse over a relatively short time period (2006-7), these authors argued nonetheless that "a year is a long time in climate change communications" (Segnit and Ereaut, 2008:6) and suggested that even over this period there had been a shift in the ways in which climate change was being talked and written about[14].

These authors argue that in newspaper reporting and more formal publications there has been a move away from dominant discourses of 'alarmism' as well as 'small actions' (small-scale domestic response to climate change) – towards what they term "a new common sense" which acknowledges the existence of anthropogenic climate change whilst simultaneously moderating the tone and rhetoric around discussion of the issue; Butler and Pidgeon (2009) also note that media reporting has moved closer to the consensus science position on climate change in recent years. Whilst still identifying "sceptical repertoires" in both the 2006 and 2007 work, Segnit and Ereaut (2008) nevertheless argue that these have become more marginalised.

[14] Segnit and Ereaut (2008) present media discourses in terms of linguistic repertoires: "loosely coherent lines of talking and thinking about climate change" (Segnit and Ereaut, 2008:4)

What these studies point to, is that portrayals of climate change in the media and other public forums have shown change over time. This is not to say, however, that straightforward trends can be detected: indeed, whereas Carvalho and Burgess (2005) suggest that media reporting of climate change tended increasingly to emphasise *lack* of consensus in climate science, more recently this trend would appear to have (partly) reversed.

Identifying connections between media reporting and public perceptions is problematic. As Boykoff and Roberts (2007) note, interactions between science, policy, media and the public are complex and dynamic: whilst the current state of climate science shapes media reporting, in turn media reporting and public concern shape climate science activities and policy. Nevertheless, Butler and Pidgeon (2009) noted that public research participants did often cite the media as sources of information about climate change: for example, climate change was frequently attributed to natural causes, with the media given as a source for this perspective. The portrayal by the media of opposing views was also found in participant's accounts to contribute to uncertainty about anthropogenic causation. This reflects further research on media reporting by Boykoff and Boykoff (2004), who have argued that journalistic norms of 'balance' (giving both 'sides' of a debate a hearing) in fact leads to bias in reporting: whilst the majority of scientists accept an anthropogenic contribution to climate change, the debate has nonetheless often been presented in more oppositional, dualistic terms.

Political discourses of climate change

Not only are mediated portrayals of climate change structured according to particular discourses, so too are the politics and policies of the environment (Hajer and Versteeg, 2005; Dryzek, 1997). Understanding language and the way in which it is used to construct meaning and justify political action in this area has therefore been a subject of attention by researchers (Feindt and Oels, 2005; Jordan and Gilbert, 1999).

According to Dryzek (1997) political discourses of the environment are either 'reformist' (adjusting but not fundamentally changing the status quo) or 'radical' (rejecting the very structures of modern industrial society). In the context of climate change, Kurz et al. (2010) have argued that political discourse has tended to be characterised by an 'ecological modernisation' agenda, whereby environmental demands are seen as compatible with unlimited economic growth and able to be addressed through technical solutions. In the national (Australian) context addressed by these

authors, 'solutions' to climate change were thus centred around the maintenance rather than changing of people's lifestyles.

One means by which there is a clear intersection between policy and public discourses, is in the area of sustainable consumption: conceptualising individual consumer choices as means of addressing environmental problems. Hobson (2002) has argued that in the UK a series of government campaigns (by different political parties) has promoted sustainable consumption at the personal level as a solution to climate change and other environmental issues. This, she argues, has occurred "as part of a prevailing ecological modernisation paradigm" (Hobson, 2002:96) which has persisted even through major upheavals in the UK political landscape[15]. The emphasis here, then, is on a *continuity* in the means by which climate change as a societal concern is portrayed in political discourse aimed at the public.

Public discourses of the environment and climate change

Whilst there is now a substantial body of work considering media and political discourses in respect of the environment and climate change, as well as more generalised discourses, there is a surprising lack of work that sets out to identify public discourses of climate change in themselves[16].

Discursive studies do exist into public perspectives on environmental issues and sustainability in a more general sense; though even here it is argued that discourse analysis and discursive psychological approaches are yet to be utilised much (Kurz et al., 2005). Kurz et al. (2005) have argued in the context of energy use, that discourses are nevertheless important to understand as they can impede sustainable practices. These researchers suggest that public discourses constitute 'linguistic resources' which are commonly known and able to be used or 'drawn upon' by individuals in a society, including to explain one's beliefs or actions. In the context of energy use,

[15] For example, the Conservative party in the early 1990's ran a campaign entitled *Helping the Earth begins at Home*, and in the late 1990's the Labour party ran a campaign called *Are you doing your bit?* which suggested that "a few changes in what you do at home, at work, when shopping or getting about, is all that you need to do".

[16] I make a distinction here between a research tradition which sees discourses as socially-shared sense-making devices situated in language and which people are able to "draw upon" (Kurz et al., 2005), and more general thematic analyses of participant talk: the latter type of study constitutes the majority of qualitative work to date.

for example, a commonplace discourse may be summarised in terms such as "energy is essentially replaceable" or "energy is used for the necessities of life" (Kurz et al., 2005:616).

Another study of public environmental discourses by Dickinson et al. (2010) considered the ways in which tourists justify transport choices (especially flying). These researchers argued that several discursive strategies – asserting that politics is to blame for preventing action on climate change, emphasising scientific doubts, or declaring limited knowledge – provided justifications for not taking action through changing travel behaviours. Dickinson et al. argue that people frequently assert limited agency in responding to climate change, and use "powerful discourses" that deny responsibility.

Although researchers such as Dickinson et al. have focussed on the means by which people use discourses to deflect responsibility or justify their actions, other research incorporates the notion that discourses may also be used to understand or interpret phenomena. In this vein, Zeyer and Roth (2009) present two core interpretative repertoires from their analyses of students' talk about the environment: a 'common sense repertoire' and an 'agential repertoire'. These authors suggest that in the 'common sense repertoire', direct experiences as well as 'folk' scientific facts, can be used to argue for particular truths. For example, the authors quote a student drawing on their personal experiences of extreme weather events and information obtained from the television, to arrive at a 'common sense' conclusion that there is a human component to climate change. The 'agential repertoire' by contrast emphasises the role of human agency in respect both of environmental harm and protection: ideas about blame, responsibility, and morality in action are incorporated here.

Whilst Zeyer and Roth's work is limited to an educational context (and indeed to 15-16 year old Swiss students), their analysis nevertheless offers insights into how the sorts of themes commonly identified in other qualitative work may cohere together as discourses which enable people to *make sense* of environmental issues, including climate change.

Myers (2007) has likewise argued that many of the ways in which people talk about risk issues, including in respect of environmental concerns, are revealed through 'commonplaces' in talk. These commonplaces are defined as "generally applicable and generally known arguments" (Myers, 2007:285) used to understand, explain and manage interaction[17]. Myers argues that commonplaces

[17] Myers states that: "Commonplaces use formulaic language. But they are not fixed expressions like idioms or proverbs; we cannot search for them using specific strings... They are recognised, not by specific words, but by the way the argument presented is taken in the next turn by other participants".

correspond in particular to matters of responsibility, agency, morality, and uncertainty. For example, in the context of responsibility he notes that people are concerned with the normative concerns of apportioning responsibility; especially, that one must take responsibility for others as well as oneself.

In an analysis of how focus group participants respond to environmental rhetoric in campaign literature, Myers and Macnaghten (1998) argued that these sorts of commonplaces were repeatedly made use of. Participants for example often drew on ideas of equity, such as to argue that if one country should have its activities restricted for reasons of sustainability, then this should apply equally to other countries. Similarly, Myers and Macnaghten (1998) point out that the (somewhat clichéd) campaigning argument that "we do not inherit the world from our ancestor, we borrow it from our children" is recognised as a 'posterity commonplace'.

Another study considering the linguistic construction of environmental issues, is that of Phillips (2000) who interviewed Danish couples about their perspectives on the environment. Phillips argued that people commonly use a 'discourse of everyday constraints' whereby daily life is understood as complex and impinged upon by factors such as time pressure and financial considerations – these, it is argued, can furthermore be used to justify and explain (lack of) political engagement and personal action.

As can be seen from the review of the studies above, ideas about personal and collective responsibility emerge repeatedly across findings concerning public discourses of climate change and environmental/sustainability issues. Bickerstaff et al. (2008:1313) indeed talk of the importance of "discourses of responsibility", including with respect to climate change. These authors suggest that climate change represents a complex problem of responsibility for people, as it is bound up with ideas about the *relationships* between personal and state responsibilities. Participants in their study accepted that individuals play a part in the causes of climate change, and viewed themselves as (morally responsible) citizens who were expected to behave pro-environmentally – and yet, they also asserted a lack of personal agency given the collective nature of the causes/solutions and constraints upon behaviour. Bickerstaff et al. suggested therefore that whilst moral discourses of personal responsibility were apparent in the case of climate change, participants also 'rhetorically directed' responsibility towards institutional actors (usually government) such as by affirming that government should enable and guide personal choices.

Social representations research

Social representations theory is a further area of enquiry which has been argued to offer substantial potential for understanding the way in which environmental issues are understood (Castro, 2006).

Despite the different origins and theoretical emphases of discursive and social representations research, as with a view of 'discourse' which considers understanding to be a socially-shared sense-making resource, a social representation similarly can be defined as "a widely shared set of beliefs, a systematic framework for explaining events and evaluating them" (Breakwell, 2010:866)[18]. As in the case of discourses, understanding is contextualised to wider cultural ideas and collective assumptions beyond the individual: Wagner et al. (1999) argue that from the social representations perspective, social psychological phenomena and processes can only be understood if they are seen as being embedded in historical and socio-cultural conditions.

Using a social representations framework, Castro (2003; drawing on previous work by Castro and Lima, 2001) identified different 'discursive forms' for talking about nature and the environment. One of these, the 'action discourse', focused on behaviour change as a means to deal with environmental problems. A 'conciliation discourse' by contrast saw environmental problems as serious, but able to be addressed through education and information provision. Two other discourses, the 'resistance discourse' and 'human species discourse' portrayed the severity of environmental problems as still controversial and a matter of opinion.

A further study which aimed specifically to understand the social representation of climate change, this time in the context of media reporting, has suggested that verbal and visual portrayals of climate change are anchored to emotions (Hoijer, 2010). Hoijer argued that difficulties in portraying the abstractness, uncertainty and remoteness of climate change as a scientific question, has lead to its being translated into tangible, concrete and emotionally-loaded stories. Media articles, Hoijer suggests, commonly 'anchor' (i.e. relate to pre-existing notions) climate change through fearful ideas and emotions, such as by portraying it as a 'threat' or associating it with metaphors of serious illness and death (e.g. one newspaper article analysed by Hoijer talks of how 'sick' our planet is). Hoijer also draws attention to associations of news reporting with guilt (for

[18] Also as a 'cultural meaning system' (Moscovici and Markova, 1998), or "widely shared representational system" (Wagner et al., 2001). Volklein and Howarth (2005:436) likewise characterise a social representation as a "system of ideas" which "helps us to make sense of our world and to interact within it with other societal members".

asserting that people's actions are causing future harm), and nostalgia (for times when the climate was more stable and clement).

One of the most exhaustive studies of social representations of climate change, is that by Smith (2009). From an analysis of articles in the British press and a large number of public interviews, this researcher concluded that a core anchoring process used by both was the understanding that climate change 'contravenes the natural', with tangible and concrete events used to visualise this. Smith argued that a consequence of local representations such as flooding or unexpected weather was that climate change came to be seen in an 'inconvenient' rather than an 'alarmist' way. Visual imagery was also argued to be important in objectifying climate change: images such as melting icebergs acted to familiarise people with climate change, and to influence emotional responses. Such responses were at times characterised by negative affect (e.g. despair) however Smith also suggested that the imagery of climate change often lead to detachment and disengagement through its distance and lack of personal relevance.

From a social representations framework, Smith's work argued that both positive and negative perspectives on climate change were able to "peacefully co-exist" – rather than leading to cognitive discomfort, this was argued to illustrate the complexity of public understanding of climate change. This line of argument, I suggest, provides a useful counterpoint to the assumption often invoked in the literature in a *de facto* way, that cognitive dissonance is a central or inevitable outcome of diversity in climate change understanding (cf. Stoll-Kleemann et al., 2001).

Synthesis of findings from discursive and social representations research

Research considering discourses and social representations of climate change spans a number of disciplines and domains. For this reason, it is problematic to draw conclusions about over-arching discourses of climate change, and, specifically, how these may have changed over time.

In general terms, however, this research literature does emphasise the importance of attending to the means by which climate change is constructed through language and ideas. Studies have considered how climate science has been both supported and challenged through public discourse, with research into media reporting in particular pointing to shifts in scepticism and alarmism over time. Whilst the links between public perceptions and media reporting are far from straightforward, the place of the media as an important information source is nonetheless identified. A further important source of public understanding of climate change identified is interpretation via the weather.

That perspectives on climate change are bound up with questions of ethics and responsibility, is asserted in a number of studies. Some research points to continuity in how the politics of climate change is constructed in discourse, with individual as well as societal level solutions to climate change situated within rather than in opposition to current economic systems. The place of individual responsibility in relation to societal systems and structures is also revealed through discursive work; for example, the ways in which 'everyday constraints' are argued to limit personal responses to climate change; and the strategic use of discourses by people to negotiate questions of responsibility.

Whilst this body of research points to some shared themes, given the relatively small number of discursive studies of public understanding of climate change it is nevertheless not feasible to infer from these with any confidence, how these discourses may have altered or remained consistent over recent years. In some senses, climate (change) has been shown to be situated within a historical timeframe as part of a shared cultural imagination. However, it is a central objective of the present study to systematically identify the characteristics and temporal dimensions of public understanding in a more contemporary context.

Discursive and social representations approaches: implications for the present thesis

The research reviewed above, reveals that there are a variety of ways in which discourses may be thought of as constructing meaning with respect to climate change. The terms 'discourse' and 'discourse analysis' indeed cover a wide range of possible approaches used across the social sciences[19]. Even so, it will be important to delineate the specific discourse analytic approach seen as appropriate for the present study.

Throughout the thesis, I refer to public 'understanding' of climate change, and an intention to identify the dominant ways in which climate change is understood by people. What this 'understanding' translates to in discursive terms, are the ways in which climate change is rendered *meaningful* through the concepts, arguments, assumptions, metaphors, language terms etc. that are used in participants' talk. As Hajer and Versteeg (2005) put it, discourses are "ensemble[s] of ideas,

[19] One of the foremost authors in this field, Teun van Dijk (1997) argues for this reason that the very concept of 'discourse' is "essentially fuzzy" as is the field of discourse studies itself. Potter and Wetherell (1987: 6) similarly note that "perhaps the only thing all commentators are agreed on in this area is that terminological confusions abound".

concepts and categories through which meaning is given to social and physical phenomena"; these authors note elsewhere that discourses are characterised by 'linguistic regularity'.

The use of a discourse analytic approach in the present study is driven, in part, by a relative lack of such work with respect to public understanding of climate change, and an absence of research examining how public discourses may have varied over time. Despite the large number of studies which have considered general, media and political discourses of climate change; despite the extensive qualitative research conducted into public understanding of climate change; and despite studies considering public discourses of environmental issues in general; very few genuinely discursive analyses exist of public understanding of climate change. Whilst the term 'discourse' is at times used in a generic sense by some qualitative researchers, the focus of key qualitative studies in the UK has mostly been upon identifying or discussing public understanding in terms of key thematic categories (e.g. responsibility, knowledge) rather than how these categories *cohere* as sense-making devices.

The advantage of using a discourse analytic approach is that this offers the potential to examine the ways in which a wide range of concepts – as revealed through language – are used in complex and interacting ways to interpret climate change. To give a practical example from the results chapters of the thesis, a discourse is identified concerning the *status and practice of science*, which draws upon key concepts and metaphors of science – such as evidence, measurement, hypotheses, and scientific debate: climate change is understood via these concepts as an empirical, objective, physical phenomenon; whether it is 'real' or important is determined by the terms of reference of science. By contrast, the discourse concerning *lifestyles and social practice*, conceives of climate change in terms of its relationship with the practicalities of everyday life (e.g. demands of work, pressures of family life) and in the context of living in a modern (consumerist, industrial, Western) society: this discourse is thus about 'ways of living'. Both of these discourses are equally valid but largely self-contained ways of understanding what climate change represents, each emphasising a different ontology and set of ideas.

The notion of discourse, as adopted by the present study, can thus be construed in basic terms as "a way of seeing and talking about something" (Barry and Proops, 1999). However, to constitute a valid discourse, for the present study this 'way of seeing' must also exist at a collective level, whereby people have in common similar ways of understanding climate change. In these terms, discourses can be said to be "commonplaces" (Myers, 2007) – even clichés (Myers and Macnaghten, 1998) which are widely recognised. Zeyer and Roth similarly suggest that discourses are "communicative processes used to make meaning" which are "inherently shared and a

characteristic of culture rather than of individuals" (Zeyer and Roth, 2009:962). Because discourses both 'make meaning' and are 'communicative' they are found to emerge in a largely spontaneous manner in conversation between people – including in the focus group or interview setting used in research projects. What the present study seeks to do then, is to characterise the dominant 'communal interpretations' as used to understand and talk about climate change.

Importantly for the longitudinal focus of the present research, is that discourses are considered to be 'shared' not just among members of a *population*, but also across a *time period*. What this means in practice is that similar 'ways of seeing' climate change are anticipated to be found in participants' talk in the re-analysis of data from unrelated projects and different years. This is seen as both a reasonable *a priori* assumption and a criterion for the discourse analysis itself: the former because a review of the literature points to many commonalities in the themes and concepts derived from qualitative analysis of participant talk; the latter because by definition the discourses identified in the present study will be constructed from an analysis of data from multiple projects.

That discourses are seen as spanning different time periods does not mean however that they are unchanging or uniform: rather, in seeking to understand change over time I follow the tradition advanced by discourse theorists such as Potter and Wetherell (1987, 2002) and Gilbert and Mulkay (1984) who have advocated attending to variability in accounts as a means of understanding the different ways in which phenomena are constructed[20].

A discourse in the context of the present thesis, in summary, has certain key features: it is characterised by 'linguistic regularity', and it constitutes a way of understanding which is socially-shared. In defining discourse, I draw on Dryzek's (1997) definition (also used in Hulme, 2008) which incorporates both of these features:

> [A discourse is] a shared way of apprehending the world. Embedded in language it enables subscribers to interpret bits of information and put them together into coherent stories or accounts. Each discourse rests on assumptions, judgements and contentions that provide the basic terms for analysis, debates, agreements and disagreements.

In addition to the idea of discourse as *shared* and *patterned*, the present thesis also draws on the discursive psychology approach of Potter and Wetherell (1987). These authors have introduced the concept of 'interpretative repertoires' to explain the ways that people use to make sense of and negotiate their world. Where their approach is distinct, however, is to also emphasise language

[20] The practicalities of detecting variation over time in discourses are considered in more detail in the Methodology chapter.

function – the idea that "people use their language to *do* things" (Potter and Wetherell, 1987:32). This approach acknowledges that language and talk are not neutral, indeed serve to explain, justify, persuade, etc.

In the context of the present study this is seen as important – because particular arguments may be used, for example, to account for one's own conduct in (not) addressing climate change. As Buttny (1993) has argued, a central function of human speech is to account for one's actions, in consideration of others' assessments; Semin and Manstead (1983) term this 'facework'. Such accounts occur under conditions where people can be held responsible for their actions – including for both causing and addressing climate change (Butler, 2010). People's accounts of their actions warrant research attention also because they reveal the sense-making processes used to understand such ideas as relations of responsibility in society (e.g. between individuals and the state) and perspectives on agency (Antaki, 1988).

Where Kurz et al. (2005) talk of discourses as 'strategies' in the context of energy use, these authors similarly emphasise how they may be *used* in the context of environmentally-significant behaviour. By their terms a discourse:

> represents something that members of a society are able to draw upon, while interacting with other members of that society, to *legitimate* and *justify* their existing patterns of behaviour. Such discourses may also allow individuals to justify their own patterns of behaviour to themselves. (Kurz et al., 2005:617, emphasis added)

Although I see the discourse analytic approach used in the thesis as sharing many similarities with social representations theory, nevertheless there are some distinctions to be made. First, a central objective of social representation work is to emphasise the dynamic processes by which knowledge comes to be constructed, specifically via 'objectification' and 'anchoring'. These explain respectively the rendering concrete of abstract phenomena (i.e. translating into more imaginable concepts), and the incorporation of new ideas into current ways of thinking (Joffe, 2003). These foci, whilst undoubtedly relevant to climate change as a social issue, are not however directly incorporated into my analytic approach. This is because a primary objective of the study is to examine for change over time in the ways in which climate change is characterised in participant talk – rather than to seek to explain how such characterisations themselves may have arisen in the first place from *modifications* to pre-existing representations of the world. Relatedly, social representations theory is particularly concerned with how 'expert' knowledge is translated into 'common sense' knowledge; however, I do not see this as commensurate with many of the ways in which public participants understand climate change: for example, in applying ethical

considerations or reflecting upon one's own lifestyles there is no distinction to be made, as I see it, between 'lay' and 'expert' knowledge.

A second difference between social representations and discourses, is that research into the former tends to incorporate cognitive mental models (including a role for visual imagery) as well as social identity processes (Castro, 2003; Breakwell, 2001). Whilst I acknowledge that at some level discourses *must* exist in a cognitive sense (they are, after all, used by people to communicate and make sense of the world) the analytic focus in much discourse analysis – including in this thesis – nevertheless is on the language and concepts themselves, and the ways in which they cohere as discourses, rather than an intention to draw inferences as to how these may be structured in cognition.

As noted above, the field of discourse research is extensive; as such a full review of the different possible discursive approaches available is not feasible. However, this section concludes with a consideration of how the approach taken in the thesis overlaps with, and is distinct from, a Foucaultian discourse analytic approach. Such an approach is given particular attention here, because, as Feindt and Oels (2005) note, the main contestation among discourse theorists in the environmental domain, is between Foucaultian and non-Foucaultian concepts of discourse.

As with the characterisations of discourse discussed above, a Foucaultian discourse approach understands that there are "system[s] of representation" which can be revealed through language (Hall, 2002:72). However, central to the Foucaultian idea of discourse is a particular conception of *power*: not as the exercise of force, but rather something which is intimately connected with knowledge and its application. In Foucault's terms, power relations and societal structures are enabled *through* discourses. To give an example in the environmental domain: Slocum (2004) argues that the ways in which a particular climate change campaign in North America constructed a 'neoliberal' discourse around action on climate change (presuming a faith in market systems) lead to the disempowering of citizens as activists; the exercise of power through this discourse was thus in the enabling of a particular type of consumer citizenship, at the same time as restricting possibility for more participatory or oppositional involvement. In a similar vein, work by Luke (2011) argues that the dominant 'neoliberal discourse' in modern society has profound implications for the ways in which we attempt to address climate change – including consequences for what constitutes 'legitimate' conduct as individuals.

As can be seen from these examples, a Foucaultian conception of discourse extends beyond the concepts and language used to make sense of phenomena and the ways in which people themselves apprehend them. Instead, a 'discourse' in Foucaultian terms is taken often to

incorporate rather expansive systems of knowledge, practice and governance (Hall, 2002)[21]. Whilst I acknowledge that such an understanding of power relations is potentially relevant in respect of climate change – nevertheless these are considered outside the scope of the present study, which is concerned instead with the means by which climate change is conceptualised and expressed through the language used by members of the UK public.

3.4 Risk perception and understanding climate change

I now turn to research which has considered public perceptions of climate change from a risk perception standpoint. As Breakwell (2010) notes, the scale, complexity, and controversy of climate change has made it "the most globally debated and publicised object of risk perception ever known" (Breakwell, 2010:858).

Climate change as a 'distant' threat

Climate change is often argued to be seen by people as a threat distant in space and time (Swim et al., 2010; Lorenzoni and Pidgeon, 2006), such that future or geographically remote risks are 'discounted' (Gattig and Hendrickx, 2007). In one of the most comprehensive international studies looking at temporal and spatial aspects of environmental risks, Gifford et al. (2009) found that biases of temporal pessimism (that conditions will worsen in the future) and spatial optimism (that environmental problems worsen as distance increases) were found across most of the 18 countries these authors surveyed – although climate change was not specifically asked about, and there were some national anomalies.

Uzzell (2000) also found an 'inverse distance effect' for a range of environmental problems (including climate change as 'global warming'). Participants in four countries consistently rated environmental problems as more serious, the greater distance away they were. They also saw themselves as individuals to be less responsible for environmental problems that were further away, than those at the local level.

The conclusion of such studies, are often seen as pointing to climate change as a risk which is diminished or attenuated in public perceptions. However, it is perhaps debatable in *absolute* terms

[21] As Hall (2002) notes, one of the main critiques levelled at Foucault and Foucaultian discourse analysis is that there is a tendency to absorb too much into the concept of 'discourse'.

just how 'distant' climate change is seen to be at the present time. For example, whilst Upham et al. (2009) argue that a series of survey studies point towards climate change being viewed as spatially and temporally remote, the same figures cited in support of their claim could be interpreted in a reverse fashion. These authors note that in 2003 'only' 47% of English respondents agreed that they are being, or will be, personally affected by climate change, this figure rising to 53% by 2008 (Whitmarsh, 2009a). Given though that this constitutes approximately half of respondents, one may equally argue that such a figure is high, as that it is low[22]. As Upham et al. (2009) indeed note, a majority of respondents in a 2007 survey *disagree* that 'the effects of climate change are too far in the future to really worry me' (DEFRA, 2007). An even more recent survey suggests a still less clear-cut finding in respect of spatial discounting, where respondents if anything appear to indicate *higher* belief that their own locality will be affected, than will remote/developing countries (Spence et al., 2011a)[23].

Climate change in comparison with other issues

In comparison with other salient issues, it has also been argued that climate change is often found to be relegated as a lesser concern. In respect of a range of other personal, social and environmental issues, Poortinga and Pidgeon (2003) found that climate change was ranked as less important. Whilst it may not be surprising that 'your health' and 'partner and family' were the most important issues to people, it is notable that 'animal welfare' and 'terrorism' were also seen as more important than climate change at this time[24]. DEFRA found in 2007, that only 1% of UK respondents mentioned climate change – without prompting via a list of issues – as among the

[22] A similar argument is made by Lorenzoni and Pidgeon, 2006, who suggest that a survey finding that 52% of British respondents stated climate change would have little or no effect on them, indicated people "tend to attenuate the risks to themselves personally".

[23] 53% agree (13% strongly, 40% tend to agree) that 'my local area is likely to be affected by climate change'; 45% agree (11% strongly, 34% tend to agree) that 'climate change is likely to have a big impact on people like me'; 32% agree (7% strongly, 25% tend to agree) that 'climate change will mostly affect areas that are far away from here'; 46% agree (14% strongly, 32% tend to agree) that 'climate change will mostly affect developing countries'

[24] An amended version of the item comparing climate change to other issues is repeated in the survey work of the thesis.

most important issues that 'government should be dealing with' (although 20% referred to environmental issues in general terms)[25].

Weber (2006, 2010) has argued that declines in concern (or 'worry') over time, are consistent with a 'finite pool of worry' hypothesis. This states that people only have so much capacity for worry, and that greater concern about other issues such as the financial crisis and worldwide recessions which took hold in late 2008, have replaced concern about environmental issues. By this perspective, it is to be expected that as proximal, personal concerns (such as one's employment) become more salient, concerns about (distant, impersonal) climate change will diminish. Climate change in these terms is not seen by people in isolation: changes in perceptions are relative to the importance ascribed to other phenomena. Weber (2006:103) has also argued that concern about climate change is muted, in large part because the "time-delayed, abstract, and often statistical nature of the risks of [climate change] does not evoke strong visceral reactions". Oppenheimer and Todorov (2006:4) similarly suggest that expressions of concern are not paralleled in affective terms: people are "concerned but unmoved".

Social Amplification of Risk Framework

The Social Amplification of Risk Framework (SARF) aims to account for findings from disparate disciplinary studies of risk, and to offer explanations of the dynamic social processes which underlie risk perception (Kasperson et al., 2005). Recently, Renn (2011) has outlined potential contributions of the SARF in understanding societal concern about climate change.

A principal aim of the SARF is to explain why certain hazards judged by experts to be relatively low risk come to be amplified through social processes, while other risks judged to be more serious are attenuated. Kasperson et al. (2005) have suggested for example that social concerns about 'mad cow' disease constituted an 'amplified' risk, whereas socially-attenuated hazards include smoking and traffic accidents.

In one of the original formulations of the SARF, Kasperson and Kasperson (1991) proposed that climate change was an attenuated or "hidden" hazard due to its being a 'global elusive' phenomenon: unlike other more obvious risks, it is difficult to pinpoint the consequences of

[25] More recently however, and as I note above, Eurobarometer (2009; 2011) finds that climate change is for EU citizens (including the UK) the second most important facing the world today (even more so even than matters such as a global economic downturn or terrorism).

climate change at particular places or times; it has global sources, distribution and effects and lengthy time lags between causes and effects. Furthermore, complex interactions between the human and physical factors underlying climate change contribute to its 'hidden' nature. Consequently, Kasperson and Kasperson (1991) noted, presciently, that global elusive hazards such as climate change "promise to be particularly troublesome in the years ahead".

The SARF proposes that amplification or attenuation of risks depends upon both social interactions and individual responses. As Renn (2011) notes, the important question in applying the SARF to climate change lies in understanding the main drivers of amplification and attenuation of climate change as a risk. This author suggests that whether climate change is amplified or attenuated depends upon what 'resonance' it has for key actors and institutions: for example, climate change only became a salient issue for business following the 2006 Stern report's translation of climate risks into monetary terms. Renn argues that other constituencies (notably the scientific community and green NGOs) further contributed to an amplification process around this time – and yet simultaneously, the social dilemma character of climate change served to attenuate it as a risk issue through the consequent and manifest inability of political systems to address it.

Breakwell (2010) suggests that the SARF offers a useful approach for examining risk construction around climate change, however notes from her review of risk studies that no empirical work has been carried out that has attempted to provide such an account in the case of climate change. In part, it is suggested, this is because climate change is such a multifaceted and complex phenomenon that it is hard to examine in the meta-level way that the SARF conceives of risk. The present study, therefore, aims to take into consideration the means by which certain societal processes may have contributed to changes in understanding of climate change – as per the spirit of the SARF – but I do not set out to do so using a fully systematic SARF approach.

Cultural Theory and risk perception

With its roots in anthropology, cultural theory has been applied in the field of risk research with respect to environmental issues. Cultural theory, I suggest, affords a particularly rich set of insights into climate change perceptions, due to the following features: the theory aligns individual risk perceptions with people's perspectives on the wider sociocultural context; it integrates worldviews about social relations with those concerning fundamental characteristics of nature; it has theoretically and empirically connected attitudes towards environmental issues (including climate

change) with perspectives on how these are most appropriately addressed (e.g. through policy); as a theory deriving from anthropology but which has been operationalised through quantitative risk perception measures, it also offers the possibility of aligning approaches from different research methods – including within the present thesis.

A central principle of cultural theory is that people form beliefs about risks and social dangers, which reflect and reinforce their commitments to their own chosen 'way of life' or social ordering (Wildavsky, 1993; Schwartz and Thompson, 1990). This notion derives from seminal work by Douglas and Wildavsky (1982) who argued that because individuals are embedded in social structures, it is these that determine their values, attitudes and worldviews.

The primacy of people's worldviews is important to emphasise here: it is this, their preferred social mode, which people are most concerned with protecting. Should a salient environmental risk perception threaten this preferred social mode, then they will *elect* not to perceive risks as important. As Wildavsky and Dake (1990:43) put it: "individuals choose what to fear (and how much to fear it) in order to support their way of life"[26].

An operationalisation which has commonly been derived from cultural theory, is the idea that how risks are seen by people depends on two dimensions: the extent to which they are part of groups (or 'bounded units' – the so-called *group* dimension), and the extent to which their interactions are rule-bound or negotiated (i.e. constrained by externally imposed prescriptions – the so-called *grid* dimension) (Thompson et al., 1990).

This group/grid typology gives rise to four types of cultural biases, preferences or alignments (Thompson, 2003 terms these 'solidarities'): *individualists* are low on both the grid and group dimensions, affiliating relatively little with bounded groups and preferring no constraints on action; *hierarchists* are diametrically the opposite to individualists (high grid, high group), identifying with and preferring a structured society demarcated according to status, age, class etc.; *egalitarians* (low grid, high group) also identify with group relations, however reject social relations based on social distinctions or hierarchical structures; *fatalists* (high grid, low group) see their autonomy as restricted by social distinctions, however do not affiliate with groups and so see themselves as 'outsiders'.

[26] Steg and Sievers (2000) similarly note: "Cultural theory implies that risks are socially constructed; namely, people choose what to fear and how to fear it to sustain their preferred pattern of social relations."

Linkages between cultural worldviews and environmental perspectives

An important proposition deriving from cultural theory, is that concerning the means by which the different solidarities conceive of nature and its management. A number of authors have developed the notion that four 'myths of nature' map onto the four solidarities of cultural theory[27]. By this line of argument, cultural biases are integrated with an understanding of what nature is, especially in terms of its vulnerability and appropriate level of human oversight.

For those of an individualist predisposition, the 'myth of nature' is that nature is robust and benign/resilient and will recover from external shocks; it is "wonderfully forgiving" (Schwartz and Thompson, 1990:5). This idea of nature corresponds to the individualist view that "man is irredeemably self-seeking" (Grendstad and Selle, 2000:28), or "inherently self-seeking and atomistic" (Thompson, 2003:5109). This correspondence arises, it is argued, because the idea of 'nature as benign' legitimises individualist social relations wherein people are free to act autonomously with few restrictions (Steg and Sievers, 2000).

Thompson (2003) argues that for egalitarians, nature is conceived in terms which are almost the exact opposite to the individualist viewpoint, seeing it as fragile, intricately connected and ephemeral. From the egalitarian worldview, nature is considered to be in a delicate equilibrium; people adhering to this perspective tend to be very concerned about environmental problems and see people as responsible for causing and addressing them. According to Steg and Sievers (2000), egalitarians claim that nature is fragile so as "to justify equal sharing of what they see as the one finite Earth" (Steg and Sievers, 2000:255).

The hierarchists' myth is that nature is controllable (Thompson, 2003), that it is a tolerant or robust system up to a point (Steg and Sievers, 2000) but that once these given limits are exceeded and transgressed the system will collapse (Grendstad and Selle, 2000). This view of nature fits with hierarchists' worldview because it understands risks to be acceptable (up to a point) provided this is deemed to be the case by those in a position of authority or expertise: this view thus legitimises the hierarchists' view of proper social relations.

[27] Grendstad and Selle (2000) note that it was the cultural theorist Michael Thompson who, drawing on ecologists' studies of how institutions managed ecosystems, himself "injected myths of physical nature into the core of Cultural Theory, so as to synthesis the natural and social sciences in a new matter. The ecosystems were then referred to as 'myths of physical nature'."

Finally, the fatalist view of nature is that it is capricious and unmanageable: those subscribing to this solidarity "find neither rhyme nor reason in nature, and know that man is fickle and untrustworthy" (Thompson, 2003:5110).

From these integrations of worldviews of social relations and nature, directly arise propositions regarding the most appropriate means for managing natural systems. For individualists, who see nature as resilient and ideal social relations to be based on individual autonomy, market economic systems are the most appropriate mechanism for environmental protection. Egalitarians see nature as vulnerable and ideal social relations as based on equality, and so solutions grounded in social justice and based on radical changes in behaviour and society are required: unlike individualists, their view of free-market commerce is that it is "noxious self-seeking productive of unjust disparity and thus dangerous and worthy of regulation" (Kahan et al., 2011:2). Hierarchists see nature as stable within limits and ideal social relations to be based on a stratified society, and so expert oversight and statutory regulation is most appropriate. Less clear predictions are made of fatalistic views of environmental oversight: their rational management response can perhaps best be described as "just coping" (Steg and Sievers, 2000).

Cultural theory and climate change: empirical evidence for a relationship

Thompson and Rayner (1998) have argued that understandings of climate change in particular can be informed by an understanding of the worldviews derived from cultural theory. As they put it: "competing ideas about nature and about equity inform climate change policy debates at all levels, from the family hearth to the international negotiation" (Thompson and Rayner, 1998:143).

A number of researchers have thus sought to extend and test cultural theoretical ideas with respect to climate change and environmental problems.

In a relatively early study, Pendergraft (1998) investigated whether people's responses to a series of statements reflecting social worldview, view of nature and views concerning appropriate responses would cluster according to cultural theory types. The prediction of clustering by type was partially supported, with egalitarian statements differentiated, but individualist and hierarchist statements tending to cluster together.

More recent research in the USA by Kahan et al. (2011) has found that study participants' cultural worldviews are strongly correlated with their perceptions of scientific consensus on climate change. These researchers found that subjects holding individualistic worldviews were at the other

end of a continuum from those holding egalitarian worldviews, concerning their perspectives on the state of expert opinion on climate change. Also in the USA, Leiserowitz (2006) found that cultural theory measures predicted climate risk perception and policy preferences.

Some researchers have operationalised the myths of nature, with a view to appraising whether these correspond to preferences for environmental management. Steg and Sievers (2000) for example find that their framing of these myths[28] corresponded to problem awareness and policy appraisal in respect of car usage. Poortinga et al. (2003) also found that preferences for different environmental management strategies varied according to which nature myth people identified themselves with.

Research by Lowe (2006) in the UK took the step of operationalising the four myths of nature, specifically in the context of the climate system, with a view to ascertaining whether these related to cultural theory types as predicted[29]. Findings were broadly in line with the predictions of cultural theory: egalitarians, for example, were more likely than other groups to consider climate change a problem requiring collective and personal responsibility; individualists were more likely to oppose economically restrictive climate measures such as fuel taxes[30].

Cultural theory has also been applied in qualitative work: in a focus group study in the UK examining renewable energy technology, West et al. (2010) devised classifications relating to cultural theory types, in respect of how people perceived climate change. They argued that an 'individualist discourse' was characterised by a lack of concern about climate change, as it was argued the climate self-regulates and climatic variation has always occurred. The 'egalitarian discourse' by contrast saw climate change as apocalyptic and current, and with strong implications

[28] These researchers presented 'nature ephemeral' for example using the following wording: "The environmental problems can only be controlled by enforcing radical changes in human behavior and in society as a whole".

[29] For example, the 'nature benign'/individualist wording read "Climate is very stable. Climate change / global warming will have little to no impact"; the 'nature vulnerable'/egalitarian wording was "Climate shows a delicate balance. Small amounts of climate change / global warming will have abrupt and catastrophic impacts."

[30] A limitation of Lowe's (2006) study however was that, given the wording used, almost half (47%) of all participants agreed with the 'nature stable'/hierarchist worldview, with only 1% aligning themselves with the 'nature benign' viewpoint – and so it was not possible to ascertain correspondence between cultural theory type and subscription to a particular view of nature/climate (or at least, these were not reported).

for equity. The 'hierarchist discourse' regarded climate change as manageable, but requiring action. (No fatalist discourse was proposed.)

Other recent work which has explored the relationship between these ideas is that by Bellamy and Hulme (2011) who examined public perceptions of climate tipping points (i.e. possible abrupt changes in the climate system). Based on mixed methods research, these researchers argued that a 'fatalist' belief in climate as capricious (i.e. unmanageable or unpredictable) dominated participants' views of climate in group discussions. By contrast, many participants favoured top-down, regulatory approaches for addressing climate change – in cultural theory terms, a perspective associated with an 'individualist' view of environmental management.

Cultural theory approaches to climate change perception: implications for the present thesis

A central appeal of cultural theory for the present work, is that it may potentially connect understanding of the personal and social world, together with perspectives on the natural world, with the issue of climate change. Prior research has successfully applied the theory to interpret both qualitative and quantitative data: given that both these data types are used to examine longitudinal trends in the present study this framework therefore affords the possibility of integrating findings in theoretical context. Furthermore, whilst research exists which examines climate change perceptions via cultural theory, this has not previously entailed a temporal dimension. In addition, only a small number of studies have integrated cultural theory work with a discursive approach in this area. For the present study, then, cultural theory is seen as an important framework for the interpretation of public understanding of climate change.

3.5 Social practice theory and anthropological perspectives

Given that the focus of the present thesis is upon the UK public's understanding of climate change, much sociological and anthropological work is considered outside of the scope of this literature review. For the most part, environmental sociological research relevant to climate change has tended to focus on macro-level theory and concepts: such as the interactions between capitalist economic systems and the causes of climate change (Lever-Tracy, 2008). In the case of anthropology, attention is often given to the impacts, understandings and responses of indigenous groups (cf. Crate and Nuttall, 2009); whilst this provides many insights into cross-cultural and

universal ways of understanding, clearly work that is far removed from the experiences of the UK public is less relevant to my own research.

A number of studies do nevertheless offer insights into how climate change is understood by members of the public, and into the sociocultural contexts in which these understandings are situated.

Social practice theory and climate change

An important body of work affording insights into public understanding, are studies concerned with social practice theory and practice-based accounts of environmental consumption. Whilst practice-based research draws on a diverse range of ideas (Postill, 2009) this work is characterised by an emphasis on how social systems shape behaviour, rather than – indeed at times in forceful objection to – viewing behaviour as determined by internal factors such as attitudes and beliefs (Shove, 2010). Whilst people's consumption and their emissions are acknowledged as relevant to the problem of climate change, the focus of researchers' attention is instead upon the systems and everyday practices which sustain these. Nevertheless, practice theorists have often sought the perspectives of members of the public themselves in articulating the influence of social practices.

Hards (2011) for example examined the life narratives and practices of climate change campaigners, with a view to understanding how strong pro-environmental values had emerged in this group of people. She found that participants emphasised values of simplicity, frugality and low consumption, and a related rejection of consumer capitalism. These values were reported by some participants to be strongly rooted in their life history. Value sets such as waste-prevention had been instilled in childhood, or were grounded in cultural memories.

Hards also considered how values corresponding to a connection to nature, and a view of nature as fragile and deserving of respect, had emerged through participants' life experiences. For many, practices involving interaction with natural places and animals had been important in developing pro-environmental values. Several participants also, however, described their values around nature as secondary to values around social justice.

From a study of the everyday practices through which people encountered environmental concerns, Macnaghten (2003) drew remarkably similar conclusions to Hards (2011): although this research was with members of the public who were not activists, Macnaghten nevertheless found people's personal experiences with nature were again critical to their pro-environmental values. It

was thus argued that the environment became meaningful to people when it was associated with everyday social life and relationships.

The research by Macnaghten also noted, however, that in respect of global environmental issues there was little expressed sense in the group discussions that much could be done to mitigate these either at an individual or collective level. A perception of a "fundamental lack of agency" in respect of global environmental problems was found in all the focus groups. Machnaghten (2003:77) argues that:

> Individual action was seen as largely ineffective, both due to the global scale of the problems and to the perception of powerful commercial interests intractably embedded in systems of self-interest antithetical to global sustainability. Indeed this whole domain of thinking about the environment was clouded in gloom and despondency.

Anthropological studies

One of the most noticeable overlaps between climate change anthropology and many of the studies of public understanding cited above, is in the consideration of people's perspectives on the weather and/or climate. There are numerous examples of work which have attended to this, whether as part of attempts to gauge perceptions of climate change worldwide, to assess the incorporation of decision-making in contexts where climate is important (especially agriculture), or to obtain proxy climate data (e.g. Vedwan and Rhoades, 2011; Hageback et al., 2005; Mark et al., 2010; Frank et al., 2011).

These studies overall point to a universality in the equating of weather with climate – albeit with extensive localised variation in the character and consequences of this. Thus, whilst some authors have expressed concern that participants in Western countries perceive climate in terms of weather (Bostrom and Lashof, 2007), the insights from anthropology may be seen – arguably – as pointing towards a fundamental and durable association between the two.

Another way in which anthropological studies can afford insights into how climate change may be understood, is in the particular perspective it brings to Western culture and practices. Wilk (2009) has argued that a nuanced understanding of 'consumer culture' is required, which questions in anthropological terms why and how human needs and wants grow: in other words, why is it that things which were once seen as luxuries come to be seen as necessities as industrialisation proceeds? In light of the major contribution of personal car use to climate change, Bohren (2009) argues also that it is the ethos of individualism, personal freedom and expectance of mobility – all

of which are associated in modern societies with the car – which presents the most substantial challenge for addressing car use. Sloman (2006) similarly points out how ubiquitous and intrinsic to ways of life the car has become, and argues that 'car culture' as an insidious influence on social life requires to be addressed in structurally and culturally transformative ways (such as institution of car-free 'home zones' and the spread of car clubs).

Implications from sociological and anthropological work for the thesis

The studies discussed above are valuable for the insights which these afford into the interactions between social contexts and culture with individual perspectives. Studies of social practice point to the relevance of patterned ways of living in influencing how we perceive problems such as climate change – offering the argument that it is how we live our lives, that affects our values and perceptions (rather than values determining ways of living). Anthropological work points both to universality and divergences in how climate change is understood and sustained, across cultures. Climate change is shown to be consistently perceived in terms of the weather in many entirely separate and different cultures. In addition, an understanding of all-pervasive consumer society, and our place as individuals within it, has been argued to afford insights into the origins of climate change and the impediments which prevent wider action to forestall it.

For the present thesis, these studies point to the importance of a research sensitivity towards people's accounts of their everyday practice and culture, as relevant to an understanding of climate change. At times this may be in terms of the apparently mundane (daily routines such as shopping and transport choices); at others, it may be expected that people will see the phenomenon of climate change in the context of the very large-scale sweep of modern history.

3.6 'Barriers' to engagement and climate scepticism

The literature review concludes with a consideration of two ways in which public understanding of climate change has been characterised as problematic: in terms of perceptions seen as 'barriers' to engagement, and as manifestations of 'scepticism'. These conceptions are useful to review here, as they draw on a variety of cross-disciplinary ideas.

'Barriers' to pro-environmental behaviour (and to acceptance of climate change as a problem)

The concept of 'barriers' impeding an otherwise desirable state of engagement with climate change, has gained currency in recent years, most prominently in a synthesis paper by Lorenzoni et al. (2007a). These authors argued that engagement with climate change comprises cognitive, affective and behavioural elements, with barriers to this state of engagement existing at the individual and social levels. At the individual level, barriers range from a simple lack of knowledge, to uncertainty and scepticism (e.g. about the seriousness of climate change), reluctance to change one's lifestyle, and a sense of fatalism. At the social level, perceptions of a lack of political action, and inaction by industry were considered barriers; as indeed was a concern about the 'free-rider' effect, lack of enabling initiatives and social norms.

In a review of the psychological literature pertinent to climate change, Swim et al. (2010) also devote a substantial section to the "psychological barriers" that limit action on climate change. As with Lorenzoni et al.'s (2007a) research synthesis, this review suggests that at an individual level, lack of knowledge ('ignorance'), uncertainty, mistrust in information sources, and pressures arising from social norms can all constitute barriers to action. Added to these, these authors also suggest that temporal and spatial discounting (cf. Uzzell, 2000; Gifford et al., 2009), habitual and entrenched behaviours (e.g. Bamberg and Schmidt, 2003; Aarts and Dijksterhuis, 2000), lack of efficacy or low perceived behavioural control (e.g. Heath and Gifford, 2002) and rebound/tokenism, also act at the psychological level as barriers to engagement. A further study which also argues that there are multiple psychological barriers to action, is that by Gifford (2011), who identifies 29 of these, subdivided into seven 'genera'.

The combined impact of these studies (and others) is to point to an extensive and eclectic variety of barriers to action: as Gifford (2011:297) puts it, their extensiveness "cries out for organisation". Gifford also makes the argument that, given the diversity of barriers which have been identified, it may be that the existing models for understanding pro-environmental attitudes and behaviour may be inadequate for their explanation. The notion of barriers to behaviour change has indeed not been without its critics: Shove (2010:1275) for example argues that in the research and policy literature "pretty much anything can qualify as a… barrier" effectively rendering the concept rather meaningless; Hobson (2001:203) also suggests that the many barriers to behaviour change may

alternatively be considered ways of dealing with social controversy and making sense of information[31].

Studies of climate change scepticism

Whilst 'scepticism' has been conceived of as a barrier in itself, nevertheless a number of recent studies have attempted to articulate the characteristics of scepticism in their own right, as they are found to manifest in public perspectives of climate change. A consideration of public scepticism is considered timely, given the recent decreases in climate change concern in the UK and worldwide (Spence et al., 2010; Leiserowitz et al., 2010) which have been accompanied by a concern that scepticism is indeed on the rise (Tollefson, 2010; Schmidt, 2010).

The recent decline in public concern and apparent rise in scepticism, seem to have occurred at the same time as, or immediately following: a cold winter in 2009/10 (which some have presumed may have been perceived as a form of disconfirmatory evidence for a warming effect); the COP15 Copenhagen conference, which was widely seen as a failure; and a widely-reported controversy surrounding hacked emails from the University of East Anglia's Climatic Research Unit.. As with the notion of 'barriers' to engagement, discussed above, climate scepticism appears however to be a rather nebulous concept.

Climate sceptics may be portrayed as those who are vociferously opposed to the practice and findings of mainstream climate science, as well as being against policies to address climate change (Nerlich, 2010). Poortinga et al. (2011) however take a different approach to understanding climate scepticism. Their focus is on the general public, and levels of acceptance of core propositions of climate science. These researchers tested a framework originally proposed by Rahmstorf (2004) to gauge where scepticism manifested in the population, and whether different types of scepticism were interrelated.

Poortinga et al. found that the most common form of scepticism was 'impact scepticism', entailing doubts about the severity of impacts of climate change: 40% of the study's survey respondents (strongly) agreed that 'the seriousness of climate change is exaggerated'. 'Attribution scepticism', the belief that it is natural processes and not human causes that are responsible for climate change, was the view of just under a fifth (18%) of the sample. A smaller 15% rejected any notion that the

[31] This author notes: '"Barriers to action' thus become a set of discursive practices that individuals use when discussing the environmental problematique".

world's climate was actually changing. As well as highlighting differences in prevalence of different types of scepticism, Poortinga et al. nevertheless found that they were strongly interlinked: most correlations between items corresponding to the different scepticism types were highly significant and between 0.2 and 0.5 (i.e. a medium to strong correlation). A further finding was that those individuals with environmental and self-transcendence values were more likely to believe the world's climate is changing, suggesting a role for values underlying belief/scepticism about climate change.

Whitmarsh (2011) also found that environmental values, as well as political orientation, underlay climate scepticism. Unlike in the Poortinga et al. study, however, Whitmarsh considered climate scepticism to comprise a number of types of doubts concerning, among other things: the evidence base for climate science, exaggeration and over-reaction to climate change, and media alarmism. A key finding reported, was that climate scepticism equivalent to trend/attribution aspects (as in Poortinga et al., 2011) appeared to have been stable over time, but that the sense that the problem had been 'exaggerated' (equivalent to impact scepticism) had increased since survey work carried out some five years previously.

Drawing on cultural theory measures (individualism and egalitarianism), Leiserowitz et al. (2010) also found that cultural worldviews underpinned scepticism about climate change in the USA. Both individualism and egalitarianism scores were found to be highly significant predictors (in opposite directions) of loss of trust in scientists following the 'Climategate' controversy; in full regression models, these measures of worldview were indeed found to be more important predictors of scepticism than were gender, age, education, income, or even political ideology[32].

What these studies show in sum, are that scepticism about climate change – and perhaps, one might argue, its corollary, engagement – is contingent on many phenomena, at both the individual psychological level, and within the wider social milieu. Contemporary events, such as 'Climategate' and the vagaries of politics, likely impact upon the ways in which climate change is understood. The language and metaphors used by social actors such as the media to portray climate change, furthermore, create particular framings of it as a social and scientific issue. These in turn are shown to be received in different ways by people, according to their underlying values and worldviews.

[32] These researchers interpreted their results in terms of 'motivated reasoning' – that people are not dispassionate consumers of information, rather selectively interpret evidence according to their prior worldviews.

3.7 Conclusions from the literature review

Previous research from a number of disciplinary standpoints and using a range of methodologies, depicts public understanding of climate change as complex and as spanning numerous domains.

Many studies over the past twenty years have examined public understanding of climate science, including basic questions of whether climate change is considered 'real' and human-caused. The conclusion of both quantitative and qualitative work in this area has often been that the underlying science is seen as uncertain and/or contested. Some survey work appears even to indicate that public acceptance of both the veracity and anthropogenic component to climate change, has declined in recent years. It is unclear why this may have taken place, however. A range of research suggests that people draw conclusions on these matters based on a mix of sensory evidence (e.g. the weather) and information obtained from the media, and also that perceptions are in large part driven by one's values and ideology, as well as long-standing and culturally-situated perceptions of nature. A complete picture is lacking, however, as to what has sustained public uncertainty about the veracity and causation of climate change, even in light of growing consensus about the fundamental tenets of climate science itself.

Beyond questions about the basic physical realities of climate change, a growing body of research has drawn attention to public understanding of the social and societal characteristics of climate change. How people conceive of responsibility is bound up with views about the role of (and relationships between) the state and other social actors, how society is structured, and cultural questions such as the place of consumer society in driving climate change. Whilst research into the public understanding of these questions has drawn attention to many nuances and interrelations between these concepts, there is little however that can be said about how (if at all) public perceptions of responsibility and society may have altered over time, with respect to climate change.

Public perceptions about the place of the individual in causing and responding to climate change, and the extent to which people see themselves and others as having an obligation and capacity to address climate change, has been the focus of a number of studies. There is some suggestion in the literature (albeit implied) that individual-level behaviour has increasingly come to be seen by people as 'moralised'. It is possible that this has come about through the internalisation by individuals over time of a political agenda that has increasingly emphasised personal responsibility for the environment – although it is possible also that findings may reflect the permeation of this

agenda into research interests. Certainly, there is lacking in the literature empirical evidence for changes over time in public understanding of behaviour, as contextualised to climate change.

Overarching especially the social and personal domains of climate change perceptions, are questions of ethics and morality. Research has shown that public understanding is frequently contextualised to such concerns as global justice and equity, and duties to future generations. Again, however, little can be said about whether these ethical considerations have remained durable over time or whether there has been a shift in how climate change is seen as an ethical concern. Finally, the ways in which climate change is seen as an 'environmental' issue also often emerges in research findings. Here, there is some limited research (from the USA) pointing to lessening of the conflation in public perceptions between climate change and ozone depletion, but little beyond this on how the understanding of climate change as an environmental issue may have varied over time.

In sum, whilst there is now a relatively large amount of research examining public understanding of climate change, there is a very limited evidence base for a temporal dimension to this. The evidence that there is comes almost entirely from survey studies, such as those which point to fluctuating levels of concern, and provides only a partial picture of how and why public understanding has changed. It is close to impossible to infer how public understanding may have changed from a reading of qualitative studies over time – given that this research spans different fields, research traditions and objectives.

It is the aim of this thesis, therefore, to develop an analytic approach able to identify the longitudinal nature of public understanding. Importantly, this may point to areas where there is *continuity* over time in how climate change is understood, as well as areas where change has occurred. The main emphasis of this research will be upon qualitative data, as qualitative longitudinal work is entirely absent in this field. The programme of research will also be supported by the use of quantitative longitudinal analysis (e.g. via replication of prior survey items).

An extensive body of qualitative data now exists detailing public understanding in the UK, however this has been analysed in different ways according to the original aims of those studies for which these data were obtained. Because the present thesis will re-use data from five such studies (as well as novel primary data) to investigate public understanding, a consistent analytic approach is required across all datasets. Discourse analysis is argued to offer the opportunity to achieve this in a novel and productive manner, by attending to how concepts are integrated in people's understanding across different research projects. The analytic approach aims to account for how discourses are applied both to make sense of climate change as a phenomenon, as well as used to

justify and explain positions. A substantial part of the thesis will be directed towards explicating public understanding of climate change as a series of coherent discourses – prior to the consideration of longitudinal change within these discourses themselves.

Research questions

As stated within chapter 1, the main research question of the thesis is:

- *How has public understanding of climate change altered, and how has it shown continuity, over the period 1997-2011?*

This research question is subdivided into two component parts, relating to change and continuity:

- *Which commonplace ways of understanding climate change exist across unrelated research projects and methods (i.e. how are perceptions stable over time)?*
- *Which trends, variations or differences in ways of understanding climate change, are identifiable by comparison across research projects (i.e. how have perceptions changed over time)?*

With respect to the main areas of public understanding as outlined above, the main research question can also be subdivided into three component parts, corresponding to domain-specific questions:

- *How is climate change understood as a* ***physical*** *phenomenon, and what changes and continuity are observed in this over time?*
- *How is climate change understood as a* ***social and societal*** *phenomenon, and what changes and continuity are observed in this over time?*
- *How is climate change understood as a* ***personal*** *phenomenon, and what changes and continuity are observed in this over time?*

With respect to the most recent time period (early 2011), cross-sectional survey data are also used to answer the following questions:

- *How widely-held at the present time, are the main ways of understanding climate change as identified across the 1997-2010 period?*

CHAPTER 4 METHOD: OVERVIEW, QUALITATIVE DATASETS AND ANALYSIS

From the review of literature in chapter 3, I argued that there is an important absence of studies that examine a temporal dimension to public understanding of climate change. Has this understanding remained largely consistent over the past two decades, or has it altered fundamentally over this time period? It is a central aim of the present thesis to develop and apply a detailed and rigorous analysis, capable of identifying the commonplace ways of understanding climate change and how these have or have not varied.

To answer the research questions of the thesis, a mixed methods approach will be used. This enables data from both qualitative (interviews and focus groups) and quantitative (questionnaire surveys) studies to be applied and integrated. In section 4.1 the advantages of a mixed methods approach are outlined, as are some epistemological considerations. Subsequently, an overview of the different research phases of the thesis is presented.

The thesis examines qualitative data over the period 1997-2010. To permit this time period to be considered, novel primary data was obtained to complement pre-existing secondary data. This was a substantial original component of the present study, gathered from a series of ten focus groups conducted in Bristol in early 2010, moderated by myself. The design and approach for these focus groups are outlined in section 4.2.

To answer the research questions of the thesis, discourse analysis has been applied which features both a secondary and longitudinal qualitative component. In section 4.3.1, I detail how a preliminary thematic analysis and then the main discourse analysis were carried out, so as to be able to present a series of coherent ways in which climate change is understood (the discourses themselves). Some specific methodological concerns with respect to the secondary analysis of qualitative data are addressed in section 4.3.2. In section 4.3.3, I consider the methodological implications of carrying out longitudinal analysis of qualitative data.

In section 4.4 I summarise the overall qualitative analytic approach used in the thesis, presenting this as a combined secondary longitudinal methodology. An overview of the datasets used in the present study is given in section 4.5.

Criteria for rigour – in the use of qualitative methods generally, and discourse analysis in particular – are outlined in section 4.6. Section 4.7 details the details the notation system used – including

how readers can identify participants and the study in which they participated within the results chapters and appendices. In section 4.8 I present the rationales for the particular reporting structure used for the qualitative results chapters. Finally, in section 4.9 the main qualitative findings are summarised prior to their detailed presentation in subsequent chapters.

The quantitative phase of the research – a survey carried out in early 2011 – is described in detail later in the thesis (chapters 9 and 10).

4.1 Methodological approach

Rationales and epistemology of a mixed methods approach

Whilst there now exists around twenty years of research into public understanding of climate change, there is little systematic analysis of how this understanding may have endured or changed over this time period, and no work examining changes in public understanding using qualitative approaches. Some studies have looked at temporal aspects of public understanding using quantitative survey methods, though even here the evidence is limited and has not been integrated with qualitative approaches.

The research carried out for the thesis therefore uses combined qualitative and quantitative methods, an approach commonly termed 'mixed methods' (Tashakkori and Teddlie, 2003; Bergman, 2008; Creswell and Clark, 2010). As Tashakkori and Teddlie (2003:x) state, "mixed methods designs incorporate techniques from both the quantitative and qualitative research traditions yet combine them in unique ways to answer research questions that could not be answered any other way". The use of a mixed methods design in the thesis thus enables public understanding of climate change to be approached in different but complementary ways. Public perspectives obtained in a relatively open-ended and unstructured manner (the qualitative transcripts) enable depth and subtlety in public understanding of climate change to be brought to light. Survey methodology by contrast is better able provide indicators of the prevalence with which particular perspectives are held, and also the relationships between these.

As many researchers have noted, quantitative and qualitative research have on many occasions seemed to be at loggerheads – Johnson and Onwuegbuzie (2004) note that for over a century the two approaches have engaged in 'ardent dispute'. Underlying the frequent discordance between the two methodologies, has been a difference in epistemological positions. As Henwood and Pidgeon (1992) note, in Psychology quantitative research has generally been anchored to experimental and

hypothetico-deductive designs, and a positivist philosophical tradition assuming a singular, objective reality. By contrast, qualitative research more usually draws on naturalistic approaches – is concerned with naturally-occurring data, or at least data obtained outside of experimentally manipulated settings – and emphasises an interpretative approach – i.e. is concerned with how people themselves understand the world. A constructivist epistemology tends to be stressed, which assumes that knowledge and meaning are not objective and absolute features of the world, but rather are 'constructed' by people from experience; as Bryman (2004:266) puts it, the presumption is that "social properties are the outcomes of the interactions between individuals, rather than phenomena 'out there' and separate from those involved in its construction".

Some have argued that reconciliation and integration between paradigms is unworkable. However, in this thesis I align myself with those researchers who have advocated a more pragmatic approach; for example, Guba and Lincoln (2005:201):

> Is it possible to blend elements of one paradigm into another, so that one is engaging in research that represents the best of both worldviews? The answer, from our perspective, has to be a cautious yes. This is especially so if the models (paradigms) share axiomatic elements that are similar, or that resonate strongly between them.

As Johnson et al. (2007) argue, the dividing lines between qualitative and quantitative research are often far less distinct in practice in any case, than as are argued in the methodological abstract, and therefore antagonism between paradigms is unproductive. Bergman (2008) goes so far as to say that the supposedly polar opposite epistemologies of quantitative and qualitative research are really just 'straw men'. Instead, he argues, the impetus for adopting mixed methods should not be an attempt to bridge "the unbridgeable gap" between constructivism and positivism, but rather the recognition that such an approach can provide greater opportunities for answering research questions than does a 'mono' research design.

The epistemological position of the mixed methods in the present thesis is therefore best summarised as one of pragmatism (cf. Greene, 2008; Maxcy, 2003; Johnson and Onwuegbuzie, 2004), wherein there is an intention to draw on the strengths of both qualitative and quantitative methods, acknowledging the different epistemological characteristics of each, but also the areas of complementarity and overlap. As Yardley and Bishop (2008:355) argue, the integrative, epistemological basis for this sort of pragmatic approach is that:

> Pragmatism addresses the concerns of both qualitative and quantitative researchers by pointing out that *all* human inquiry involves imagination and interpretation, intentions and values, but must also necessarily be grounded in empirical, embodied experience.

Such a pragmatic approach: enables research to be flexible in the use of techniques; allows qualitative research components to inform quantitative research components (and vice versa); permits the answering of a broader and more complete range of research questions; and provides stronger evidence for conclusions through convergence and corroboration of findings (Onwuegbuzie and Leech, 2005; Johnson and Onwuegbuzie, 2004).

Where considering the features of public understanding of climate change, I will therefore draw upon both types of data. My intention will be to utilise these in a pragmatic manner in the answering of the research questions of the thesis.

Methodological approach of the thesis

The thesis incorporates analysis of primary and secondary qualitative data, and analysis of primary quantitative survey data (including in comparison to secondary quantitative data). However, given the extent of qualitative analysis carried out, it should be noted that the qualitative component constitutes the more substantial part of the research.

Given these considerations, the approach I will use can most appropriately be characterised as 'qualitative dominant mixed methods research'. Johnson et al. (2007:124) define this type of research as follows:

> Qualitative dominant mixed methods research is the type of mixed research in which one relies on a qualitative view of the research process, while concurrently recognizing that the addition of quantitative data and approaches are likely to benefit [the project].

The use of such a mixed research design permits ideas generated within the qualitative analysis, to be explored further in the quantitative phase. For example, from the discussions with focus group participants, I developed an interest in the means by which people applied ideas about recent cold weather events to appraise climate change. Whilst it had been suggested in the literature and media at the time that the cold winter weather was acting to dissuade people that climate change was a reality (as a sort of disconfirmatory evidence) it was my sense from holding discussions with people that this appeared *not* to be the case; indeed, many participants spoke of the cold weather in

terms that suggested this was evidence that climate change was occurring. I therefore incorporated survey items to test this further.

This is not to say that the quantitative phase is *necessarily* sequentially contingent upon the qualitative analysis. Indeed, the two components operate in a parallel fashion in the investigation of a number of ideas. For example, in the qualitative stage I was interested to discover whether and how participants' understanding of climate change as a part of natural systems, corresponded to the 'myths of nature' proposed by cultural theory (cf. Thompson, 2003). Such an approach I see as commensurate with the ways in which analysis has previously proceeded in the context of cultural theory (e.g. West et al., 2010). In addition, I adopted quantitative measures of 'myths of nature' (tailored to climate change) within the representative survey, to investigate whether these corresponded with other cultural theory measures. Again, this approach is commensurate with prior cultural theoretical approaches (e.g. Lowe, 2006). These two forms of analysis, combined, permit a more wide-ranging insight into the means by which perspectives on the natural world are integrated with perceptions of climate change more generally.

Research phases

The research design is described for simplicity in terms of three research phases, however particularly for the purposes of analysis there is substantial overlap between phases 1 and 2. Table 4.1 details the characteristics, objectives and analytic approach used for each research phase.

Table 4.1: Research phases

Phase	Main data type and characteristics (participant n)	Mode of data collection/ collation	Mode of analysis
1	Qualitative: focus groups from 2010 (n=47)	Primary: five participant groups each meet twice in Bristol	Phase 1 and 2 combined data analysis: discourse analytic/ qualitative longitudinal approach
2	Qualitative: focus groups and interviews from period 1997-2007 (n=162)	Secondary: data from five projects provided by original researchers	
3	Quantitative: survey data from 2011 (n=500)	Primary: online survey of representative UK sample	Quantitative statistical analysis (various techniques utilised)

4.2 Research phase 1: Bristol focus groups, 2010

This section describes the design, practicalities and conduct of a series of focus groups, carried out between March and April 2010. The focus groups were moderated by myself, and I was assisted at all sessions by Lucy Green, a Masters student at Cardiff.

The focus groups were carried out to enable the collection of a corpus of data that could be used as part of an over-arching longitudinal analysis, incorporating data also from phase 2. As such, the 2010 data was intended to constitute a cross-sectional, contemporary dataset.

Use of focus groups to research public understanding of climate change

In large part, my decision to use focus groups to generate an original dataset, was predetermined by the fact that this had been the preferred approach for four of the five pre-existing datasets with which I would be comparing new primary data. This said, there are aspects of focus groups as a research approach which are relevant to consider, including with respect to eliciting perspectives about climate change.

Focus groups are essentially a form of group interview, in which several participants respond to questioning about a pre-defined topic, and in which there is an emphasis upon interaction between

participants and the joint construction of meaning (Bryman, 2004; Morgan, 1997). The (relatively) naturalistic setting for focus groups[33] enables the researcher to investigate the nature of people's talk about an issue in a relaxed setting (Kitzinger and Davison, 2001). As these authors note, in the context of a study looking at perspectives on GM food, the focus group method enables the identification of "broader understandings of the world which inform diverse perspectives" and "to explore how different concepts are used in argument, the resource[s] which inform discussion and how ideas are mobilised and linked to each other in the course of conversation and reflection" (Kitzinger and Davison, 2001:5). The enabling of an examination of "how ideas are mobilised and linked to each other" in these terms, I argue is commensurate with the concept of discourse outlined in the literature review.

The use of focus groups in the context of the present study has other characteristic advantages (these are contextualised to Bryman's 2004:348 features of focus groups):

- Focus groups allow the researcher to develop an understanding about *why* people express the perspectives that they do. As well as the moderator using prompts to explore meaning, the group setting allows participants to probe one another's viewpoints. In the present study, this process was invaluable: both where participants disagreed with one another (e.g. where participants doubting the importance of climate change exchanged views with those believing it to be a matter of concern) and where participants shared opinions (to explore underlying ideas in some detail). As Bryman (2004:348) notes, exchanges between participants permit realistic accounts to emerge, because individuals will often argue with each other and challenge each other's views, in a way that it is difficult for a researcher to do;

- In focus groups participants are able to bring to the fore matters which they believe to be important. Open-ended prompts are used to generate discussion around broad themes but participants may take the conversation in a direction corresponding to their own concerns. In this way, people are able to relate their views on a topic, to their own experiences, memories, anecdotes etc.;

- Focus groups enable the study of how people collectively make sense of a phenomenon such as climate change. This I see as consistent with the approach I adopt in the thesis, i.e.

[33] As Bloor et al. (2001:57) point out, focus groups are 'naturalistic' rather than 'natural' events, and as such require to be structured and directed, to a greater or lesser extent, by the moderator.

that climate change understanding is identifiable in terms of socially-shared discourses. As Bryman (2004:348) puts the matter:

> The process of… understanding social phenomena is not undertaken by individuals in isolation from each other. Instead it is something that occurs in interaction and discussion with others. In this sense, focus groups reflect the processes through which meaning is constructed in everyday life.

The composition of focus groups was as heterogeneous as possible – based on gender, age and social grade. This was to encourage a diversity of views, debate and discussion in each group. Whilst it has been argued that heterogeneous groups may proceed more slowly through discussion topics, an advantage nevertheless is that they may be more effective in bringing a variety of perspectives and knowledge to bear in discussions (Stewart et al., 2007:28). Given that the research aims to draw out the variety and details of climate change discourses, the use of heterogeneous groups therefore seemed sensible.

The target number of participants for each focus group was 8-10 people. As Morgan (1997) notes, the rule of thumb size for focus groups is 6-10 participants. However, as part of the focus group procedure I subdivided participants into two sub-groups and so I recruited towards the higher end of the 'standard' sized group to allow for this.

Alignment of 2010 study design with previous research approaches

As mentioned above, the 2010 focus groups were conducted so that data obtained would be able to be compared to that arising from five previous projects described in the literature review, carried out between 1997 and 2007 (cf. Darier et al., 1999; Lorenzoni, 2003; Whitmarsh, 2005; Bickerstaff et al., 2008; Butler and Pidgeon, 2009).

Where possible, data collection protocols (i.e. interview and focus group schedules) were obtained from original researchers involved in the 1997-2007 projects. From these protocols and a consideration of research transcripts and literature arising from those projects, a number of cross-cutting themes were identified. These were then incorporated into the 2010 focus group protocol. The main themes identified across the original projects are summarised in Appendix 4.1, together with illustrative questions and prompts used from these projects.

All of the previous five projects provided initial space for participants to talk in general terms about climate change, prior to the use of more detailed prompts. At times, researchers led into a discussion of climate change through more general topics, including environmental issues. At other times, people were asked for immediate thoughts on any aspect of climate change.

All five projects included discussion about the causes and consequences of climate change. The distinction between natural versus human causation arose frequently, as did the means by which human activities were ascribed responsibility for causing climate change. People's views on the impacts of climate change were approached through, for example, asking about consequences in the future (e.g. in 20 years time) and in respect of people's own lives. Participants' (un)certainty was commonly addressed, though often implicitly: for example in 2000 participants are asked whether they think the climate is 'really' changing, or is it 'just' a case of natural variability.

The extent to which participants were concerned, and how important or serious they considered climate change to be, was considered in all projects. Terms used included 'concern', being 'bothered', and importance; and questions were asked about whether and why climate change is a good or bad thing. The 2002 groups contained no explicit questions about people's level of concern, however this readily emerged from discussions in any case.

All projects considered people's views on responsibility for responding to climate change. At times, this was asked in an open-ended fashion (i.e. who is responsible?); at other times, key social actors were referred to. All projects considered what should be done (if anything) to address climate, for example in terms of policy or behaviour change.

The 1997, 2000, 2002 and 2007 focus groups used a number of exercises to elicit discussion. These are not reviewed in detail here, however included: questionnaire items, responses to which were explored (2007); and eliciting responses to expert and stakeholder vignettes, presentations, documentation and/or quotes.

It is important to point out that for all projects (including the 2010 focus groups) the protocols provided a general framework for discussing climate change, and were not rigidly imposed. In all cases, discussions were of a semi-structured type, meaning there was scope to pursue points raised by participants and to permit interaction between participants – essentially, for conversations to develop in a relatively open-ended manner.

Further design considerations for 2010 focus groups

The focus groups which were carried out were 'reconvened': participants from each group met on a first occasion, and then a second time around a week later[34]. A reconvened approach enables more material to be covered than in a single group discussion, and participants are able to reflect upon particular topics covered in the first week in preparation for the second (Ritchie and Lewis, 2003:172). As Liamputtong (2011:46) notes, a focus group should not usually last longer than two hours – longer groups may be tiring and people's interest may wane. With these considerations in mind, I arranged two 1.5 hour discussions for each participant group.

Stimulus materials and activities were used in the focus groups, to provide a 'common external reference point' (Kitzinger, 1994) i.e. to focus discussion in a similar way for all participants. These are described in more detail below. As well as the use of stimulus materials, in the second of the two meetings participants were split into two separate concurrent groups for much of the time. The purposes of this were to permit different dynamics to develop among participants, and to generate more data than would be possible with one larger group only. I oversaw one of the sub-groups, and the second moderator, Lucy Green, oversaw the other.

Focus group structure and design

First focus group meeting

The full protocol for the first focus group is given in Appendix 4.2. This details the structure of the session, prompting questions and activities used.

The objectives of the first focus group were to generate discussion in respect of the main themes identified across previous projects. Table 4.2 summarises the main discussion themes, and shows illustrative examples of questions used[35]. Again see Appendix 4.2 for a more complete outline.

[34] The actual time period varied slightly, though most groups were seven days apart.

[35] Note that the prompts were used as a memory aid rather than a strict protocol: I saw it as important for the discussion to be relatively free-flowing and naturalistic, and provided participants were discussing matters pertinent to climate change I often saw it as appropriate to step back from the discussion.

Table 4.2: Main discussion themes for first focus groups

Discussion focus	Example question prompts
Knowledge/ awareness of climate change; general associations	What sort of things come to mind when you hear the phrase 'climate change'?
Levels of concern, views on seriousness	Is climate change something you are personally worried or concerned about?
Causes and consequences of climate change	What do you understand to be the main causes of climate change?
Responsibility for responding to climate change	Whose responsibility is it to do something, if anything, about climate change?
Ways of responding to climate change	What can be done/ what action can be taken to address climate change?
Perceptions of others' views on climate change; informational portrayal	Is climate change something that other people you know are concerned about?

Three 'focussing activities' were utilised in the first focus groups; see Appendix 4.3 for details and duplicates of materials used.

The first activity aimed to generate discussion at an early stage of the session[36]. The exercise entailed asking participants as individuals to spend a few moments highlighting one or more of the words and phrases on a provided card, that illustrated possible reactions to climate change (e.g. 'worry', 'optimism'). They were also invited to add their own words/phrases. Once participants had completed the exercise, I led a discussion around the responses obtained.

The second activity aimed to generate discussion around responsibility for causing, and for addressing climate change. This was an amended version of an activity used in the 2007 focus groups. Again, participants spent a few moments completing the activity, followed by an open discussion.

The third activity aimed to generate discussion around a series of nine illustrative participants quotes, taken from previous focus groups. The purpose of this was to investigate the extent to

[36] In practice, discussion often proceeded in an open-ended manner from the start of the session (e.g. following participants being asked what came to mind about climate change), and so this first activity was not used at the very beginning of the sessions.

which previously expressed views resonated with a new participant group. The quotes used were stylised versions of actual comments made, and related to various aspects of climate change.

At the end of the focus group, participants were provided with an A4 envelope containing copies of part of the resources to be used in the second focus group as well as a Met Office leaflet about climate change[37].

Second focus group meeting

The full protocol for the second focus group is given in Appendix 4.4. The objectives of this meeting were to reflect upon the previous week's discussion, and in addition to obtain participants' views concerning:

- Media reporting of climate change;
- Expert and stakeholder portrayals of climate change;
- Different policies and means of responding to climate change.

The second focus group was more structured around activities than the first meeting, although participants were still given as much space as possible to discuss the topics under consideration.

The materials utilised in the second focus groups are given in Appendix 4.5.

The first activity was carried out in two sub-groups, and entailed participants as a group discussing their impressions of a series of newspaper headlines, with photocopies of the headlines distributed around the participant sub-groups. The headlines used were selected to reflect a diversity in reporting of climate change, and were all obtained in the month prior to and during the COP15 Copenhagen conference – a time at which there was substantial media focus on all aspects of climate change[38]. Participants were divided into two smaller groups for this exercise, with each sub-group separately recorded and moderated.

The subject area, text and source of all headlines are detailed in Appendix 4.5.

[37] This can be found online as a pdf at http://www.metoffice.gov.uk/media/pdf/p/a/quick_guide.pdf

[38] There was more coverage in broadsheet newspapers, and so there is a bias towards broadsheet headlines; however where available I also used tabloid headlines.

The second activity used in the second session, was designed to contextualise the more complicated third activity concerning policy responses to climate change. However, it was also used as an opportunity to obtain perspectives on television news reporting, and in respect of a short series of expert and stakeholder 'talking heads'.

Participants were first shown a three minute clip from the BBC evening news, which reported on the COP15 conference just before its start, referred to the email hacking controversy at the University of East Anglia ('Climategate'), and featured a short film on Kingsnorth coal-fired power station.

Following the news clip, a series of one-minute films made by TVE productions[39], were shown to participants (with permission from TVE). These shorts can be accessed on the internet via TVE's channel: http://www.youtube.com/playlist?list=PLFB2EA7509A96B670 (last accessed November 4th 2011). The speakers and subjects of the clips used are summarised in Appendix 4.6. Following the showing of these clips, participants were asked for responses.

The third activity was designed to obtain participants' perspectives on different policies and modes of responding to climate change. A detailed analysis of participant responses to these focussing materials is not included in the thesis, however the materials used in this activity can be found in Appendix 4.5.

Practicalities and conduct of the focus groups

Ethical approval for conducting the focus groups (including a pilot) was obtained prior to their conduct. Appendix 4.7 shows the information given in the ethics application (as submitted and approved). This includes a copy of the consent form and information sheet provided to participants, as well as a sheet used for recording basic demographic information.

Prior to carrying out the main focus groups, a pilot focus group was conducted with a group of six undergraduate students, via the School of Psychology recruitment procedures. The purpose of this pilot was to familiarise myself with the question protocols and to trial questions and materials. No substantial amendments were made as a result of the pilot group.

[39] TVE is 'Television Trust for the Environment', a film production charity. TVE's 'Climate Thinkers' DVD was produced with support from the World Bank, the United Nations, and several charities.

Participants for the main focus groups were recruited via a market research company (as stated in the ethics submission). The recruitment company used pre-existing databases for recruitment of participants, as well as direct approaches to people. Each participant was paid £70 for attending the two focus groups. Funds for participant payment and for the work of the market research company came from Prof. Nick Pidgeon's ESRC Climate Leader Fellowship.

The specification for recruitment was that participants were to be representative of the population[40] in terms of age, gender and social grade. The dates of attendance, age, gender, highest educational qualification and occupation of the participants at the Bristol 2010 focus groups are given in Appendix 4.8. 21 men and 26 women attended, with a mean age of 40 years (standard deviation of 15 years).

The focus groups were timed to coincide with national survey work being undertaken by the Understanding Risk Group at Cardiff University (cf. Spence et al., 2010) also concerned with public understanding of climate change. As such, they took place for the most part during mid-March 2010 to early-April, with an additional group run at the end of April/early May. The focus groups were carried out at two locations in the city of Bristol, close to the city centre and able to be reached by car or public transport. Five groups of people each met on two occasions, meaning a total of ten 1.5 hour sessions were conducted. Focus groups in all cases took place on weekday evenings between 7pm and 8:30pm.

Prior to the discussion proper in the first meeting, I gave an introduction to the purpose of the research and obtained informed consent. A simple icebreaker was used, where participants were asked to say their name and something about themselves. The structured protocol was then used to direct discussion.

Prior to the second focus group, participants were reminded (usually by text and email) about the location and timing of the meeting.

Discussions were tape-recorded and transcribed as soon as possible following the meetings.

[40] Given the small numbers of total participants, technically it is more appropriate to say 'quasi-representative'

4.3 Research phase 2: Use of combined qualitative analytic techniques

4.3.1 Discourse Analysis: practicalities and procedures

The present study uses discourse analysis to determine the main ways of understanding climate change (the discourses themselves), drawing on theory described in the literature review. In particular, the approach adopted here recognises certain key features of discourse, each with their own analytic implications:

- Discourse is s*ocially shared* – practically speaking, this means that ways of representing climate change will be detectable in unrelated transcripts and across more than one research project; in this sense they are also *commonplace*;

- Discourse is *patterned* – discourses comprise recognisable and recurrent metaphors, rhetorical devices and concepts; these features are situated and identifiable in language;

- Discourses are *purposive* – they have function; they are used by people for particular ends.

With respect to the practicalities of conducting discourse analysis, it is more problematic to outline some aspects of this process than others, especially – as Burman and Parker (1993:2) note – given there is a "danger [in] pretending that there is a simple method for gathering discourses (as if they could appear like the rest of the data psychologists collect)". Potter and Wetherell make a similar argument about the actual process of discourse analysis:

> Analysis of discourse is like riding a bicycle compared to conducting experiments... which resemble baking cakes from a recipe. There is no mechanical procedure for producing findings from an archive of transcript. There is no obvious parallel to the well-controlled experimental design.

An attempt is nevertheless made to present the discourse analysis carried out here, in as transparent a way as possible. Some aspects of the analysis are less overt than others – for example, the interpretation of the datasets has at times entailed long periods of reading and re-reading of transcripts, combined with a process of development and refinement of discourses over

several months. In this sense, the research approach combines both components of Coffey and Atkinson's description of qualitative research[41]: that it is 'artful' as well as 'methodical':

> [a]nalysis is not about adhering to any one correct approach or set of right techniques; it is imaginative, artful, flexible, and reflexive. It should also be methodical, scholarly, and intellectually rigorous (Coffey and Atkinson, 1996:10).

The analysis proceeded through two broad stages: (i) initial familiarisation/preliminary coding and (ii) identifying discourses and their component parts.

Initial familiarisation and preliminary coding

A preliminary coding of a sub-sample of approximately 50% of transcripts (n=20) from across the datasets, was carried out to lay the groundwork for a more substantial discourse analysis. This preliminary analysis was carried out according to the procedures of 'open coding' commonly used within grounded theoretical approaches (Charmaz, 2006). The main objective here is to work through the transcripts systematically (approximately line-by-line), so as to note both low-level concepts and more abstract features deemed relevant (Henwood and Pidgeon, 1992) – in the case of the present thesis, which are likely to be relevant as component parts of discourses of climate change.

An illustrative example of the manner in which this open coding was carried out, showing a part of a 2010 focus group transcript, is given in Appendix 4.9 (note this is reproduced in original format and so represents a 'work-in-progress').

In parallel with the open coding procedure, research notes (or 'memos') were also kept to enable ideas about the relationships between categories/codes to take shape (this proceeded along the lines suggested by Robson, 1993:387, and Henwood and Pidgeon, 2003). Memos were taken as notes by hand during the analytic process and referred to where developing more fixed discourses.

Having carried out a series of open coding analyses, I formed the opinion that 'saturation' (cf. Bowen, 2008) had been achieved; that is to say, the main concepts pertinent to the overall analysis had been identified, which would not have changed substantially were more open coding to have been carried out.

[41] I am indebted to Dr Karen Parkhill for pointing me towards this dualistic characterisation of qualitative approaches.

Identifying discourses and their component parts

Following the open coding process described above, the main characteristics of the discourses and their component parts were classified. This process drew on the environmental discourse analytic approach designed by Dryzek (1997) and applied also by Hulme (2008) and Segnit and Ereaut (2008) in the context of climate change. The analysis also drew on the consideration of function (or 'language-in-use') as advocated by Potter and Wetherell (1987).

The first stage of the discourse analysis entailed selecting key recurrent metaphors, rhetorical devices, and other concepts that cohered together (cf. Dryzek, 1997:17). For example, reference to *long timescale* events (such as human evolution, continental drift) are commonly used where discussing the physical characteristics of climate change, as are references to the inherent *changeability* of nature ('mutability') and *cyclical* character of change (e.g. recurrent ice ages).

As well as identifying key concepts, it is important to attend to how they cohere as 'ensembles of concepts' (Hajer and Versteeg, 2005) pointing to their being component parts of a wider frame of meaning. The identification of correspondences between concepts in this way begins the process of developing self-contained "recurrent patterns" of discourse (Willott and Griffin, 1999:449). Concepts may be considered to cohere as components of a discourse if they are used in conjunction with one another in interpreting climate change in a particular way (e.g. in the example above, as portraying climate change as a natural and physical process).

The next stage of the discourse analysis entailed depicting in some detail the 'ontology' of discourses as a whole that over-arched these 'ensembles'. Dryzek (1997:16) defines the ontology of a discourse as "the basic entities whose existence is recognised or constructed"[42]. In practical terms, this entails naming and characterising discourses based on the meaning emergent from the coherence of concepts. In the case of the concepts above the discourse derived was termed *climate as nature*: it recognises climate change as a physical phenomenon which is a part of wider natural systems[43].

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[42] Dryzek (1997:16) adds by way of illustration: "some discourses recognise the existence of ecosystems, others have no concept of natural systems at all... some discourses organise their analyses around rational, egoistic human beings; others deal with a variety of human motivations".

[43] To give further practical examples: the discourse identified concerning the *status and practice of science*, tends to reference key concepts and metaphors of science – such as evidence, measurement, hypotheses, and scientific debate; climate change is construed via these notions as an empirical, objective phenomenon (its ontology). By contrast, the discourse concerning lifestyles and social practice, construes climate change in terms of its relationship with the practicalities of everyday life (e.g. need to get to work, pressures of looking

The third stage of the discourse analysis entailed attention to its *function*. Potter and Wetherell (1987:33) suggest that discourse function can be both specific (e.g. making a particular argument) and global (e.g. presenting oneself in a favourable light). According to these authors, "the analysis of function cannot be seen as a simple matter of categorising pieces of speech, it depends on the analyst 'reading' the context".

I suggest that there are occasions across the transcripts where function may be relatively explicit. For example, during a discussion about the acceptability of taking flights, a 2010 participant states:

> I want to fly, because I want to take my kids on holiday, and pay for them to have nice things. I have a concern about, obviously the environment but I don't want to stop my kids experiencing different things.

A specific function here is in the justification of one's choices; a more global function is likely to be self-presentation (wishing to be seen in a positive light).

At other times, however, it is important to note that function may be required to be inferred. For example, a separate 2010 participant remarks:

> I did an online exercise which said basically I'm a baby-eating world-dominating killer. So, even if I reduced my lifestyle down to knitting my own socks from locally-sourced nettles then I probably couldn't offset my own carbon footprint… It's just rubbish.

One function of this talk is to characterise online carbon calculators in a negative light. However, the more important (and implicit) function, I would argue, is the expression of irritation about unrealistic expectations of individual responsibility, through the use of sarcasm – which requires inference concerning (cultural) context.

Interplay between grounded/inductive and theoretically-informed discourse construction

The present discourse analysis is not intended to be a fully inductive approach. In practice, an awareness of prior theory and research has informed the development of the discourses outlined in the following chapters. Again, a pragmatic approach is adopted, in which discourses are

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after a family) and in the context of living in a modern (consumerist, industrial, Western) society: this discourse is thus about 'ways of living'. Both these discourses are equally valid but largely separate versions of what climate change 'is', each emphasising a different ontology and set of concepts.

generated which are both grounded in the data and yet not dissociated from prior theorising. Such an analytic process – entailing a constant interplay between data and conceptualisation – has been described by Henwood and Pidgeon (1992:104) as a "'flip-flop' between ideas and research experience" and as sensibly reconciling the 'inductivist positivism' of purely grounded approaches and a hyothetico-deductive method; Schiellerup (2008: 169) describes a similar procedure as a "constant two-way dialectical process".

With respect to prior research findings and theory, the discourses identified are grouped into three broad categories: physical, social and personal/psychological discourses. More specifically, certain discourses and parts of discourses are informed by prior conceptual frameworks. For example, the *relational responsibility* discourse (one of three 'social' discourses) is concerned with how climate change responsibility is conceived of in terms of relationships between social actors (especially government and individuals) as previously identified in the literature (Bickerstaff et al., 2008). The *climate as nature* discourse (one of three 'physical' discourses) recognises the conceptualisation of climate change in terms of the 'myths of nature' framework proposed by cultural theorists (e.g. Thompson and Rayner, 1998).

At the same time, these discourses could not 'exist' unless participants portrayed climate change in such terms. As such, the detailed composition of discourses is arrived at through extensive attention to participant talk as recorded in the transcripts. Some discourses are also more weighted towards a novel interpretation of climate change understanding. For example, the *folk psychology* discourse outlines the means by which action on climate change is seen to be contingent upon the psychology and motivations of others. Whilst this has been alluded to elsewhere in the literature (Fischer et al., 2011) the discourse as presented here is closer to a set of ideas driven by participants' remarks in the datasets themselves, than as oriented to a prior framework.

I now turn to a consideration of both secondary and longitudinal analysis of qualitative data. Whilst neither of these approaches are entirely novel, neither is at all well-developed in many areas of social science. Moreover, the combination of these methods is new: no prior literature has been obtained that outlines how such an approach might operate[44]. Sections 4.3.2 and 4.3.3 therefore outline in detail the principles and practicalities for a combined secondary and longitudinal qualitative methodology, to investigate changes in public understanding of climate change over time using multiple extant datasets.

[44] Neither literature searches, nor personal communication with experts in both longitudinal qualitative analysis and secondary qualitative analysis, have yielded any work directly incorporating these two approaches.

4.3.2 Secondary Qualitative Analysis

Techniques for the secondary analysis of *quantitative* data have been established over many years across the social sciences. Writing some 35 years previously, Glass (1976:3) for example states that "some of our best methodologists have pursued secondary analyses in such grand style that its importance has eclipsed that of the primary analysis" and cites studies from the early 1960's in which meta-analytic techniques were being used to make sense of conflicting study results.

By contrast, secondary qualitative analysis can still be considered a relatively nascent methodology. In a review of the field, Heaton (2000) states that the re-use of qualitative data remains an "under-developed" approach; Long-Sutehall et al. (2011:335) emphasise that "whilst there is a well-established tradition of carrying out secondary analysis of quantitative datasets within social… research, this has not been the case with qualitative datasets".

Hammersley (2010) draws attention to the recent growth in interest in the re-use of qualitative data, but suggests that at the present time much that is written tends to focus on debates about the advantages and problems of secondary analysis (rather than on practicalities of method).

Epistemological and methodological concerns

Data 'fit'

One of the main concerns of researchers considering secondary qualitative analysis is that of data 'fit' – that is to say, that problems may arise in respect of using data which has been obtained for one purpose, being put to another (Heaton, 2008; Hammersley, 2010). Whilst identifying data fit as a critical concern, Heaton (2000) argues that most published studies nevertheless failed to address this in their research reporting.

As Hammersley (2010) argues, the potential problem of data fit does not automatically disqualify re-use of qualitative data, any more than in other circumstances where researchers work with extant materials. Nevertheless, these concerns warrant consideration as to the degree to which secondary data may be considered to match novel research questions. Clearly, if there is considerable mis-match between research objectives and the data available then problems will arise. This said, questions asked of qualitative data often change over the course of the research process in any case, and must maintain their 'fit' as this process proceeds. This is as true for primary as for secondary analysis.

An initial assessment of data fit in the present study entailed a broad reading of all transcripts obtained for each project, to ascertain which parts were of relevance to the overall objective of the present research. This 'sorting' of data into relevant and less relevant parts has been identified as an important stage of secondary qualitative analysis (Heaton, 2004).

In all cases, there are sections of the original datasets (i.e. transcripts) appropriate for re-analysis, with other parts discarded. For all transcripts, those sections of interviews/focus group discussions where participant talk relates to any aspects of climate change perceptions – including for example perspectives on the status of climate science, or responsibility for addressing climate change – these are retained for analysis. Where aspects of the discussions are not directly relevant, however, these are not included. In practice, this has meant either overlooking these sections when analysing transcripts, or in the case of lengthy irrelevant sections, omitting these when importing transcripts into NVivo. Table 4.3 summarises the material *omitted* from each of the research projects following data sorting.

Table 4.3: Material from original datasets omitted from analysis

Data set	Material not included
1997/8 (Darier et al., 1999)	Perceptions on general environmental issues (e.g. litter); discussions between participants and policy makers
2000 (Lorenzoni, 2003)	Response of participants to detailed climate change scenarios, as formally presented to them
2002 (Bickerstaff et al., 2006)	Discussion of nuclear power as a risk issue
2003 (Whitmarsh, 2005)	Discussions exclusively concerning participants' experiences of flooding; one interviewee transcript omitted due to its unusual characteristics (an economics lecturer relating climate change to technical, discipline-specific matters)
2007 (Butler and Pidgeon, 2009)	Discussion of nuclear power as a risk issue

A second means by which data fit is attended to, is that the discourse analysis carried out incorporates an inductive approach which is grounded in the data available (see above). This research approach ensures that the characteristics of the data to an extent precede and determine the discourses identified – i.e. they 'fit' by design.

A third means by which data fit is attended to, has been the re-application of elements of original research design for the conduct of the Bristol 2010 focus groups, with the objective of ensuring that novel primary data is comparable as possible to earlier datasets (as described above).

Data 'familiarity'

A further concern in the literature on secondary qualitative analysis, is that of data familiarity (Heaton, 2000). Of considerably more relevance to qualitative than quantitative material, is the notion that research findings are often considered to derive from an analyst's proximity to the subject of research; the implication may be that this is not possible to achieve by an unfamiliar researcher who was not involved in the original research processes.

In much qualitative research – particularly that tending towards more interpretivist or ethnographic approaches – the aim of the researcher is to understand and explain the world 'through the eyes' of research participants (Bryman, 2004:279) in a manner in which "subjectivity is paramount" (Holstein and Gubrium, 1998:139). An example of ethnographic work in the field of climate change perceptions of this type of work is that by Norgaard (2006a,b) who conducted a year of field research in Norway entailing participant observation, interviews and media analysis. Given this researcher's immersion in everyday life, it is hard to see how a 'secondary analysis' would be feasible. Although a revisiting of interview transcripts may not be unreasonable in itself, Norgaard points out that even these were not considered in isolation, rather were triangulated with participant observation; moreover the *immediate context* of participant talk in this research is asserted to be important where it is stated for example that "[I] especially noted topics that were not discussed… and *how people seemed to feel* talking about [climate change]". (Norgaard, 2006a, italics added).

In contrast to the work by Norgaard, the secondary datasets utilised for the purposes of the present thesis are, however, not considered to present a substantial challenge viz. familiarity. In each case, data were gathered for purpose on specific occasions (i.e. were not part of a wider ethnographic context), transcribed verbatim and – most importantly – *analysed as texts*. According to the original researchers themselves, data analysis did not entail such 'ethnographic' concerns;

indeed a relatively straightforward coding and thematic analytic procedure appears to have been applied for the most part. Thus Whitmarsh (2005:93) reports that her "interviews were recorded, transcribed and analysed using a hierarchical coding procedure". Lorenzoni (2003:215) reports that "responses to the questions contained in the discussion protocol were analysed thematically". The analytic approach for the ULYSSES focus groups in 1997 entailed "selectively transcrib[ing] [the transcripts] and then [scanning] the transcripts for discussion sequences relating to the topics of primary interest" (Kasemir et al., 2003).

In all the original research projects, whilst research accounts reveal that considerable effort went into the preparation and conduct of generating the research data, nevertheless the data used can be considered to have been treated as self-contained bodies of textual material. Strictly speaking then, 'familiarity' with the original data should not be considered analytically problematic: the data are preserved in their original form as documents, which may be analysed in the same form as previously (albeit using a different approach).

This said – and with the benefit of reflection following the conduct of the Bristol 2010 focus groups – it must be acknowledged that the absence of face-to-face interaction with research participants inevitably positions the researcher at some remove from the subtle contextual detail of focus group discussions; as Lofland and Lofland (1995:16) argue in respect of qualitative approaches, "face-to-face interaction is the fullest condition of participating in the mind of another human being".

An illustrative example from the Bristol groups of the importance of immediate context, entails an interaction between two participants where a largely silent young participant began to explain how she believed that climate change may be connected to space travel having made holes in the upper atmosphere, which now permitted more heat through. A second participant (rather tactlessly) laughed this suggestion down, and the first participant as a consequence did not pursue her suggestion: the possibility of understanding her perspective was lost as a consequence of her embarrassment.

The details of an occurrence such as this (as well as being challenging for myself as a researcher to manage at the time) do not appear explicitly in the focus group transcription, but may yet be borne in mind due to my personal familiarity as the original researcher. Similarly, if (as seems highly likely) particular nonverbal behaviour or ways of talking (such as the use of sarcasm) were known to the original researchers from the 1997-2007 datasets when carrying out their analyses, it cannot therefore be stated that familiarity is as comprehensive for a new researcher. This type of 'tacit' knowledge – or 'head notes' (Ottenberg, 1990) – which are derived from encounters such as that

described above, has been affirmed as having an important role in the analytic process, and indeed as having particular implications for secondary qualitative analysis (Mauthner et al., 1998; Gillies and Edwards, 2005).

Whilst recognising this limitation, it may be argued that incomplete familiarity does not constitute an insurmountable problem. Firstly, relative lack of contextual knowledge is not unique to secondary analysis (for example, it is common in research projects using multiple researchers and analysts). In addition, it cannot be assumed that what a primary researcher 'knows' in terms of context is always correct, far less complete: interpretation dependent upon assumptions is always required (Hammersley, 2010). Nevertheless, it should be acknowledged that there are more interpretative constraints for the primary than the secondary researcher.

In the case of the secondary analyses performed in the thesis, for the most part audio or video tapes of discussions were not available, and so the analysis is confined to the transcripts alone. Arguably, the analysis of secondary transcripts – as opposed to one incorporating researcher presence at the original discussions – is therefore in some ways akin to a 'textual analysis' approach to discourse analysis (cf. Fairclough, 2003). Yet still, and as Fairclough (2003:129) affirms, one may orient discourse analysis towards "identify[ing] the main parts of the world (including areas of social life) which are represented" in this text or talk. Indeed, practically speaking, the line between 'talk' and 'text' may be considered blurred in much qualitative analysis, where this is ultimately performed upon written transcripts of conversation, discussion, interviews etc.

Practicalities and ethics of secondary qualitative analysis

A number of researchers who had originally carried out research in previous years were approached by Prof. Nick Pidgeon (first supervisor) with a request to be able to access and re-analyse their qualitative datasets. Given that re-analysis of qualitative data remains unusual, it is important to recognise that the researcher network of Prof. Pidgeon was central to accessing this material.

With gratitude, I acknowledge the assistance of the following people in providing data: Eric Darier and Simon Shackley (ULYSSES project, 1997-98); Irene Lorenzoni (from her own thesis);

Lorraine Whitmarsh (from her own thesis); Nick Pidgeon (2002 Leverhulme Trust programme); and Nick Pidgeon and Catherine Butler (2007 Leverhulme Trust programme)[45].

The ethical position regarding re-use of data by a new researcher outside of the original research team, is not entirely straightforward (Kelder, 2005)[46]. Because of concerns about the ethical position of re-use of qualitative data, advice was therefore sought from within the supervisory team, and from the School of Psychology Ethics Committee. Stipulations were made that the data re-used should be anonymous and that any re-analysis should be for a comparable purpose (i.e. concerning public understanding of climate change rather than an entirely new research objective).

A formal ethics approval submission was made following these inquiries, which was approved; information included in this is given in Appendix 4.10.

Approaches to secondary qualitative analysis

Whilst secondary qualitative analysis remains a relatively under-developed approach, nevertheless it is useful to consider some of its key objectives as outlined in the literature.

Types of analysis

From a review of 55 studies in the health domain, Heaton (2000) proposed six types of secondary qualitative analysis, later amended to five types based on 65 studies (Heaton, 2004). The types of analyses identified incorporated studies which aimed to go beyond the focus of the primary study, or to consider particular questions in greater depth; studies which combined data from multiple secondary or primary studies for the purposes of comparison or sample enlargement; and studies which either repeated original analytic approaches or used new methods and perspectives. The more recent typology proposed by Heaton (2004) is given in table 4.4.

[45] Further data was provided from 1988 by Jacqueline Burgess, which was not utilised due to there being little or no reference to climate change. A request was also made to one other researcher, who had also obtained qualitative data on public perspectives on climate change, but this request was declined.

[46] On the one hand, this may be argued to be problematic, because research participants have not given explicit consent for their data to be used beyond the original research. On the other hand, once qualitative data has been anonymised and analysed, it is (implicitly) considered able to be made 'public' by researchers – and as such is used in publications, theses and reports. A common characteristic of qualitative writing, indeed, is the use of long passages of participant talk to illustrate analytic points.

The most appropriate characterisation of the secondary analysis used in the present study, is that it incorporates elements of 'assorted', 'amplified', and 'supplementary' analysis. The research combines secondary analysis with primary research; combines data from several primary studies for the purposes of (longitudinal) comparison; and seeks to investigate in a more in-depth manner emergent issues not addressed in the primary studies (whilst keeping within the bounds of not asking entirely novel questions of the data). Although there is considerable overlap between types, this is not unusual: as Heaton (2004:38) notes, the types identified are not exclusive and may occur in conjunction with one another.

Table 4.4: Types of secondary qualitative analysis

Type of SQA	Description
Supra analysis	Transcends the focus of the primary study from which the data were derived, examining new empirical, theoretical or methodological questions.
Amplified analysis	Combines data from two or more primary studies for purposes of comparison or in order to enlarge a sample.
Supplementary analysis	A more in-depth investigation of an emergent issue or aspect of the data which was not addressed in the primary study.
Assorted analysis	Combines secondary analysis of research data with primary research and/or analysis of naturalistic qualitative data.
Re-analysis	Data are re-analysed to verify and corroborate primary analyses of qualitative data sets.

Analytic considerations

Harder to demarcate than a broad typology, are analytic approaches particular to secondary data. Indeed, in prefacing their own approach, Long-Sutehall et al. (2011:335) point out that despite the recent growth in interest in the field, "very little information is available regarding the process, as publications tend to focus on the outcomes of analyses".

In her review of secondary studies, Heaton (2004) finds that grounded theory, content analysis and narrative analysis were some of the more commonplace approaches utilised. However, the methods used appeared to have more to do with the fact that re-analysis tended to be carried out in a similar manner to the primary studies (indeed often by the same researchers), than with a deliberate intention to select an approach suitable for a secondary analysis.

Long-Sutehall et al. (2011) – drawing on the arguments of Heaton (2004) – recommend that secondary analytic approaches be similar to those applied in the primary analysis, out of consideration for data 'fit' (as outlined above). In the present study, there *are* differences between analytic techniques employed between primary and secondary analyses: nevertheless, due to the fact that the analytic techniques as originally employed are not considered to have been *contingent* on the nature of the data this is not considered problematic.

The discourse analytic approach used in the present study is outlined in more detail below. At this stage, however, it is useful to outline why the particular type of discourse analysis used is considered appropriate for the secondary analysis of climate change understanding.

Firstly, it should be noted that the incorporation of six different projects gives rise to an overall corpus of data featuring 209 participants, 32 focus group transcripts, 21 interview transcripts, and a total of almost 750,000 words of text. This quantity of data, whilst advantageous in terms of its extensiveness and richness, is nevertheless not possible to process at the fine-grained level which much 'discourse analysis' is done: for example, approaches such as conversational analysis (Pomerantz and Fehr, 1997) require meticulous interpretation of often very short sections of talk, with conclusions based upon tone of voice, hesitation, turn-taking, etc. Even were this level of detail available (and it is not) it is not feasible within any realistic time period to consider the datasets in this manner.

The discourse analytic approach used here instead focuses on a higher level of abstraction, whereby discourses are considered to constitute ways of representing the world which "transcend concrete and local representations" (Fairclough, 2003:124). As outlined in the literature review, the emphasis of the discourse analysis of the present thesis is on identifying commonalities which are *shared* by people – importantly, commonalities shared across research projects and over time. This emphasis also addresses concerns about data fit and familiarity: the former because by definition discourses must be applicable across research projects; the latter because at a higher level of abstraction and at a trans-individual scale, the minutiae arising from conversational interaction is deemed to be of lesser importance (i.e. *what* is said is more important than *how* something is said).

An additional consideration prior to the (re-)analysis of the datasets in the present study, was to determine whether this should commence from first principles – i.e. without reference to original codes/themes derived – or entail some recognition or synthesis of these.

Medjedovic and Witzel (2005) have suggested that codes connected to original transcripts can afford useful insight in the re-analytic process. However, this approach was not adopted for the following reasons: firstly, coding schema were not available for all datasets; secondly, coding procedures and codes obtained varied between studies and/or were unclear or unstated; thirdly, because coding schema were obtained as part of independent studies, a difficult and potentially unfruitful process of reconciling coding across studies would have been required.

Other researchers involved in secondary qualitative analysis have argued that 'bespoke' analytical frameworks are important to use, entailing data coding for the purpose of each (new) analysis (Henwood et al., 2010). The approach I have taken, similarly, has been effectively to set aside previous categorisations and interpretations of data, such that new analysis begins with a 'clean slate' (West and Oldfather, 1995). In practice, this has entailed some 'cleaning' of transcripts, to ensure that all have the same initial format: original researchers' memos ('notes to self'), notations etc. were removed, and pseudonyms[47] reconfigured.

4.3.3 Longitudinal qualitative analysis

As with secondary qualitative analysis, whilst longitudinal qualitative research is not in itself new, nevertheless for many areas of the social sciences its application is rare: as Neale and Flowerdew (2003) argue, it is a paradigm that "has yet to be articulated and clarified".

Holland et al. (2006) in a review of the field, note that longitudinal qualitative research has been undertaken as a matter of course in disciplines such as anthropology, where many classic studies have indeed entailed long-term commitments to a research site. A range of other social science studies reviewed by these authors have also employed such methodology, though in a less established manner. For example, developmental psychology studies have looked at areas such as

[47] Some studies used pseudonyms, others participant numbers: rather than adopt a confusing mix based on the original names/numbers, I renumbered these.

development of identity (Kraus, 2000) and gender construction (Gulbrandsen, 2003) using longitudinal approaches[48].

At other stages in life, longitudinal methods have also been employed to attempt to understand key transitions: Henwood and Procter (2003) for example explored men's changing attitudes towards becoming fathers via repeated interviews during and after their partners' pregnancy; Henwood et al. (2010) reported on changing male identities in response to financial crisis; Hardcastle (2001) investigated changes from sedentary to active lifestyles in older people; and Millar (2007) examined lone-mother experiences of poverty in the context of a transition from unemployment to paid work.

In some of these aforementioned studies, consideration is given to the particular advantages and limitations of longitudinal qualitative approaches: for example, Kraus reflects on the adequacy of the period of time devoted to his analysis; Millar upon the potential for longitudinal work to delineate the complex processes at work in life transitions.

Other work has also discussed the advantages and limitations of the approach. For example: Lewis (2007) argued that longitudinal qualitative data was particularly valuable in permitting insights into the relationships between people; and Corden and Nice (2007) argued that it was only through the use of such an approach that certain issues were able to be highlighted, namely in respect of individuals' changing experiences as they progressed through a training programme.

These studies, whilst affording some insights into the current state of the field, nevertheless are singularly *different* from the present study in one important regard: they follow a particular cohort of individuals (children, fathers, employees, etc.) over a time period. Missing from the studies reviewed by Holland et al. (2006) and obtained elsewhere, are approaches examining change over time using a series of cross-sectional datasets with different participants. As Holland et al. (2006:21) note, "most qualitative longitudinal studies have taken the individual as a unit of analysis" – although this may be extended to encompass families and other groups over time (e.g. Holland et al., 2004). This emphasis is likely in large part due to the nature of the studies themselves – which are mostly, if not exclusively, concerned with understanding individuals' and/or social groups' experiences of *life transitions*. Even some work which has explicitly considered the combined use of secondary and longitudinal qualitative methodology, does so with

[48] This said, it is notable that some of the studies cited by Holland et al. in their review, in fact rely on quantitative techniques for analysis: for example, a study referred to by Hughes and Dunn (2002) applies chi-square tests to ascertain the significance of changes in prevalence over childhood of coded instances of expressed emotion.

reference to archived project data which examines individuals' transitions in a similar manner to the primary studies (Irwin and Winterton, 2011).

The consequence of this character of the literature, presents a challenge for the present thesis. This is to structure a longitudinal approach of a different type to that found previously: one that aims to examine changes in people's understanding over time, through reference to different groups of participants' perspectives. Nevertheless, related issues connected with how to address context in qualitative longitudinal research, and how to identify trends over time, are of relevance to the present study – these are considered further below.

Qualitative longitudinal research: addressing context

In order to be able to make claims about change or continuity over the time period of interest, it is necessary first to give consideration to questions of context pertinent to the present study design.

Although there are similarities between the methods and objectives of each of the secondary datasets re-analysed for the present research, nevertheless every interview or focus group carried out is in some sense unique: no two group compositions, set of inter-individual interactions or conversational thread is (or could ever be) duplicated. In this sense, each group discussion or researcher interview has a unique *proximate context* (Schegloff, 1992); this proximate context, in Wetherell's (2002:388) terms, entails "the immediate features of the interaction, such as the sort of occasion, the sequences of talk and the capacities in which people speak".

Paying analytic attention to proximate context is a concern particularly of conversational analysts, who are interested in such matters as the sequential organisation of talk (e.g. turn taking). As Wetherell (2002:388) notes, however, many discourse analysts are instead more interested in meaning-making at a more general or abstracted level:

> This view of [proximate] context and what is relevant to analysis makes most sense if the conversational activities are the focus and these activities are quite narrowly defined. Other discourse researchers, however, are much less interested in the nature and sequencing of activities in talk and much more interested in semantic content and modes of representation.

It is indeed the 'semantic content' and 'modes of representation' which are of interest to the present study. Indeed, I consider discourses to constitute modes of understanding which, *by definition*, are not tied to the 'local' context of a single focus group or exchange between

participants. They are instead understood to be capable of arising across any number of local contexts or possible social encounters: in this – as argued in the literature review – I consider discourses to be 'commonplaces' (Myers, 2007), or manifestations of 'shared understanding' (Dryzek, 1997).

This is not to say however that context of *any* sort is irrelevant – rather that the contextual influences of interest with respect to climate change discourses are considered to be outside of a particular situation: in Schegloff's (1992) terms this is understood as *external* or *distal context*.

Goodwin and Duranti (1992) suggest that there are four main ways of conceptualising context for the purposes of analysis of talk. Equivalent to Schegloff's idea of 'distal' context, is that which these authors term 'extrasituational context': they too argue that this is important to many analysts, in terms of the *frames of reference* within which talk is embedded. An example of the relevance of this type of context (cited by Goodwin and Duranti) is given by Cicourel (1992) who details how cultural and organisational contexts in hospitals permeate the ways in which matters are discussed by clinicians.

Cicourel (1992) however warns against the risk of 'infinite regress' whereby a researcher may feel obliged to describe "everything" about a context. As he observes:

> Such a demand is impossible to satisfy because no one could claim to have specified all of the local and larger sociocultural aspects of a context. As researchers, we obviously privilege some aspects of a context while minimising or ignoring other conditions. (Cicourel, 1992:309)

In deciding which aspects of context to privilege, Wetherell (2002) argues that decisions about what counts as *relevant* context (i.e. what to attend to and what to disregard) depends upon whether conversational activities or modes of representations are the object of study (as discussed above); also that the theories or concepts of discourse applied, should determine considerations of context. In the present study, given discourse is defined as a 'shared way of apprehending the world' (Dryzek, 1997) that transcends local contexts, it thus makes sense to privilege distal over proximate context during analysis. In the case of climate change, such external, 'distal' or 'extrasituational' context might for example correspond to the UK's political or economic systems (and changes in these over the time period), the place of science in society, or characteristics of media reporting about climate change (including at a particular time).

In practical terms, external context may be uncovered either *explicitly* in the remarks of participants, or require to be *inferred* via shared meaning frames (to which the researcher is a party).

For example, a context referred to explicitly by a participant from the 2010 focus groups concerned the UEA controversy where allegations were made in the media of academic dishonesty. This was conveyed as follows:

> We had the academic information recently discredited which didn't help, whether the case is true or not that adds an element of doubt

Here, the argument that climate science may have been undermined and uncertainty heightened, is *explicitly contextualised* to a contemporary event.

By contrast, an example of the relevance of context which requires to be *inferred*, is another participant's assertion, also in 2010, that:

> Me recycling one wine bottle, am I going to save the world?… If I don't put my photocopying paper in the recycling is it going to make a huge amount of difference?

Here, it is necessary to recognise from one's own cultural understanding, the following features (among others): the implied proposition that 'recycling' has come to be associated with 'saving the world', together with the counter-suggestion that a single individual's actions are arguably negligible.

Where reading transcripts it is therefore necessary to attend both to the 'background' or cultural context at all times, and to be alert also to context in terms of contemporaneous and influential factors. Attention to context from a researcher perspective is thus a matter of analytic sensitivity – indeed can be considered a part of the reflexivity that constitutes a discourse analytic approach to data (Wood and Kroger, 2000). Attending to external context in this way is, in turn, intended to be aligned with the research objective of attention to the temporal dimension of public understanding: the analytic sensitivity to context is both in terms of durable or subtly shifting 'background' context and context in the form of more discrete occurrences.

It should be noted that whilst proximate context is not attended to in the development of discourses and in drawing inferences about temporal aspects, it is however considered as a potential confounding influence: this is considered below, in the discussion of detection of trends in qualitative data.

Identifying longitudinal trends in qualitative data: insights from the literature

Approaches towards identifying change over time in qualitative data vary; as Shirani and Henwood (2011) point out, there is no unitary methodology for qualitative longitudinal research. Nevertheless, I consider here some guidance from the qualitative longitudinal literature, and qualitative methodology literature more generally.

Neale et al. (2012:8-9) argue there are four core qualitative longitudinal methods which have now been used[49]. Firstly, Neale et al. note that a number of studies have paid particular attention to significant life events, or 'turning points' as part of their analysis. This analytic focus, whilst sensible for 'life course' studies, does not however make sense for the present study where unrelated cross-sectional datasets are used. Secondly, Neale et al. note that 'bespoke analytical frameworks' have been used in some projects. Henwood et al. (2010) for example used a case study format to detail how fathers had responded to the financial downturn around 2008. Henderson et al. (2012) also utilise a case study approach to articulate change over time, based on biographical data obtained from individuals as they moved from their teens to adulthood. Again, however, a central concern with case histories and biographical analysis I consider to be at some remove from the objectives of the present study.

The third approach to longitudinal method identified by Neale et al. (2012) is characterised as 'adopting a theoretically light touch' (cf. Charmaz and Henwood, 2009). An example of such a study is that by Coltart and Henwood (2012) who drew on psychosocial concepts, as well as concepts of class and wider sociocultural trends, to detail mens' experiences of new fatherhood. Research such as this reveals the advantages of opening up qualitative longitudinal research to multiple interpretative frameworks, however it cannot be said that the removing of theoretical constraints constitutes, in itself, an identifiable longitudinal *method* – rather a general preferred *approach*. The fourth and final approach delineated by Neale et al. (2012) entails attention to relationships between research participants and significant others in participants' lives; again, however, this is not itself an approach which can be usefully transferred to the present study.

Other literature has attempted to characterise some of the strategies used in qualitative longitudinal analysis – including review work by Corden and Millar (2007). The emphases in this work are upon

[49] These authors refer specifically to the work of the cross-disciplinary *Timescapes* research project, which provides a useful (and largely representative) body of work through which to consider the current state of the art in qualitative longitudinal research.

issues of general study design, however, and do not detail methods for qualitative longitudinal analyses appropriate to the present study.

I conclude, therefore, that there is an absence of practicable techniques able to be directly transferred to the longitudinal analysis here. I argue instead for the adoption and adaptation of more general qualitative techniques for the interpretation of longitudinal change in the present study.

Identifying longitudinal trends in qualitative data: use of comparative methods

Central to the requirement of the longitudinal analysis in the present study, is the ability to *compare* datasets between (and within) years, so as to draw conclusions about their similarity or difference over time.

The importance of working with qualitative data in such a comparative manner, is indeed affirmed in both the qualitative longitudinal and more general qualitative literatures. Irwin et al. (2012) for example report with respect to qualitative longitudinal research, that a comparative process permitted novel themes to emerge which would not otherwise be evident (though particular methods for achieving this are left unspecified).

In presenting the comparative method used in the present study, I draw on the idea of the 'constant comparative method' advocated in grounded theory (Glaser and Strauss, 1967) and since developed by others (e.g. Hewitt-Taylor, 2001; Thorne, 2000). This method is often used to develop comprehensive codes in their own right within a corpus of data (Henwood and Pidgeon, 1992; Boeije, 2002) however as I apply it here is designed to detect similarities and differences *between* datasets.

As Boeije (2002:393) notes, "the literature does not make clear how one should 'go about' constant comparison, nor does it address such issues as whether different types of comparison can be distinguished". As such, I will present here how this was achieved in the present study in as practical terms as possible.

Prior to a comparison made between datasets, the over-arching discourses considered to represent public understanding of climate change, were determined. This procedure is described separately above.

Following the identification of all discourses, each of the transcripts from the period 1997-2010 were then *coded* in the following manner:

(i) Sections of participant talk within transcripts were coded (highlighted and linked to a 'node' in NVivo) according to the discourse to which they corresponded (e.g. 'status and practice of science');

(ii) Transcripts were similarly coded according to discourse components: constituent themes, metaphors, concepts and terminology (e.g. 'expertise', 'consensus in science', 'science uncertainty').

At this stage, the data as coded was *organised* for the purposes of comparative analysis. This process entailed:

(i) collating all excerpts of participant talk corresponding to a discourse, to produce a comprehensive set of *discourse-specific excerpts* (NVivo permits data to be accessed in this way, via the viewing of 'nodes' rather than transcripts);

(ii) transferring collated discourse excerpts as new documents (via exporting these to Word);

(iii) subdividing each set of excerpts by year, to produce *six subsets* of transcript excerpts *for each discourse*;

(iv) repeating these steps for discourse components, where these were substantial in number within and between years.

Comparison was then made of excerpts *within* a given discourse and *between* datasets/years. This constrains the analysis to an identification of discourse variability, rather than attempting to assess variability across the more wide-ranging discussions recorded in the transcripts[50].

In line with discourse theory outlined in the literature review, variation is detected in the following ways:

[50] This constraint is used so that variability is examined within the same areas of meaning: that is, it makes sense to examine whether the ways in which, say, uncertainty around climate science is understood varies over time; it does not make sense to examine whether the ways in which science uncertainty is understood at one time period is different to the ways in which, say, personal responsibility is understood at another time period.

(i) according to *discourse components*: differences between years in the types of concepts which appear within a discourse (e.g. different types of 'evidence' applied to support/undermine climate science)

(ii) according to *function*: differences between years in the ways in which a discourse is used, such as in justification or argumentation (e.g. use of evidence to interrogate *reality* of climate change *vs.* use of evidence to interrogate the *causation* of climate change).

As part of the process of examining for difference and similarities over time, the following additional criteria are considered:

(i) attention to similarity *within* datasets and difference *between* datasets: confidence in differences identified can be asserted where a particular discourse feature is largely consistent within one dataset/year, and where this contrasts with how this manifests in a second dataset (e.g. consistent climate change/ ozone depletion conflation in an early dataset *vs.* limited reference and lesser conflation in a later dataset);

(ii) attention to *contrasts* between datasets and *trends* across datasets: greater confidence in a trend can be asserted where *incremental* change is identified between datasets over progressive years, than where difference is noted only between two datasets/years;

(iii) attention to *time-proximate* comparisons: in a number of cases, 'later' datasets (e.g. 2007 and 2010 transcripts) are compared with 'early' datasets (e.g. 1997 and 2000 transcripts); this enables further comparison over time where incremental trends are unclear, and/or to take account of possible influences arising from a single project's research design.

Both in the case of detecting variation between datasets (components and functions) and in considering criteria for variation (contrasts and trends), *working hypotheses* are continually formulated, adapted, rejected or accepted. Practically speaking, this entails researcher identification of possible similarities or differences between datasets, and the probing of these through additional comparison across transcript excerpts.

The process of developing working hypotheses was carried out by hand – working hypotheses about changes and consistency across transcripts were developed and reformulated over many readings of discourse excerpts and the original transcripts. This stage of the research is considered to have been necessarily a more inductive and iterative process. Nevertheless, as part of the

refinement (and discarding) of working hypotheses, a verification procedure is used to check that any change identified is not simply an artefact of the nature of the original research projects. At this stage, *proximate context* is taken into account. Considerations for this purpose include:

(i) examination of whether relevant participant remarks are closely connected with moderator prompts, focus group materials, etc.;

(ii) checking of coded instances to ensure they do not have excessive bias towards a particular participant or participants.

In giving consideration to changes in emphasis or salience of a particular feature of a discourse over time, I have not sought to make numerically quantifiable claims. Following Kitzinger and Davison (2001:5) I argue that the data to hand "does not lend itself to numerical analysis" and to have done so would have detracted from the interpretative value of the qualitative analysis. Instead, through maintaining a qualitative approach through the longitudinal analysis, the richness of the data is retained and subtleties in the ways in which language and ideas are used can be considered. The conclusions drawn as to the relative weight or emphasis of particular discourse components at particular time periods, therefore rests in part upon researcher interpretation and – more transparently – upon the evidence as presented in the following chapters contrasting participant talk from different years. This is not to say that I make no attempt in the thesis to quantify the prevalence of discourse characteristics, including over time: however, this is undertaken as part of the survey methodology described at a later stage (chapters 9 and 10).

4.4 Summary overview: analytic approach

A summary overview of the methodology employed, is given in table 4.5.

Table 4.5: Qualitative analysis overview

Analytic stage	Objective
Broad reading of transcripts and original research	Data familiarisation
Data sorted for relevance; irrelevant sections discarded	Data fit
Line-by-line open coding of sub-sample of transcripts until 'saturation'; memos used to outline provisional discourses and conceptual links	Preliminary process to full discourse analysis; further data familiarisation
Identification of key concepts and how these cohere as discourses; identification of discourse functions	Main discourse analysis
Transcripts imported into NVivo; coding of transcripts by discourses/sub-discourses/conceptual categories	Detailed classification of discourses
Data collated by discourses/sub-discourses; inspection of coded instances *within* discourses and *between* projects for temporal variation; variation checked against original transcripts	Qualitative longitudinal analysis: identification of discourse variation
Research reporting process	Detailed exposition of findings; transparency and rigour

4.5 Sample sizes and data availability

Table 4.6 provides a summary of the datasets available for analysis, with corresponding numbers of participants involved and number of coded instances derived from the present discourse analysis (an indication of how substantial each of the datasets are for the purposes of the present study). The number of groups involved in each research project[51] is also given.

[51] In the case of the 2003 interviews, this number (n=21 interviews) is divided by three for equivalence with longer focus group discussions.

Table 4.6: Datasets and extent of data available for analysis, 1997-2010

Dataset	Number of participants (no. groups)	Number of codes generated (approx. codes per participant)	Data stage (no. participants)
1997/8	14 (6)	405 (29)	'Early' datasets (n=33)
2000	19 (4)	592 (31)	
2002	24 (3)	770 (32)	'Interim' datasets (n=45)
2003	21 (7)	730 (35)	
2007	84 (9)	984 (12)	'Recent' datasets (n=131)
2010	47 (10)	2150 (46)	
Total	*209 (39)*	*5631 (27)*	

As can be seen from table 4.6, there is a general trend towards an increase in the amount of data available over time. Whilst there exists no clear clustering of data at particular time periods, for the sake of convenience the data stage in table 4.6 indicates approximately where, relative to the overall time period, these research projects are situated. Thus where research findings are reported subsequently in this thesis, this is often with reference to 'early' and 'recent' data – though individual research projects are also referred to in turn.

Overall, the quantity of data available is considerable, however is more limited towards the earlier period. Given the smaller participant pool from 1997/8, in particular, interpretation of longitudinal trends in discourses is often achieved through considering datasets together (e.g. of 'earlier' datasets against 'recent' data).

4.6 Evaluating the qualitative research

Taylor (2001) suggests that rigour in discourse analysis can be linked, firstly, to the *richness of detail* in both the body of data used and the analysis presented; secondly, this author suggests rigour is linked to the *explication* of the process of analysis.

I suggest that the richness of detail of the datasets available is substantial – indeed the present research is fortunate through being able to use secondary data, and so to have a larger corpus to draw on than do most primary studies. Taylor's criterion for the richness of detail in the analysis as presented, is addressed through the provision of a comprehensive set of participant excerpts and detailed interpretation for each discourse (presented within chapters 5 to 8). Due to restrictions of length, summaries only are given in the main text of the thesis; however, the full set of arguments and evidence for each discourse identified, are placed in the appendices of the thesis to which the interested reader can refer.

Taylor's (2001) suggestion that rigour in discourse analysis is also connected to the explication of the *process* of analysis is addressed in detail in the commentary given above. I have set out in some detail the procedure by which discourses are constructed, in terms of the identification of their component parts, overarching ontology, and consideration of function. In addition, there is detailed consideration of the means by which the analysis balances the application of prior constructs with a data-driven approach, clarification of how context is attended to, and a framework presented for the identification of variation over time in discourses.

Taylor (2001) also suggests that discourse analysis may be evaluated through *triangulation*. In the present thesis, this is approached within the qualitative analysis by the use of multiple datasets to derive discourses. Triangulation of methods is also enabled through the use of survey methodology, one objective of which is to measure levels of agreement with statements that reflect discursive framings. One means by which the validity of the discourses presented in the qualitative findings can be appraised, is therefore through an assessment of how 'commonplace' these are found to be in a representative survey sample.

Criteria for evaluating qualitative research more generally are provided by Yardley (2000) who suggests four main characteristics of good qualitative research. These are reproduced from Yardley (2000:219) in table 4.7; following this author, essential qualities are shown in bold, with examples shown in italics of the form these qualities can take.

Table 4.7: Characteristics of good qualitative research

Sensitivity to context
Theoretical; relevant literature; empirical data; sociocultural setting; participants' perspectives; ethical issues
Commitment and rigour
In-depth engagement with topic; methodological competence/skill; thorough data collection; depth/breadth of analysis
Transparency and coherence
Clarity and power of description/argument; transparent methods and data presentation; fit between theory and method; reflexivity
Impact and importance
Theoretical (enriching understanding); sociocultural; practical (for community, policy makers, etc.)

Whilst each of these 17 separate possible criteria for evaluating research will not be considered separately in this section, I do suggest some of the ways in which the essential qualities are addressed.

Firstly, one important facet of sensitivity to context in the present study, is in terms of what Yardley terms the 'sociocultural setting'. Particularly for the social and personal discourses identified (chapters 6 and 7) there is an attempt to present in some detail how people's understanding of self and society informs perspectives on climate change. From a researcher perspective, sociocultural context further informs the interpretation of participant talk – for example, through attention to how individuals manage normative injunctions to act pro-environmentally. In terms of attention to sociocultural factors particular to the time period (e.g. the changing political climate) this is considered separately and in some detail with respect to each discourse identified, in chapter 11.

With respect to commitment and rigour, I argue that Yardley's criterion of 'breadth/depth of analysis' is met in the present study. Yardley (2001:221) suggests that rigour can be conceived of as the "completeness of the data collection and analysis": the ability of the data to supply all the information needed for a comprehensive analysis, and attention to the variation and complexity observed in the data. In the present study, as noted above, multiple datasets representing a large corpus of data are used. The completeness of analysis, I suggest, is revealed through the detailed account of the diverse ways in which climate change is understood – as outlined in chapters 5 to 8.

Attention to complexity of the data is attended to particularly in terms of the diverse range of concepts and their use within each discourse; variation within discourses is also of particular relevance in the present study for interpreting change over time.

As well as reporting of findings within chapters 5 to 8, I have included within the Appendices extensive additional detail for each discourse identified. This approach to reporting is commensurate with the criterion that Yardley terms 'transparency': using this approach, numerous excerpts from transcripts are able to be presented as evidence for conclusions drawn. In addition, I have detailed in this chapter both the processes of data collection used, and analyses applied.

In terms of the impact and importance of the research, such is likely indeed only be revealed some time following the production of this thesis[52]. Nevertheless, another means by which Yardley suggests impact can be assessed, is in the presentation of a novel, challenging perspective on a topic, which can be seen as having theoretical worth. It is the aim of the present study that this should be an outcome of the research undertaken: this is returned to in the Discussion chapter, in light of the implications of the study findings for current understanding of public perspectives.

4.7 Notation and transcription system

Across the six datasets, there were 209 research participants. I have used a notional system that assigns each participant two numbers, the first corresponding to the participant ('P'), the second corresponding to the research project (dataset year) in which they participated. This system was used to enable a reader to easily ascertain from which year of research an individual participated, and to distinguish participants one from another. Given the unusually large number of participants, this system was also adopted to avoid the likely confusion which could arise from the use of two hundred plus different pseudonyms.

For example, using this system P5-1997 is a participant in the first project (1997/8 focus groups), P5-2003 is a participant in the fourth project (2003 interviews), P47-2007 is a participant in the fifth project (2007 focus groups) and P20-2010 is a participant in the most recent Bristol 2010 focus groups.

As discussed above, aside from exceptional cases no participant 'meta data' (e.g. age, areas of personal interest or employment) is utilised in carrying out analyses – indeed is not known in most

[52] In providing an example of the importance/impact of research, Yardley (2000) cites the example of work by Foucault in the late 1980's influencing policy in the mid-1990's.

cases. The full list of participants is nevertheless given in Appendix 4.11 for completeness, together with some basic sociodemographic data. (Note that Bristol participant codes in the same format are given in Appendix 4.8).

Where reporting participant talk, I have adopted a convention of showing speech as recorded in transcripts, but simplified this in places by omitting original researchers' reference to hesitation, repetition etc.

Square brackets ([ ]) indicate unspoken but implied talk. Triangular brackets indicate a transcription or non-verbal point (e.g. <sic> or <shortly afterwards>). Three dots (…) indicate omitted speech but where the substance is retained.

4.8 Approach to the reporting of findings

I took the decision to report the findings from the qualitative stage of the research separately from both the quantitative findings and interpretation via theory and prior research. Chapters 5 to 8 present the discourses in turn, with further detail for each discourse provided in the Appendices.

The objective of the reporting structure used, is to present in a systematic manner the characteristics of each of the discourses identified, and how these did (or did not) vary across the datasets. In line with the analytic procedure used, each discourse is outlined firstly according to the ontology of the discourse, and with respect to the metaphors, rhetorical devices and other component parts. Having presented these in outline, a more detailed interpretation is presented of the characteristics of the discourse via the use of transcript excerpts from across the 1997-2010 time period. Functions and consequences of a discourse are then outlined. Conclusions about variation and continuity over time (the longitudinal part of the analysis) are given either for the discourse overall (if a general change is detected) or for component parts.

The advantage of presenting the qualitative findings in this way, is that this enables priority to be given to the reporting of the main features of the discourses, as well as to comparisons across the time period. With the requirement to present findings from six separate datasets, including in a temporal context, I concluded that to have *also* attempted to integrate theoretical discussion and/or quantitative results alongside these, could have detracted from a central concern to first delineate public understanding as self-contained discourses. That each discourse is presented in turn in an equivalent format, also enables clarity and consistency in the reporting of findings. Following the presentation of qualitative findings, quantitative methods and results are reported

(chapters 8 and 9). Interpretation of both sets of findings, with reference to theory and prior research, is then undertaken within the Discussion chapter.

I acknowledge that the writing-up structure adopted is one possible approach of many. As Bringer et al. (2004) note, rigid formulae do not exist for the writing-up of qualitative research; Gilgun (2005:261) similarly suggests that "qualitative researchers have a marvellous range of choices in how they convey their findings". However, in terms of qualitative longitudinal reporting, more recently Henderson et al. (2012:17) reflect that "the writing up and representation of qualitative longitudinal research is one of the least debated... aspects of [the] methodology".

With no standard approach for this field, and with respect particularly to the need to convey qualitative findings from multiple original studies in concert with a temporal dimension, the reporting structure chosen is therefore considered to be a sensible – albeit not the sole possible – way of achieving this.

4.9 Qualitative findings: chapters 5 to 8

The next four chapters report the findings of the discourse and qualitative longitudinal analyses in terms of a series of ten discourses. These are subdivided according to three 'physical' discourses (chapter 5), three 'social' discourses (chapter 6) and two 'personal and folk-psychological' discourses (chapter 7). Chapter 8 reports findings of two further over-arching 'hybrid' discourses concerning 'ethics' and 'environmental harm'.

Figure 4.1 gives a summary overview of the discourses derived, as reported in the subsequent chapters. Figure 4.2 outlines the proposed relationship between these discourses: it should be noted that there is considered to be a degree of overlap particularly between social and personal discourses; the ethics discourse is an overarching set of ideas that permeates discussion of social and personal phenomena.

Figure 4.1: Summary of discourses derived

1. ***Physical discourses*** (chapter 5)

   (i) **Scientific and informal-empirical discourses**

   a. Status and practice of climate science

   b. Informal empiricism (experiential 'common sense' science);

   (ii) **Climate as part of nature**

   Climate in the context of nature (e.g. nature as mutable)

2. ***Social discourses*** (chapter 6)

   (i) **Social structures and actors**

   a. Climate change as a social dilemma

   b. Relational responsibility (responsibilities between actors);

   (ii) **Lifestyles and social practice**

3. ***Personal and folk-psychological discourses*** (chapter 7)

   (i) **Folk psychology** ('common sense' psychology of others)

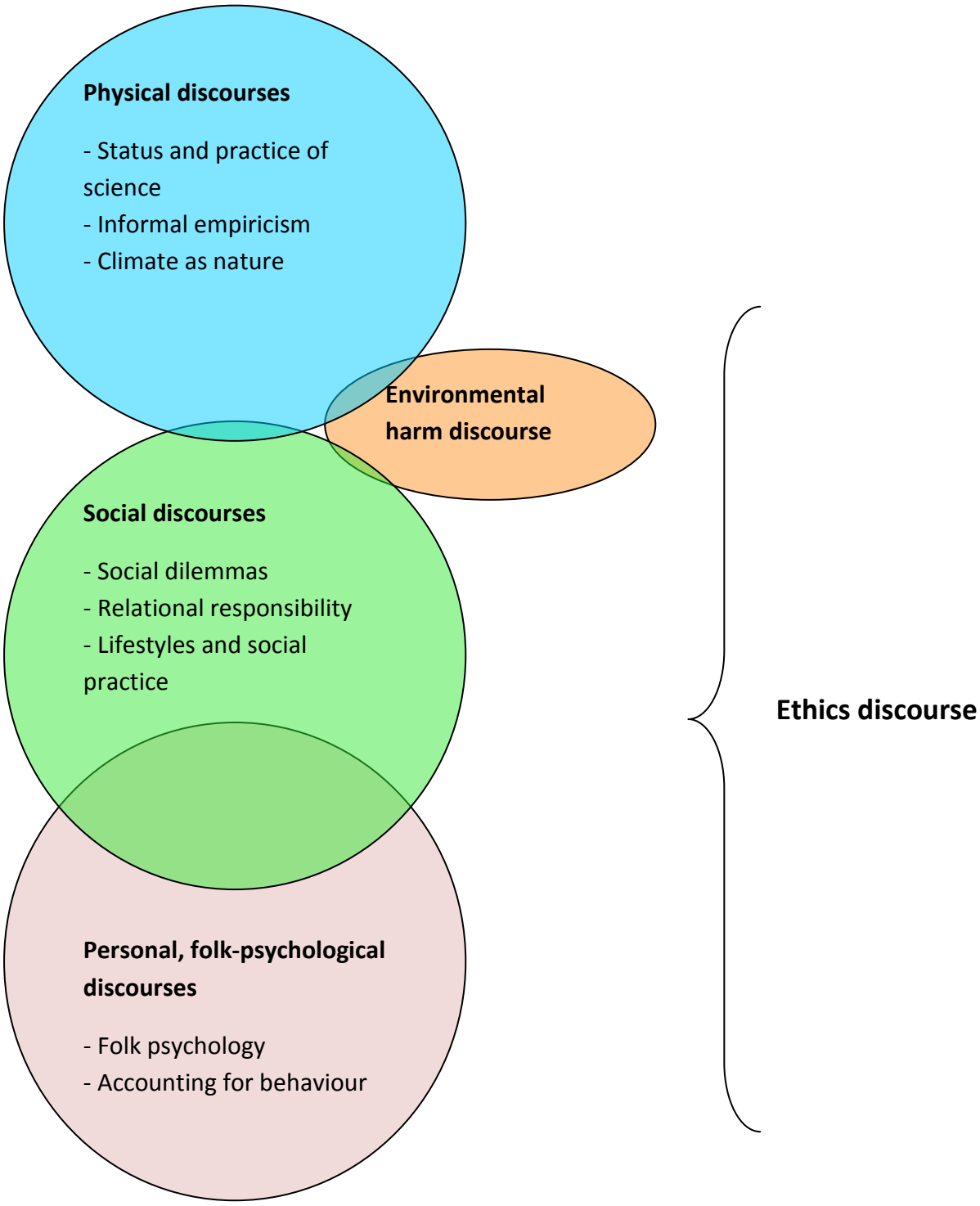
   (ii) **Accounting for climate-relevant behaviour**
   (perspectives on one's own actions)

4. ***Hybrid/over-arching discourses*** (chapter 8)

   (i) **Ethics** (ethical principles applied to climate change)

   (ii) **Environmental harm** (climate change as an 'environmental' issue)

Figure 4.2: Overview of discourse correspondences



CHAPTER 5 QUALITATIVE FINDINGS (I): PHYSICAL DISCOURSES OF CLIMATE CHANGE

The discourses reported in this chapter are concerned with the physical characteristics of climate change: two of these discourses relate to the scientific and informal-empirical interpretation of climate change (sections 5.1 and 5.2) and the third is concerned with climate change interpreted in terms of perspectives on the natural world (section 5.3).

This chapter reports a ***summary interpretation*** *of findings. The main characteristics of the three physical discourses are presented, as is evidence in the form of excerpts from across the datasets from 1997-2010. For an* ***extended interpretation*** *and additional excerpts, the interested reader should refer to Appendix 5.*

5.1 Status and practice of climate science

Overview: main characteristics and ontology of the discourse

Climate change is understood as a scientific concern. Truths about the veracity (reality or lack of existence), causation (human or natural), and the future consequences and implications of climate change, are knowable through the techniques and expertise of science. Equally, limitations in knowledge and lack of certainty are explained in terms of (climate) science practices and capabilities. The discourse for the most part draws on a positivist epistemology, whereby truths are objectively, empirically knowable – although this assumption is called into question in more recent talk.

Metaphors, rhetorical devices, recurrent motifs

- Truths/ 'reality'/ 'facts' to be detected, proved, disproved, predicted
- Scientific processes: empiricism (e.g. use of evidence, theory-testing)
- Technical/natural scientific language: e.g. measurement, analysis, research

- Scientific debate/disagreement; evolution of ideas and theory in science
- The role of experts and expertise in interpreting scientific knowledge
- Emphasis on depersonalised physical causes and effects (e.g. temperature, 'humans') rather than social aspects

Characteristics of the discourse

i. Consensus and uncertainty in climate science

Notions about *consensus and uncertainty* are commonplace in participants' portrayals of climate science: from the perspective that there is no consensus or definite knowledge whatsoever, to the perspective that scientists are mostly or entirely certain about aspects of the science.

*Un*certainty is commonly conceptualised using the notion that there are *contrasting opinions* in existence among scientists: this appears across all datasets. For example, in 1997 P1-1997 states that "they [scientists] are not sure… People have got one opinion about what it's going to be and another group have got another opinion"; in 2000 P7-2000 remarks "I'm interested in the idea of climate change but I'm not quite sure- there's quite conflicting views about what's actually happening". In respect of causation, P4-2003 argues that "the actual cause in the change in the weather… the experts are all divided on that"; and in 2007 P79-2007 states that "I've read and seen two different arguments that state two different completely conflicting views".

Implicit in many assertions, is a view that conflict in opinion is an inherent characteristic (is 'normal') in science: P3-2000 for example states that "typically with scientists if you ask them or you hear debates, they'll say 'yes it is' and then another scientist might well say 'well maybe not'".

Another means by which uncertainty arises, is in the portrayal of *climate science as yet-to-be decided*: the notion that 'the jury is out' features in participant assertions across the datasets. As P11-2000 complains, "what I don't like is that there is no definitive scientific argument that… you can trust". The use of the idea of 'proof' points to this understanding of science – applied to climate change – such as where P1-1997 argues that there is a lack of 'proof': "they reckon the global temperature has gone up… but they can't prove that it's because of human intervention".

The idea that it is premature to draw conclusions about climate change also emerges, as where P14-2003 states that "I'm not sure whether we're at that stage where we can wholeheartedly say: 'yes, there is…. global warming'".

The positivist notion of "hardened facts" is used by P15-2007 also to make the argument that the realities of climate change are yet-to-be established: "There need to be hard facts... people need to come to consensus all throughout the world… it should be basically research hardened facts".

ii. Methods and prediction in climate science

Where uncertainty is considered to be a factor in climate science, this is also commonly attributed to the *methods* and *predictive power* of science.

In terms of the methods used to draw conclusions about climate change, P22-2010 argues that there is uncertainty ("does anyone really know?") in large part due to changes in the methods and techniques of climate science, whereby "things that we are measuring today we haven't measured in the past".

A method particularly pertinent to climate science, is the use of computer models. As an underlying method, these may be considered questionable in themselves: "we're talking about using computer models and how accurate can we [be]?" (P17-2002).

Another recurrent means by which the predictive capacity of climate science is argued to be limited, is through reference to previous inaccurate predictions: in essence, that *precedence exists for erroneous prediction*. As P1-2000 reflects: "I think back to 20-25 years ago when… scientists were talking about the collapse of… the world because of pollution… and it's not happened"; similarly, in 2010 two participants agree that past predictions of "horrendous" futures were overstated:

> P32-2010: Do you remember… you used to see the headlines were absolutely horrendous, you know, in twenty year's time this is going to happen... I look back now and think: 'well none of those things happened'.
> P31-2010: Or if they did happen, they weren't so bad after all were they?

Featuring in two of the datasets, is the specific notion that in the past scientific predictions have been (inconsistently) for dramatically lowered temperatures. As P11-2000 argues, "20 or 30 years ago they were talking about an impending ice age"; some ten years later in 2010, P28-2010 attributes his own stated scepticism to this problem: "One of the reasons I am sceptical is because in the 1970's it was going to be the start of a new ice age".

iii. Agreement among climate scientists

Whilst assertions regarding lack of certainty are commonplace, nevertheless the counter perspective – that there *is* certainty or consensus – does also emerge often. Where a *consensus position* is affirmed, this in all cases asserts that climate change is 'real' and/or human-caused[53]. For example, in respect of whether the climate is changing, P8-2000 argues that "almost all the information that we've seen shows that we have some... global changes are taking place"; P2-2003 suggests that "I don't think they can actually prove it down to... the nth degree, but there's a lot of evidence pointing in that direction"; and P7-2010 states that "scientists agree pretty much, apart from a few loonies, there is such a thing as climate change".

In a number of places – and exclusively among the later (2007 and especially 2010) groups – percentage figures are used to express degrees of certainty about climate change: for example, P13-2007 asserts "90% of environmental scientists do agree now that there is climate change"; in a 2010 group P33-2010 states "it's 95% of scientific knowledge" and P34-2010 that "the science is accepted by… 90% of scientists". In a separate 2010 group, P40-2010 states scientists are "90% sure" that climate change is "happening", and P44-2010 that "I've heard figures like 90% of the scientists think that it's happening". In another 2010 group still, P25-2010 argues that "there is a consensus of about 95% of the scientific community that global warming is very serious… and is almost certainly caused by man".

iv. Expertise in climate science

The place of *expertise* as a factor influencing the status of climate change knowledge is referred to across the datasets. Notwithstanding the portrayal of divergent opinion among experts, most usually the ascription of expertise to scientists is taken to contribute to a position of (relative) certainty. For example, in respect of what she has read about climate change, P17-2003 asserts that "I feel I ought to believe it because most of it has scientific backing". P2-2010 similarly affirms a trust in the practice of climate science: "we have to put our trust in some people and… the Met Office… have been recording the weather for a hundred and twenty-odd years… and you kind of expect them to get their numbers right, to have basic maths".

[53] No participant in any group argues that there is a scientific consensus that climate change is *not* real or does *not* feature an anthropogenic component.

Despite assertions such as these, expertise is often portrayed as problematic. As P22-2007 puts it, "we don't as individuals go and test what gases are coming out of planes and cars and we're only told aren't we… we don't know for definite". In 2010 groups, P20-2010 states that "there's the fear- there's the experts, do they really know what they're on about?" and P31-2010 questions a reliance on experts in any sense, by way of analogy with economic expertise: "these people [climate scientists] *are* experts, but, you know, we have expert economists that screwed up the economy, so why is a scientist going to be any more of an expert than someone else that predicts the future?"

Climate science expertise is also challenged in one 2000 group, with reference to potential bias arising from non-scientific influences upon expertise ('vested interests'). Whilst asserting a need for neutrality in climate science, P3-2000 nevertheless argues that "it's very very difficult to have an international body that can be neutral because it's got to be funded by somebody".

The notion of oil industry-funded 'science' as biased and unduly influenced, emerges in three separate groups in 2010 discussions: however in contrast to the 2000 excerpt, it is the credibility of those refuting (mainstream) climate science which is challenged here; for example: "I tell you what I'm not prepared to believe, and that's the scientists who are paid by the oil companies" (P44-2010).

v. The University of East Anglia controversy

In addition to such defences of the consensus climate science position, the 2010 groups also refer to the controversies which arose around the leaking/hacking of emails from the University of East Anglia (UEA) in late 2009/ early 2010. It is only in the 2010 groups, and uniquely in the context of the UEA controversy, that any aspect of climate science is portrayed as dishonest and/or discredited. Whilst not featuring to any large extent, this was referred to in three of five of the 2010 Bristol groups.

In respect of the UEA controversy, P19-2010 states that "we had the academic information recently discredited which didn't help, whether the case is true or not that adds an element of doubt": importantly, the suggestion here is not that the academic practices were necessarily dishonest, nonetheless that they *may* have been is enough to heighten uncertainty. In the same group, P15-2010 recalls questions she herself had considered:

> Somebody told me that the UEA was the hub of information and that it was a glitch, that they'd deleted [data]… I thought: 'well, how much of the data was deleted?... Was it important data?'... So I thought that just added to the confusion.

In a separate group, P26-2010 argues "well it [the UEA controversy] chips away at the very bedrock of the arguments of global warming, CO2 emissions… I need to rely on something which I would consider to be a very strong fact… how relevant is it to the big picture? I don't know". In the third group in which the matter was mentioned, P31-2010 states that the story "undermined some of the science didn't it. They were skewing some of the results to get the answer they wanted".

Change in the discourse over time (1): Inconclusive science to position-dependent science

One manner in which there has been identifiable change over time within the discourse, is in a shift in how uncertainty and consensus in climate science is explained and portrayed.

There is a move from explaining uncertainty about climate science in terms of its being *inconclusive* (earlier groups) towards uncertainty construed as the presence of multiple (possibly valid) positions: this is termed here a trend towards *position-dependence*. The main characteristic of position-dependence is that climate science is characterised by opposing 'sides', each with their own *version* of the truth – rather than that 'truth' is a singular entity to be attained.

In the 1997 and 2000 datasets, there are numerous instances of participants asserting that the realities of climate change are not yet established, used to explain underlying positions of uncertainty. Phrases which indicate this are those such as "nobody knows" (P10-1997); "they can't prove [a human cause]" (P1-1997); "we don't really seem to know" (P3-2000); "at the moment we don't seem to have [a consensus]" (P1-2000); "there is no definitive scientific argument" (P11-2000). Although it is argued in places that there are 'conflicting views', where appearing this is indicative of disagreement as part of 'normal' science.

Across the 2002 dataset, participant perspectives are characterised still by views of uncertainty which continue to emphasise the science as inconclusive. For example, in direct response to the quotations presented to them, P7-2002 states "I'd love somebody to prove it you know… get some data… and once you've got that data… it's pretty conclusive isn't it". .

In the 2003 interviews, there is evidence of uncertainty around climate science explained both in terms of inconclusive science, and of position-dependence. Again the notion of a "stage" not yet reached is asserted, where P14-2003 suggests "I'm not sure whether we're at that stage where we can wholeheartedly say: 'yes, there is…. global warming'".

Elsewhere across the 2003 interviews, there is evidence of portrayals of both versions of uncertainty. For example, P19-2003 asserts that arguments made by scientists that particular environmental changes constitute "proof that global warming is happening" are "a very premature conclusion"; P14-2003 also suggests "it's still too early to know" and "too soon to judge". In respect of climate science construed as position-dependent, by contrast, P21-2003 argues that "both sides are going to exaggerate their arguments"; P15-2003 elsewhere argues that "there are contradictory views… depending on what country you're living in".

By the 2007 datasets, position-dependence has become noticeably prominent. As with P15-2003's emphasis on views dependent upon "what country you're living in", P17-2007 argues "a lot of American scientists will not acknowledge the fact that we're damaging this Earth we live on... in America … there's two different stories out there". In a separate group, the idea of two 'sides' is emphasised, where P24-2007 argues "one side just says… 'climate change has got nothing to do with what the human race is doing' and another says 'yeah, it's all to do with it'"; in another group still P42-2007 alludes to sidedness where stating "I've seen so many reports in the papers about global warming and it's due to this- and then the next guy comes along and says it's a load of rubbish".

In the 2007 groups, the notion that there is a 'truth' or truths about climate change which are yet to be established, appears largely absent. By this time period, there is the sense that 'sides' and oppositional perspectives dominate explanations of uncertainty.

By the 2010 focus groups, the notion that uncertainty in climate science relates to position-dependence is now prevalent. A clear allusion is P32-2010's argument that "it is all opinion isn't it, and it depends what you want to believe". Similarly, in a separate group P15-2010 argues that climate change "is the same as any social issue, that you can read as many different articles written by desperately educated and important people, and you can find as many as you want to back up your opinion whatever your opinion is".

As with the 2007 groups, the notion of 'sides' in the climate debate emerges: P11-2010 states that "I've seen both sides" and P27-2010 that "there just seems to be no sort of right or wrong, it's a very debatable point".

The role for 'opinion'– in direct contrast to "hard evidence" – is affirmed by P12-2010, who states: "we're not told from the point of view of hard evidence, we're told from the point of view of opinions of Joe Bloggs". The effective labelling of positions is made by P31-2010, who states that

"people that say 'I'm not convinced' are suddenly climate change deniers… the issues are very polarised, i.e. **you're a believer or a non-believer**" (emphasis added).

Using the analogy of research on cigarettes, P30-2010 herself appears to characterise change over time in respect of climate science, in terms of a move from an inconclusive matter, to a situation where an evidence base has been established but yet where an identifiable 'group' still elects not to 'believe':

> To me it seems a bit like the old argument about whether cigarette smoking causes cancer. For years no one believed it… finally it's got to the point where *most* people believe... but there are still a group of people, possibly **those who are tied in for some reasons of their own, to not believe** (emphasis added).

Change in the discourse over time (2): perspectives on information excess

A second means by which there appears to have been a temporal shift in emphasis, is an increase over time in emphasis upon *information excess* as underlying uncertainty. Such information excess may relate to large volumes of evidence, and/or an extensive range of opinion, portrayed as impinging upon an inability to discern the 'truth'.

In the 1997/8 focus groups, no reference is made to an excess of information. In the 2000 groups, two separate references are made, where P1-2000 suggests that "I think… we're getting hit with so much of it now that it's almost overload… how do you pick out what's true?"; P13-2000 also asserts "you get so many different opinions from all these learned people".

In the 2002 focus groups, no reference is made to information excess, however two interviewees (of 21) do so in 2003. The first of these asserts that "it's not a problem that there is no information available, the problem is that there is too much information" (P13-2003). A second interviewee also notes "there is so much discussion and debate... it's clearly not certain".

By 2007, a number of references to information excess have appeared – in four of nine focus groups and on a number of occasions. For example, P73-2007 makes a direct link between information excess and personal uncertainty, where explaining "to me there is so much contradictive <sic> evidence, so I'm really no sure what... who to believe or who to accept"; P79-2007 states that "there's so many conflicting views"; "; and P42-2007 remarks "I've seen so many reports in the papers about global warming and it's due to this- and then the next guy comes along and says it's a load of rubbish".

By the 2010 groups, the notion that information excess underlies uncertainty about climate change appears in four of five of the participant groups. In the first of these, P19-2010's first response to a moderator prompt asking participants what "first comes to mind" about climate change is: "a lot of conflicting information... there is just so much information… there's no definitive answer"; equally, P15-2010 asserts that "there's such a lot of information" and in this same group P11-2010 also remarks that "I've seen far too much and read far too much to be able to make an informed decision".

Elsewhere, P6-2010 states that "there's just so many vast differences in opinion, you just don't know what to believe" and P27-2010 clarifies his position as "confused" rather than "sceptic" by reference to information excess: "I wouldn't say sceptic, I'm perhaps more confused, because there's a lot of very very different theories out there".

Continuity in the discourse over time: uncertainty around human causation

Inspection of the datasets across years, suggests that portrayals of uncertainty, specifically with regard to human causation, have persisted over time.

Notably, whilst participants in the 2010 groups do on many occasions affirm that there is a scientific consensus that there is a human component to climate change, in all five groups there are also statements to the contrary: that the matter remains uncertain. Two examples of such portrayals of uncertainty are that "scientists never said climate change is definitely happening… if it's man-related or not, they're not certain" (P40-2010) and that "we are part of it, but there's a natural cycle as well… there's just so many vast differences in opinion" (P6-2010).

Comparison of these characteristic excerpts with those from earlier years, including 1997-8 and 2000, indicates persistence in such portrayals. In the earliest dataset, for example, P1-1997 asserts that "temperature has gone up… but they can't prove that it's because of human intervention". In the 2000 groups, P5-2000 for example asserts "you can't decry the evidence… there must be a warming globally… but whether it's caused by what we're doing or whether it's… natural… I have a hard job to decide".

Functions and consequences of the discourse

The discourse presents climate change as a formally knowable and impersonal phenomenon. Its status is subject to rational appraisal and the application of evidence. Whether one accepts the reality of climate change or not, this is based on the knowledge claims of others and of evidence obtained by others. Where consensus is asserted, this tends to be based on the view that experts 'agree' or that their evidence is convincing; where lack of consensus is asserted, this tends to be based on the view that experts do not (or can not) agree, or that expert claims may be flawed.

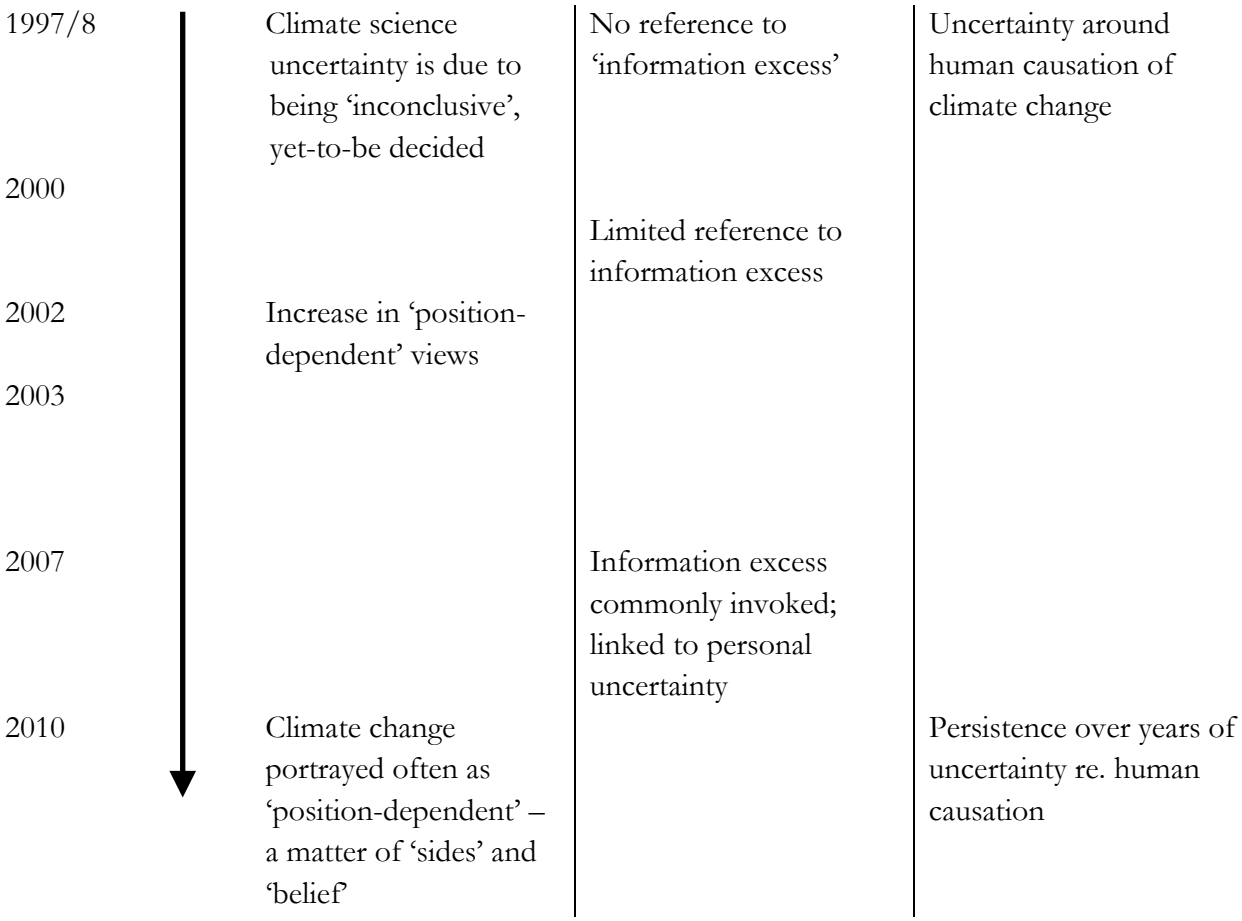
One possible consequence of the discourse is that, where the realities about climate change are seen as being determined by an external and exclusive expert domain, this separates climate change from the concerns of individuals themselves: it is perceived from 'outside' and as at some distance from the abilities and knowledge of ordinary people. Whether referring to consensus or confusion, these are seen to occur as part of the contentions and competing claims of 'expert' others.

This said, the arguments made by participants as outlined above do readily incorporate common-sense appraisals of received wisdom and the assertions of experts – people apply their own judgments to scientific judgments. Appropriately or not, the discourse therefore permits the insights and common-sense ideas of individuals themselves to be applied to this otherwise scientific and technical domain.

Secondary Longitudinal Qualitative (SLQ) summary: changes and continuity of the discourse

Figure 5.1 illustrates changes in the discourse, as considered above.

Figure 5.1: Change in *status of science* discourse across datasets



5.2 Informal empiricism

Overview: main characteristics and ontology of the discourse

Climate change is understood as a physical phenomenon, able to be directly and immediately perceived by the senses and through one's own sense-making processes. The discourse is termed 'informal empiricism' to reflect that it entails the application of informal 'evidence', to draw conclusions about the realities, causation and importance of climate change. The foremost type of evidence which appears in the discourse, is that relating to the weather and seasons. In addition, an eclectic range of indirect and vicarious evidence may be applied.

The discourse does not logically presume a position about the realities of climate change because by its nature a variety of conclusions can be drawn. Nevertheless, for the most part, it tends to lead to the perspective that climate change is a reality through its being directly perceptible.

Metaphors, rhetorical devices, recurrent motifs

- Weather and seasonal events, especially of an unusual/ abnormal sort (e.g. seasonal 'merging')
- Direct evidence of the senses (e.g. climate change you can 'see'); 'everyday' occurrences
- Indirect and vicarious/ anecdotal evidence (e.g. obtained from acquaintances)
- Comparative reference to personal memories (e.g. of weather in childhood)
- Common-sense reasoning about climate change using these evidence types

Characteristics of the discourse

i. Evaluating climate through informal evidence

Across multiple datasets, participants make explicit reference to their own sense-making processes in appraising climate change – and indeed the utility of these. For example, in 2002 P4-2002 asserts that "I think you've just got to try and make your own judgment yourself, muddle through" before going on to illustrate her position with reference to personally having noticed changes in insect life. Similarly, in 2003 P4-2003 explicitly states that he 'knows' from his own judgment that changes in the weather have occurred: "All I know is from clear observation, the pattern of

weather has changed". The assertion that it is to a process of reasoned judgment that one must resort is made by P16-2010, who asserts "I think we've all got to try and cut through the crap and see what the realistic situation is"; and by P1-2000 who proposes that "I think what we need is… people to look through the spin and try to get to reality". As P70-2007 puts it, "I look at the weather and that tells me that the atmosphere is changing".

ii. Weather and seasons as informal evidence

The most common means by which climate change is evaluated – its veracity, implications, and attribution to human/natural causes – is through reference to the weather and seasons.

The use by participants of terms that relate to the direct experience of the senses (to notice, to see, to detect, etc.) and use of the present tense (that the weather 'is' a certain way) point to this. Examples include: "I've noticed very different seasons, seasonal weather changes" (P3-2002); "the main thing I notice which seems to me to be detectable is… the winters are warmer" (P1-2000); and participants in 1997 suggesting that the weather has 'gone haywire'.

The types of changes to temperatures, weather and seasons vary, but generally encompass a view of *change or abnormality*. These include: "changing weather patterns" (P14-2003), increased rain or hail, rain "at the wrong time" (P4-1997), and less snow or snow at "the wrong time" (P22-2007). Other examples of change and abnormality include stronger sun, greater unpredictability of weather, more dry spells (or drought), more flooding, more extremes of weather or "freak conditions" (P9-2002), winters which are shorter or wetter or warmer or which finish later, shorter or colder springs, warmer or dryer or longer summers, etc.

Conclusions are drawn by contrasting direct experience of the weather with what is considered 'normal' – with terms such as "wrong" (P22-2007), "all to cock" (P5-1997), "bonkers" (P45-2007), and "unnatural" (P18-2003) used to emphasise this. For example, P18-2003 (following reference to hot weather in March) argues this "seems totally unnatural… the seasons aren't behaving as they should do".

Despite the variety of weather and seasonal evidence applied, there are commonplace types which emerge repeatedly across the datasets. Hotter temperatures are referred to in all years (even 2010, where research groups directly followed a very cold winter) as is weather which has become less predictable, with more extremes or shifted patterns. Reference to 'merging' or seasons becoming

less distinct consistently emerges. The following participant quotes from three separate years illustrate this:

> Merging into one… they're just not distinctive like hot in the summer, cold in the winter. (P7-1997)
>
> We don't seem to have, I don't think, definite seasons… It seems to drift one to the other… there's no definite line. (P3-2002)
>
> I definitely think that the seasons have changed, it's shifted, we don't get summer in the same way as we used to. (P24-2010)

Conclusions may be drawn through comparative *reference to memory*. P18-2003 for example suggests that "I don't remember a week as hot as this in March before". Elsewhere, P21-2007 remarks: "when I was younger, I always remember everybody knew when they could plan their holidays: flaming June, April showers, you know… it's all different now"; and P15-2002 that "when I was a little boy summers were short and winters were long, it seems the other way round [now]".

iii. Indirect and vicarious informal evidence

As well as experiences of weather and seasons, participants refer to other indicators – from their own experience, from the experience of others (vicarious experience or evidence) and from other indirect sources (e.g. the internet, television).

P64-2007 for example refers to a nearby farmer having a substantial strawberry crop "because of all this rain, which is obviously something to do with climate change". The notion that seasonal change has occurred may derive from others' reports, for example where P16-2003 explains "I know from talking to people who've been skiing at the same place for thirty years that the pattern of winters is not as… regular".

Evidence from the natural world may be incorporated. P4-2002 for example asserts that "something I did notice this summer… we're getting an awful lot of butterflies back" to which another participant (P5-2002) replies: "That's to do with warmer winter… the winters are not cold enough to kill off some of the eggs". Similarly, P7-2010 suggests that "things are more noticeable now... there are very strange bugs around now".

Informal and quasi-scientific evidence of this sort used to appraise climate change varies: indeed, knowledge may be applied in a rather *ad hoc* fashion. An example occurs in a 2000 group where

P14-2000 argues that "we've lost 11 species of bumble bee this year" to illustrate the evident harm caused by climate change; elsewhere, P79-2007 refers to "a really stupid statistic, I heard about a cow giving out more CO_2 than a car" to argue against the importance of fossil fuel emissions influencing climate change. Arguing in a similar vein, P40-2010 suggests that whilst carbon emissions from flying may be harmful, this is countered by "all the dust particles [from airplane engines] when the light hits them it just reflects back up".

In an early instance of mediated evidence used to appraise climate change, a participant in a 1997 focus group remarks upon having obtained from the internet information revealing that "they reckon that 1995 was the warmest year we've had on record… they reckon temperatures have gone up one degree" (P1-1997). From a television programme, P1-2000 refers to a "picture of a world greatly affected by climate change". In three separate 2007 groups, participants refer to information obtained from television: in each of these cases, the information obtained is taken to argue that climate change is non-anthropogenic – this type and application of evidence is considered in more detail below.

iv. Change in character of the discourse: trends in informal evidence types over time

Across the datasets, there is a move within the discourse from an almost exclusive consideration of weather-related and/or season-related direct evidence towards less personal, more abstracted or mediated forms of evidence.

The 1997/8 instances of the discourse are characterised almost entirely through reference to the weather/seasons. Participants refer to their own recent experience, contrast this with their memories, report anecdotes, conversations and opinions of others – but almost always with reference to this evidence type.

Extensive reference is still made in the 2000 transcripts to weather-related evidence. This is used both to confirm the presence of climate change – e.g. P13-2000 notes "it's affecting the climate, the springs are quite different from what they were" – and to disconfirm it – as where P5-2000 argues "not that many years ago… we all said 'oh dear, climate change is going to mean desert everywhere' [and] of course we have this summer roll up and… there's lakes all over the place". There are also a small number of instances of less direct evidence, for example in the case where P15-2000 refers to a television programme that points to evidence of "a world greatly affected by climate change".

Within the 2002 and also 2003 datasets, the dominant means of interrogating climate change, is again with reference to weather-related and seasonal evidence – albeit with occasional reference to other more technical evidence.

Across the 2007 transcripts, reference to weather and seasonal evidence does still recur. It is in 2007, however, that a separation of informal empiricism from the more direct and experiential types of evidence becomes more pronounced. The main way in which this occurs, is through participants' application of indirect and technical-seeming evidence obtained via media sources: this features in four of nine 2007 groups. Thus P1-2007 refers to the role of sun spots in the causation of climate change as follows:

> I recently saw a programme on [TV]… and they were talking about… Basically the more sun spots you've got the hotter the temperature will be with the sun and the more heat is going to radiate to the planet… that's why we're getting the whole climate sort of problems we're getting.

In another 2007 group, P7-2007 also refers to a "programme on television" in which it was argued that climate change was natural, leading her then also to make this assertion. Elsewhere, P11-2007 also refers to having obtained information from a television programme about natural cycles underlying climate change.

In the 2010 focus groups, an even greater variety of mediated and technical/abstracted evidence is applied in participants' reasoning about climate change. P22-2010 for example reflects upon *An Inconvenient Truth* and counter-arguments to it:

> I remember when the Al Gore film came out sort of the counter-arguments that came out to that where you can layer over the graphs with the same ups and downs for however many hundreds of years and things, so I find it very difficult to say that the weather's definitely a cause of it.

In a separate 2010 group, P2-2010 refers to information obtained via a work colleague, in respect of data ("readings") pointing to climate change being a natural phenomenon which has occurred in the past:

> A colleague [told] me... that over the last hundred years or so in Wales they've taken climate readings [and] there are loads of freak occurrences… it's actually happened like that over the last hundred years… it hasn't really changed.

v. Functions of the 'informal empiricism' discourse: changes over time

As can be seen from the 2007 and 2010 excerpts quoted above, informal evidence is frequently used to evaluate whether climate change is 'natural' or human-caused. This reflects a relatively recent change in emphasis.

In the earlier datasets, the discourse is applied more usually to demonstrate that climate change is occurring – often presenting informal evidence as self-evidently demonstrating this. This application of informal evidence is particularly prevalent in the earliest 1997/8 group discussions: here, long sequences of discussion about the weather/seasons are used to emphasise a view of change which is considered to be a reality[54].

Similarly, in 2002 P8-2002 alludes to the idea that changes in weather are self-evident, where he states that "I suppose everyone will agree" that the weather is changing. Elsewhere in 2002, participants refer to the weather or related ideas to argue that climate change is real or express doubts about it occurring – but the primary distinction is between if it is or is not 'really happening'; for example, in the case of an assertion by P22-2002 that "there's not the snows like there used to be so it has altered hasn't it?" In the 2003 transcripts, the application of the discourse is likewise mostly applied with respect to the reality or otherwise of climate change.

In the 2007 and 2010 transcripts, however, there is a marked shift however towards informal empiricism used to appraise causal attribution. In 2007, for example, the use of weather evidence is aligned with reasoning in respect of human causation of climate change, where P60-2007 argues that "you've only got to look at the weather… to see that something drastically is happening… and it does make you think that something's got to be causing it and there's no one else here that's changed apart from us and what we're doing to it". Conversely, a lack of human contribution is able to be concluded, on the basis that (supposedly) anthropogenic behaviours have been taking place for some time: "We've had gas and coal for so many years now [but]... if that was… changing the climate then that would [be] happening a long while ago" (P63-2007).

A similar conclusion can be drawn about natural causation, with reference to the convergences of weather and human history. Thus P28-2010 expresses his doubts about human causation, by noting that some thousand years previously "there used to be much warmer weather in Greenland, quite large communities who grew vegetables, so what... happened then?"

[54] It should be noted also that a feature of the 1997/8 protocol was to ask participants for their views on the weather – a technique not repeated in other projects.

Conversely, in a separate 2010 group the logic of human carbon emissions leading to climate change is expressed as a common-sense, cause-and-effect notion, where P44-2010 proposes that:

> If the planet's spent three hundred million years locking carbon away … if you then spend two hundred years what the world took three hundred million years to sort out, something's got to happen hasn't it. Cause and effect.

These various means of reasoning about causal attribution do not mean that the earlier modes of reasoning are absent in 2010, however their prominence – along with those instances from 2007 – points to an increasing concern over time with using 'informal empiricism' to consider a 'causation' rather than 'reality' proposition.

A final example which recurs across several datasets, and is illustrative of a continuity in modes of informal empiricism, is in the use of a piece of anecdotal evidence in a manner similar to the 'Greenland' case study quoted above. In four of the six datasets (2000, 2002, 2007 and 2010) there are instances of participants referring to the Thames having frozen over at some unspecified (but historical) point, provided as evidence *either* that extremes of temperature are not new (i.e. an 'anti' climate change argument) *or* that the weather was colder in the past (i.e. making the point that the climate has changed). Two examples illustrating, respectively, these two applications of evidence about a frozen Thames are as follows:

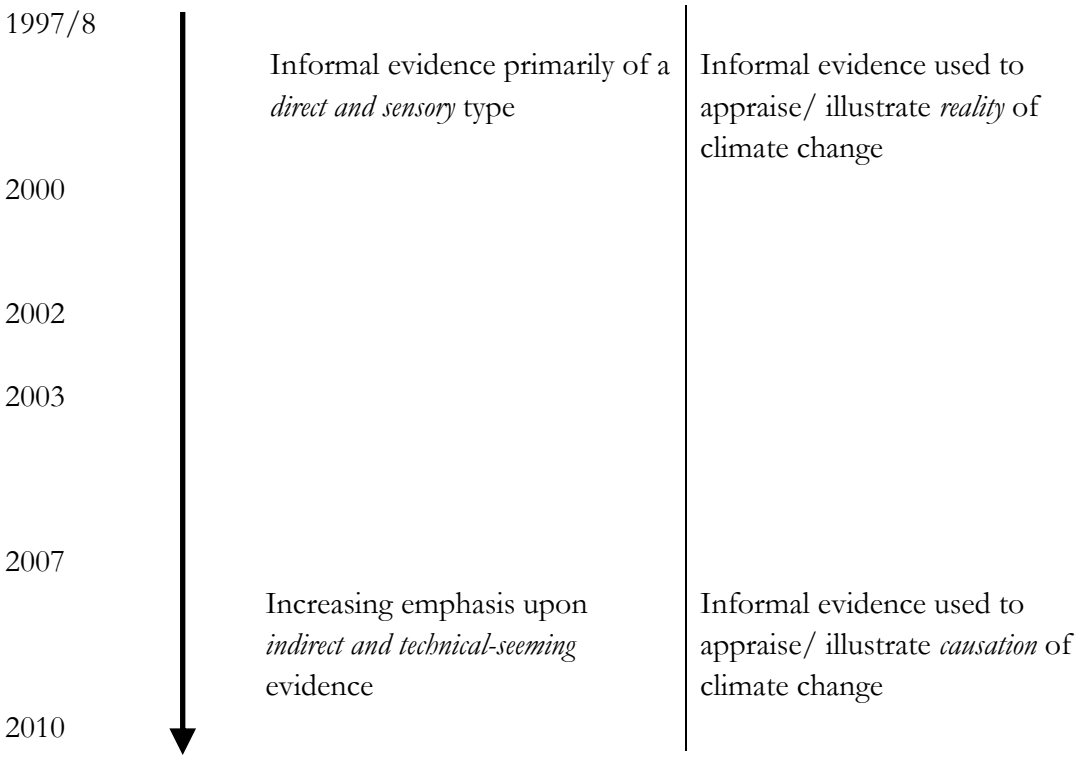
> A few hundred years ago people used to skate on the Thames… I wouldn't have thought there was much pollution… so… I do wonder whether there's a little bit of alarmist talk. (P3-2000)

> The Thames froze didn't it, they used to ice skate on it at the turn of the century. I mean, it's never like that in our lifetime is it? (P18-2002)

SLQ summary: changes and continuity of the discourse

Figure 5.2 illustrates changes in the discourse, as considered above.

Figure 5.2: Change in *informal empiricism* discourse across datasets



5.3 Climate as part of nature

Overview

Climate change is interpreted in the context of certain fundamental features of the natural world. Specifically, these are that the Earth, its climate and natural historical and geological features are characterised by mutability. This mutability is a fundamental, inherent part of natural systems, in that this is how the world 'is' and is meant to be. Over very long timeframes, the Earth is understood to be ever-changing: this is evidenced and illustrated by events such as ice ages and continental drift. In this context, climate change as a contemporary concern constitutes an often unremarkable and expected episode. Anthropogenic influence is not necessarily dismissed, but is seen as contributory or additive, and may be discounted in relative terms.

Metaphors, rhetorical devices, recurrent motifs

- Change as inherent to natural systems, including climate
- Change as perpetual and inevitable, analogous to a planetary 'evolution'
- Long and very long timescales, such as 'ages', 'epochs', 'eras', 'millions of years'
- Cyclicality of change, especially as between ice ages and warm periods
- Relative influence of humanity, usually seen as diminutive or at least partial

Characteristics of the discourse

Central to the discourse is the notion that change, or *mutability*, is a fundamental characteristic of the Earth, and as such of climate.

This is often asserted in statements seeming to affirm an ontological truth: of *how things are*, or *are meant to be*. There are numerous instances of this across the datasets. P7-2007 states that "it's a natural way of the Earth… so it can't be good and it can't be bad, because if it's the way it's meant to be then it's the way it's meant to be". P13-2002 equates climate change to human famine, both as phenomena which are "meant to happen". P37-2010 argues that "by the nature of climate change, climate will always change". Alluding to a 'whatever will be' proposition, P42-2007

suggests that "if it's going to happen, it's going to happen", and in separate 2007 groups P51-2007 states "I just think this is the way it is" and P2-2007 that "the Earth is just going through something it wants to go through".

The notion of *perpetual or eternal change*, contextualised to the Earth as a whole and climate in particular, is commonplace. Thus P1-2000 suggests that "things are changing and they always will", P31-2007 that "the climate does change itself anyway," and P23-2010 states that climate/weather "has been changing all the time as far as records began". As in this latter quote, the climate is often portrayed by participants as ever-changing: "climate change is not a new thing in the world" (P16-2003). P42-2010 uses the metaphor of human ageing to characterise this progression, suggesting "it just happens, because I suppose it's like us as a person, we change as we get older, so I guess the Earth is changing as it gets older".

A metaphor for change often invoked, is *planetary evolution*. P4-2002 refers to "a certain type of evolution", P15-2003 suggests "change happens all the time, there's a lot of evolution" and P51-2007 that "the world has got to evolve and this is just happening". Appearing to counter other participants' views that climate change is a contemporary phenomenon, P17-2002 asks "but hasn't life and evolution over thousands of years developed that way?" Using similar ideas, climate change may be characterised as a "natural progression" (participants P16-2002 and P8-2002 in separate groups both use this term).

In keeping with these ideas, the *timescales* used to describe climate change are frequently of the order of thousands or millions of years, or otherwise indefinitely long periods. These timescales may even extend to the beginning of (the Earth's) time. P5-2000 suggests "I have a feeling that a lot of this climatic change could well be climate changes that we've had going back to the year dot". Similarly, P19-2002 suggests "the climate has changed since the beginning of time, up and down, things are always changing" and P5-2010 argues "everything we've done hasn't helped it, but climate changes. It has done since the planet began".

These long timescales are said to present a different *temporal perspective* on climate change, as where P15-2003 argues "we see change happening in our lifetime scale, but if nature works on a much longer timescale, we don't always have things in perspective". This notion of perspective is also raised by P9-2002, who argues that a human perspective has been erroneously applied to what is in fact a geological-timescale phenomenon:

> We're all so terribly important <ironic statement>, you don't see it on a huge timescale as to what's happened to the Earth, it's always this is a disaster happening now. But

> sometimes you have to accept that you've got to look at the earth over millions of years, not just the 60 years that you're going to be around.

Similarly, P5-2003 adapts the metaphor of 'a drop in the ocean' to suggest that in respect of weather patterns changing "our lifetimes" are "a miniscule little drop in the evolution of time and the whole world".

It is common for change of climate over time to be portrayed as *cyclical*. The term 'cycle' and/or similar notions are used in all datasets. For example, P4-1997 asks "is it something that just happens from time to time… does it happen every hundred years?" and P30-2010 remarks "there are these hundred-year cycles of climate". Although these two quotes suggest centennial cycles, elsewhere participants talk of "a ten, fifteen million year cycle" (P11-2007) and P49-2007 suggests that "it's always going to happen, it's happened, millions of years ago, it's going to happen, millions of years to come. The world is always going to change. The world has changed since the start". Elsewhere, participants suggest that "the climate… has to be seen as part of the larger Earth cycle" (P3-2010), "obviously there have been cycles of ice ages et cetera" (P3-2000), "I think we're in some form of cycle" (P4-2003) or that "these cycles have been happening before" (P14-2002). P7-2007 also proposes that "every... so many hundreds of thousands of years… this comes around anyway, this change in climate".

Certain *key events* in the history of the Earth recur as illustrations of the long-term mutability/ cyclicality of the planet. Floods for example "come round, they come and go" (P19-2000), or climate change may be seen to be associated with sun spot cycles, such that "we do have an eleven-year sun spot, eleven-year cycles, we've always had eleven year cycles, it's been there forever" (P14-2002). P29-2007 also refers to sun spot cycles, though over the timeframe of "every seven million years".

In four of six of the datasets, the example is used of past sea level rise or continental movement, to portray long-term changes in the planet; as P40-2010 suggests, "it's happened in the past, it'll happen again, that land is lost to the sea, land is regained by the sea". The specific notion of Britain having been joined to France arises several times. For example, P3-2000 argues that "you do get these natural phenomena anyway… ten-thousand-odd years ago, man could walk from France to Britain". P18-2010 equates changes in sea levels similarly to (effects of) climate change, arguing:

> We tend to go round in circles... obviously England was part of France and now it's not joined… that is natural as such, that's not an impact from climate change, so perhaps this [present consequences] is just another form of natural history.

A further event used to emphasise the precedence of major change is that of the extinction of dinosaurs. However, the most common geological event associated with climatic cycles or presented as an important precedent, is that of *ice ages* – this receives mention in all datasets but the 1997/8 groups. The argument is presented, that ice ages have occurred before, and/or recur through time. As P19-2000 suggests:

> Over the last… however many million years, we've had ice ages, we've had hot periods and when the next ice age is due or when the next hot period is due… we don't know. We live for an average of 70 years and an ice age can last … several thousand years.

P13-2002 similarly argues "I think it's just another era in the world isn't it. We've had the Ice Age, we've had all the different ages and it's just another one that's happening". Again, in 2007 P39-2007 draws on the cyclical nature of ice ages to support an argument for natural rather than anthropogenic climate change:

> I think it's natural climate change… there was a Stone Age, there was an Ice Age, the ice is retreating, that's natural, it's going in retreat and then there's going to be another age that'll come on after that, not in our lifetime… but something else will come along.

The idea of recurrent ice ages is again applied in 2010, for example where a participant argues that whilst climate change is not necessarily "good" it is nevertheless part of a larger pattern – a mutability across "the great grand scheme of things":

> [The] thirteenth, fourteenth century had a mini ice age, and so that was a natural sort of change… I'm not saying it was an easy or a good thing, but it happens… so you could say in the great grand scheme of things that things move forward.

In these accounts of the Earth's history, can be detected a *natural precedence logic*: given that climatic change (and related phenomena) have occurred before – indeed are constantly recurring – then there is a natural order to them. The sense is conveyed that this is at some fundamental level 'meant' to happen *irrespective of human actions*.

Further striking instances of this idea can also be found across the datasets. P19-2002 for example refers to changes in coastline since Neolithic times – despite a lack of industry (i.e. human-derived carbon emissions) at this time:

> Every piece of sand you can see here <coastal location> was all hunting planes in Neolithic times… I've seen the fossils myself… it's all Neolithic and there's elk bones, all kinds of things. And so the whole place was completely different… without any environmental, industrial or any kind of impact the whole place just 100% changed.

A similar argument is made by P21-2007 who draws attention to the lack of industrial technology during previous ice age(s) to conclude that present climate change ("global warming now") is likewise not anthropogenic:

> They reckon the Earth was covered in ice, right? But you didn't have global warming then, you didn't have cars and aeroplanes and fridges and freezers causing it, you had nothing, nature [did] it, and I think if there's a global warming now at the moment my opinion[is] it's nature doing this, it's not us... We didn't destroy the Ice Age in the beginning did we?

In a separate 2007 group P42-2007 adopts this same line of reasoning – here in respect of biblical floods and dinosaur extinction:

> There's... a natural evolution in the way things go… the floods in the Bible, now there wasn't any rockets or fuel… there wasn't anything the human race were doing to create that … the meteor hit the Earth and killed all the… dinosaurs… that was just a fluke of nature… it's nothing to do with… smoke or any damn thing, if it's going to happen, it's going to happen.

Functions and consequences of the discourse

I suggest that the 'nature mutable' discourse functions to situate climate change in the context of wider universal truths than those limited to the contemporary concerns of science, politics, the media – even the human race.

Understanding climate change in these terms however leads to a diminution of its importance, and of the role of human actions in causing and addressing it. In some senses the discourse may be used purposively to downplay the 'threat' from climate change; or simply be an emergent property of the discourse.

There is an associated *acceptance* of climate change in these ways of understanding: for example P1-2000 states "we just have to accept that… things will change", and P13-2002 argues (quoted previously above): "I think it's **just** another era in the world isn't it. It's **just** something else that's happening, we've had the ice age… it's **just** another one that's happening" (emphasis added).

The use by P13-2002 of the word 'just' (almost certainly as synonymous with 'merely') asserts the normality and hence lack of warrant for concern of this variety of (non-anthropogenic) climate change. Other examples already quoted above also use this term (e.g. "the Earth is **just** going through something it wants to go through", P2-2007).

In two places, there is the suggestion that cycles of natural change are even a form of terrestrial renewal: P14-2007 suggests "the Earth goes in a cycle to renew itself". P5-2010 argues that the Earth could indeed "heal" following the end of humanity:

> If it does get really bad and wipes out most of the human race then… it would give the planet time to heal. The human race will have learnt their lesson, if there's any of us left. If not then the planet will heal and life will go on, as it's intended.

The use of long timeframe perspectives that frame human existence as relatively inconsequential; of an inevitability of change inherent to the very workings of nature; aligned with examples from history that emphasise the inexorability of planetary change, and the irrelevance of human action – all serve to frame climate change as something which both is – and can only be – outside of our sphere of influence. They suggest that an acceptance of climate change is the only reasonable response.

Change in the discourse across the datasets

These portrayals of climate change are remarkably consistent across the datasets. In all or most years of research for which data has been analysed, each of the characteristic component parts described above are present.

One trend that is identified, is a functional change in how the discourse is applied. This is in the emergence of ideas about the mutability of nature being applied as a specific *counter-position* to the notion that climate change is human-caused.

An indicative example of this use of the discourse, is participant P5-2010's assertion that:

> I agree we've got something to do with it **but** then I also think that global warming is natural... everything we've done hasn't helped it, **but** climate changes. It has done since the planet began. (emphasis added)

The function to which the discourse appears to be put here, is in the reconciliation or explanation of two competing possibilities – that climate change is *both* natural *and* has a human component.

A particular feature of the language used here and elsewhere across the transcripts, is the use of the word 'but' in portraying two contrasting possibilities. It is notable that this 'human *but* natural' pairing appears with increasing prominence over the time period. For the most part, this phrasing is used to downplay the human component to climate change; although the reverse can be the

intention. For a detailed tabulation of all identified instances of these pairings, see Appendix 5, table A5.1.

It is possible that the increasing prevalence of these pairings, reveals something of the way in which climate change has come to be debated: that there are two 'versions' of causes of climate change, which one is expected to choose between or otherwise reconcile.

Alternatively, the pairings may reveal the development of a nuanced view of climate change: that rather than it being considered *either* natural *or* human-caused, the conclusion may be drawn that both are incorporated – and that by extension it is a matter of interpretation which is the more salient.

'Missing' discourses of nature

It may have been anticipated that together with a high prevalence of views portraying nature/ climate in the 'mutable' terms outlined above, that many instances would also be obtained of participants speaking of nature/climate in terms which portrayed it as 'ephemeral' (i.e. vulnerable to human perturbation). This could be predicted from the cultural theory 'myths of nature', as outlined in section 3.5 of the literature review. In fact, few instances of this kind of portrayal emerge in any of the datasets[55].

One example is the assertion by P80-2007 that human actions are highly damaging ("I think we have a huge impact on everything"), and that "if you take one thing from one you're mucking around with the balance constantly". P9-2002 also notes that even a small temperature rise may lead to large effects: "it's amazing to think that that small rise in temperature can result in icecaps melting that much and having that much effect".

Interestingly, in a direct parallel with the diagrammatic way in which cultural theory myths of nature have been characterised (i.e. with nature as a 'ball' on various surfaces) P17-2003 remarks that:

> I see it as a sort of ball rolling down the middle of the road; you've only got to hit one small stone and it's deflected, and it just keeps on that deflected course, and I'm pretty sure we can have triggered changes like that.

[55] A particular point was made of revisiting transcripts at this stage with a view to detecting any omitted cases.

The one remaining instance of nature seen as 'ephemeral'/ vulnerable, is the assertion of P25-2010, who states that:

> I think [climate change] is a very real threat… it may or may not be the end of life on this planet. That's if certain tipping points are reached where it's irreversible, that once you get past a certain point of change, that the Earth can't go back on itself.

CHAPTER 6 QUALITATIVE FINDINGS (II): SOCIAL DISCOURSES OF CLIMATE CHANGE

The discourses reported in this chapter are concerned with the social characteristics of climate change. Climate change is understood here in terms of a social dilemma (section 6.1), in terms of the relations of responsibility between different social actors (section 6.2), and in the context of modern lifestyles and social practice (section 6.3).

*This chapter reports a **summary interpretation** of findings. The main characteristics of the three social discourses are presented, as is evidence in the form of excerpts from across the datasets from 1997-2010. For an **extended interpretation** and additional excerpts, the interested reader should refer to Appendix 6.*

6.1 Climate change as a social dilemma

Overview: main characteristics and ontology of the discourse

A social dilemma discourse emphasises the problems of conflicts between collective versus individual/singular interests in the context of climate change. This may be conceptualised at various scales, from the individual to the international: for example, the value of individual action on climate change may be disputed where others do not act; international solutions may be considered to be obstructed by multiple conflicting national interests.

Particular characteristics of social dilemmas as portrayed in the context of climate change include: an emphasis upon self-interest, whereby social actors (from individuals to nations) place precedence upon their own interests over collective interests; the notion that inaction or free-riding by some single actors (nations, individuals) underlies the overall collective problem of climate change; and dilemmas of conflicting intentions, where efforts to address climate change may have unintended harmful consequences, or where such efforts contradict other objectives.

Metaphors, rhetorical devices, recurrent motifs

- Conflicts between the interests of single actors and collective interests
- Social dilemmas at an individual and/or international level
- The intrinsic nature of social systems (e.g. use of Darwinian metaphor)
- Global 'villains' (e.g. the USA, China) and 'minnows' (e.g. England)
- Reciprocity (and its absence)

Characteristics of the discourse

The notion of social dilemmas permeates much talk concerning the roles, interests and motives of social actors themselves. As such, it is problematic to precisely isolate each instance of a social dilemma discourse in use. Nevertheless, the approach taken has been to code participant talk where the overriding idea being emphasised is that of a social dilemma, as described above. Having done so, general characteristics and patterns of longitudinal change are able to be explored.

i. Dilemmas of self-interest

Many instances of social dilemmas are referred to as self-evident truths about human society. For example, P5-2000 refers to being "pessimistic" about the capacity of "mankind" to take collective rather than self-interested decisions, and P20-2010 similarly refers to not being optimistic due to "human beings" being self-interested:

> I tend to get a bit of a pessimistic outlook on mankind… as far as being able to get together and make independent decisions for the benefit of everybody without self-interest coming into it… this is the big problem and probably one of the biggest problems for mankind. (P5-2000)

> It's going to come down in the end to ordinary human beings … to all get working together… but I don't know whether that's possible... I think self-interest will take the place of a great many people, in their thoughts. (P20-2010)

Equally, P24-2002 suggests that "those that are in power and have got the money and all the rest of it will find a way of being above everybody else and they won't bother too much about those

that are getting drowned"; this participant uses a Darwinian metaphor to argue that "it's like survival of the fittest isn't it. The survival of the richest".

At a macro-level, such a dilemma may give rise to a 'dilemma of privilege' – if one country is secure, then they will have limited motivation to act in the interests of others; for example, P5-1997 asserts:

> If you're asking every country in the world, all the big powers to do something about it, if some countries or [regions] are not as badly affected, they're not going to be as forthcoming are they [in contrast to] if everybody's in the same boat.

On many occasions, the self-interested nation seen as central to the international social dilemma of addressing climate change, is the United States of America. P4-1997 argues that flaws in the Kyoto Protocol[56] originated due to "America sticking their heels in". P7-2002 similarly refers to the USA as both disproportionately destructive and obstructive, where he asserts "I don't think there's the will politically within the world to do much… the biggest polluter being America, they're just not prepared to do anything".

ii. Commons dilemmas and free-riding

That single-nation action is pointless or irrelevant in the context of wider inaction emerges often, and is often related to problems of free-riding. Separate excerpts of participant talk from across the datasets illustrate the continuity of this view; for example in the following portrayals:

> I'm conscious there are many countries in the world who are probably larger contributors to the sources of global warming that… do nothing… and it makes me wonder, given the balance of population between the Western world and the wider world, whether in fact it's just a drop in the ocean. (P16-2010)

> What's the good of a little country like England… doing something to help the environment and then the whole of Europe or Russia or China… does something completely the opposite?... it's almost a waste of time. (P5-2000)

> If we do something and other countries don't it's pointless. Pointless. (P66-2007)

The view that climate change constitutes an *international* social dilemma has important consequences for views about *national* response. On the one hand, P1-2000 argues that, as a direct consequence of international lack of consensus, a unilateral response is necessary: "trying to get a

[56] It is presumed this is what is being referred to as the recent "big meeting"

disparate group like Europe… to do something about climate change is going to be very difficult… so I think we've got to revert back to what is achievable within our own compass". By contrast, P7-2002 appears to suggest that (British) national response is in fact negligible where not in the context of global action:

> It's a world problem… the top countries that are polluting the world can't agree to actually do very much about it. So irrespective of what we might do on a very small island called Britain we're not going to make a lot of difference.

Whilst the USA is cited with particular frequency, there are other portrayals of an international social dilemma where climate change is concerned. Thus for example, "the Russian countries… don't seem to have restrictions on how much… fossil [fuels] they use" (P7-2002); "China, they're just pushing out more… India is doing its best as well [to pollute]… Argentina, Brazil, they're cutting the forests down…" (P66-2007); "developing countries… like India and China and places like that… say 'well, why should we give a shit?'" (P21-2003).

Just as climate change is seen as constituting a nation-scale social dilemma, so it is seen in smaller-scale, personal terms. Indeed, the parallels are not lost on participants; P8-2010 herself makes this comparison:

> You have… the individuals who are like 'well I'm not going to bother if they're not going to bother'. And then you have the same thing at a country level, 'I'm only going to do as much as everyone else'.

Such contingency of response upon others' actions (an 'I won't unless you do' attitude) is indeed expressed by P23-2010 in the context of the Copenhagen conference:

> The hypocrisy that comes with Copenhagen: … the 'unless you're doing it I'm not' attitude…

At the individual level, the problem of 'free-riding' is construed similarly in terms of a social dilemma, whereby non-action by some individuals is seen to limit the value of action by others:

> I sometimes feel we're wasting our time, because so many other people don't do things… I sometimes wonder if it's worth it. (P7-2003)

> P28-2010: If you and I change what we do… it doesn't really make any difference whatsoever.
> P25-2010: If I don't eat cows, it doesn't make a big difference.
> P28-2010: That's right, that's it. Unless half the population stopped eating cows.

P42-2010 also portrays the contrast between the negligibility of individual action and the importance of collective action, in terms of a social dilemma, where she states:

> Me recycling one wine bottle, am I going to save the world? I'm not… If I don't put my photocopying paper in the recycling is it going to make a huge amount of difference? But then if I don't do that and nobody else does – do you see what I mean?

As well as portraying one's own action in these terms, a social dilemma view even extends to asserting the irrelevance of other's pro-environmental behaviour:

> P23-2007: I read it last week, there was a family and they decided they were going to go completely green, they weren't go to have a car, they weren't going to do this, they were going to do that… and **I thought, more fool you**... I know you're doing your little bit, but what are you really... what difference are you making?

Taken together, nation-scale inaction may also be presented as the context for individual-scale fatalism; for example, given that "the developed world is producing all this… filth and the developing world, China… is going to be producing the most in the future", P4-2000 asks rhetorically "what can individuals do in terms of trying to influence it? I find that difficult".

iii. Dilemmas of conflicting interests

As well as the prototypical commons dilemmas described above, dilemmas posed by *conflicting interests* between individuals or nations are referred to. P18-2002 for example portrays multiple actors with competing interests, resulting in a collective dilemma in the context of climate change:

> There's just too many people and it's too much of a mess to sort out… I think you just can't bring everybody together, there's just too many people, too many people.

With respect to the contemporary financial crisis, P2-2010 refers to economic objectives contrasting with climate mitigation: "we're supposed to be spending money to get out of recession, but we're not supposed to be spending money to keep us out of climate change. It's lots and lots of different messages". Equally, P7-2000 asserts "the government is hypocritical in a way because they want us to buy all these cars but at the same time they say we should be using cars less".

At the international level, the globalisation of markets is ascribed properties of a social dilemma, wherein one party's responsibilities are transferred to another: thus, P2-2003 argues "it's all very well we in the West tidying up our act, but we take advantage of the Third World countries" and P74-2007 notes "[we] talk about the Chinese economy, it's Western Europe and America that's

given them money to go ahead… to make various products for us… we're talking about how bad it is and we're giving them the money".

The general sense that different nations' competing interests pose a dilemma for responding to climate change is asserted by P1-1997 who argues: "one country couldn't do anything about it really, unless they all pull in the same direction. It's a global problem so you need a global solution."

A social dilemma interpretation of lack of success at COP15 in 2009, is portrayed in a 2010 group: "you've got fifteen thousand people go to Copenhagen and they can't agree on anything" (P31-2010). This notion of competing political interests leading to collective failure at COP15 emerges on other occasions in 2010, such as where P2-2010 characterises the conference as 'divisive', and P33-2010 talks of the vested interests at play:

> And I think there was kind of discord in that lots of countries won't sign anything because there were some money things... there was no kind of cohesive answer... it was divisive (P2-2010)
>
> It [COP15] was never going to go anywhere… [there] were too many people talking about money and corporate interests and countries and 'me and mine' (P33-2010)

The failure of COP15, whilst seen in social dilemma terms, is however perhaps simply a concrete example of a wider characteristic of human relations. Where asked about the international dimensions of climate change[57], P18-2010 portrays the problem as a manifestation of an enduring – even fundamental – human problem:

> Trying to reach an agreement, you know, hundreds of years, thousands of years, there's been battles over various disagreements… The fact remains… countries are going… to be very strongly opinionated… so it's difficult to see internationally how that will pan out.

iv. 'Anti-dilemma' perspectives

As evidenced by many of the excerpts above, social dilemma perspectives tend often to be associated with a sense of resignation, fatalism and lack of agency.

[57] The moderator asked: "What do other people think about this international side of climate change? Whether it's – because a few countries have been mentioned in passing here. Do you think this is an international problem that we can do anything about?"

There are nevertheless across the datasets notions that serve the function of rejoinders to the argument that climate change constitutes a (perhaps intractable) social dilemma. Whilst less commonplace, they are of note for portraying an 'answer' to the problem.

One notable characteristic is the idea of 'doing your bit'. This is used both to argue for a *social obligation*, and also as seen as part of a *cumulative effort*. Thus for example, P17-2003 directly rebuffs the idea that there is 'no point' in individual action where the state does not itself act by drawing on the idea of one's own obligation ('I can help') and as part of a wider effort:

> Moderator: So… the fact that the government isn't taking more action… does that make you feel there's no point in individuals, yourself, making an effort to cut down?
> P17-2003: No, I would still do my part if I could, because that's the only way I feel I can help… yeah, it's only a very small part, but if other people do it as well, it should make a difference. It certainly should. And if you can get people to do that worldwide, it would make a big difference.

Equally, across several of the 2007 focus groups participants speak of 'doing your bit': for example, P6-2007 suggests that "we can all try and do our bit", P23-2007 that "we should all do our bit", and P84-2007 argues that there is a purpose (the term 'can' is used in this respect) in individual action: "humans can do something… you can do your own little thing".

Again, across the 2010 focus groups the idea of 'doing your bit' recurs. The purpose of this in cumulative and normative terms is emphasised on several occasions. Thus for example P23-2010 suggests that individual parts have a cumulative impact; and P25-2010 asserts an obligation to act given the UK has a high relative ('per capita') impact:

> A voice is what we are and we can think with our own private lives and I do feel that if everybody does a bit, it's a lot. (P23-2010)

> All we can do is do our bit and as we are one of the nations that per capita consumes an awful lot, it's very necessary for us to do that. (P25-2010)

P27-2010 also argues for individual action on the basis of both a normative ('a responsibility') and cumulative ('collectively') argument: "if everybody does something, then collectively it should be more powerful than anything else. And I [think] everyone's got a responsibility to do something".

As in many of these examples, the cumulative/collective aspect of multiple individual actions is affirmed in many places across the transcripts. This is often revealed through the use of the term 'everyone' or 'everybody'. Elsewhere, P4-2002 suggests that "if we all stood together… there is the wherewithal to change things", P12-2002 that "if everybody did one small thing… that's going to

help", P24-2007 that "everybody should be involved" and P4-2010 that individual action would be meaningful "if everyone did it".

The idea that individual action is cumulatively meaningful is asserted by two participants (P11-2007 and P13-2007) in direct response to another participant's repeated suggestions that this is *not* the case, in the following 2007 exchange:

> P17-2007: Do you think we honestly make any difference ourselves by burning low energy lamps and switching...?
> P13-2007: If everyone did it, yeah.
> P17-2007: And don't leave your television set on standby at night?
> P13-2007: Yeah, if everyone did it.
> P17-2007: Do you think we make a difference to that?...When you see what… the United States and China are doing?
> P13-2007: It'd still make a difference wouldn't it.
> P17-2007: We're just fiddling about we are.
> P11-2007: Yeah, but if 60 million people in the UK start it, maybe it'll become a trend. You know, somebody's got to start it somewhere. If we can be the world leaders in energy efficiency, we can set an example, maybe other countries will say 'Well, it works in the UK, maybe we can follow their lead'.
> P13-2007: Better than 60 million people not doing it.

This exchange is revealing both for the function of such an 'anti-dilemma' argument in responding to a proposition of fatalism/resignation, and also for the means by which the nature of the argument is extended from a small-scale individual to large-scale international level.

Changes in social dilemma perspectives

It is striking the extent to which the view of climate change as a social dilemma, is persistent across the datasets. At different scales and in respect of different emphases a social dilemma discourse recurs in similar forms across the years. For the most part, it would appear that a view of climate change as a social dilemma is therefore a consistent and durable discourse. However, one means by which a subtle shift in character of the discourse has emerged, is in terms of an increasing politicisation at the national level.

In the earliest data (1997/8), the only (slight) allusion to a national political dimension, is a participant's reference to economic consequences of climate mitigation, whereby "if we have to reduce our output… it means we've got to cut back on use of cars… the knock-on effect of that means producing less cars it's putting people out of work" (P5-1997). In the 2000 data, two references made are similarly general, though do refer to government/political contradictions; thus

for example P3-2000 refers to the "£10 million announced this week to the coal industry… which is going to pollute the atmosphere. So there are lots of contradictions that politicians have".

In 2002, some limited participant talk includes references to specific competing local/national priorities and political considerations. As P5-2002 argues, "whilst the local authority might want to put money into… environmental issues, you will always get somebody who will push the priority of [for example] health". P3-2002 considers problems arising were government to act to restrict economic activity: "[if] the government come on and say OK we're responsible for this and industry has to take a very, very huge step back and we have to scale everything down… but there's probably going to be five million people lose their jobs".

In the 2007 groups, reference is made in more specific terms to the conflict between individual interests and government/collective action. Thus P15-2007 argues, in the context of how reduced flying may impact tourism, "you've got to think of tourism, what that brings in for the country… so… that's less money coming in, that's more taxes on us" (P15-2007). At the household level, P14-2007 refers to the (supposed) consequences of personal energy conservation upon his tax payments: "I'd love to have double glazing throughout but … if I did that would put my community tax up, because the government thinks if I've got double glazing my house is worth more."

By 2010, discussion contextualising climate change to national politics is more prevalent still. P2-2010, as quoted above, talks of the dilemmas of conflicting imperatives both to spend and not spend money in the face of a recession and climate change. A similar point is made where P22-2010 talks of the UK's response to recession as conflicting (a 'massive battle') with the longer-term considerations of climate change:

> There's a massive battle between what we're saying every day in terms of our economy needs to improve… that needs to come from spending, [but] then we're saying but we don't want to buy the goods that are made from palm oil and we should be recycling instead.

Elsewhere, P31-2010 presents political decisions in respect of climate change as a stark (and electorally unattractive) choice for politicians:

> Can you imagine politicians saying: 'we're going to close a school this week, because we've got no money, and the NHS haven't got any money, but we're giving two hundred billion to Argentina or something to- for the Amazon or something'. That's the reality of it, you know, short-term political problems against the bigger picture.

Climate change may also be characterised as a national political dilemma in the context of the electoral cycle, whereby a motivation by politicians to ensure "people are happy" conflicts with longer-term needs:

> I think that there's a real issue with climate and the government … they are only in power for so long… they will always look for short-term solutions to make sure people are happy with the decisions they make, therefore they're unable to make a long-term solution (P18-2010)

It is suggested that the accounts referred to above, point towards recurrent notions of collective versus singular interests, which over time have increasingly having come to apply to the domain of politics and civic participation.

Functions and consequences

The social dilemma discourse presents climate change as a collective problem, in the context of the (often fundamental) characteristics of human society and social systems. In this, it functions as a mode of understanding that accounts for inaction and lack of response to climate change, at all levels.

As noted in several places above, the consequences of the social dilemma discourse are often fatalistic and point to lack of individual and national efficacy (e.g. that action in this dilemma context is "pointless"). Negative affective associations are noted explicitly in a number of places: a sense of being 'doomed', 'totally depressed' and pessimism recur.

This said, what I have termed 'anti-dilemma' perspectives are also presented as a means of resolving or responding to the social dilemma of climate change. These are often asserted in terms of 'doing your bit' and, importantly, emphasise a more agentic – even hopeful – view of responding to climate change even in light of its otherwise intractable character.

6.2 Relational responsibility

Overview: main characteristics and ontology of the discourse

The relational responsibility discourse is concerned with the interacting responsibilities of two or more social actors, in the context of responding to climate change. Most usually, this is expressed in terms of a state actor (usually government; often a presumed third person 'they') acting in a manner that will lead to individuals responding in a desired manner. A straightforward, and frequently cited, case is of governments providing financial incentives (or applying sanctions) to bring about pro-environmental behaviour. The discourse also applies to relationships between other social actors: for example, government and industry.

The relational responsibility discourse is mostly expressed in normative terms: as those circumstances which 'should' be in place to bring about required changes; occasionally though, existing circumstances are described.

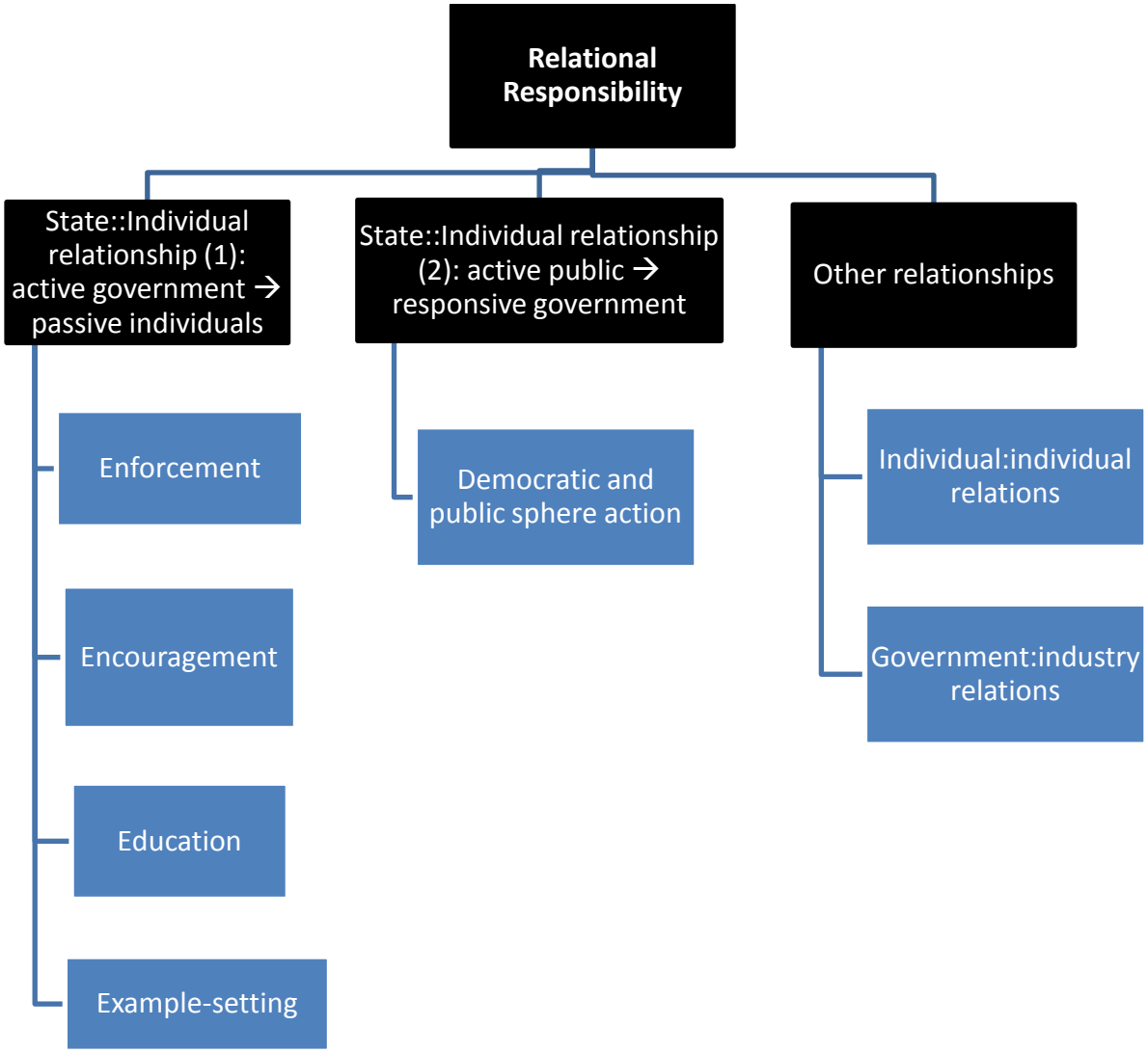
Metaphors, rhetorical devices, recurrent motifs

- Mechanistic view of society as a whole: social actors causing responses in other social actors, and mechanistic metaphors (e.g. 'cogs', 'pawns');
- Metaphors for state enforcement (e.g. 'force', 'ban', 'limit', 'control'), encouragement (e.g. 'help', 'assistance', 'enabling', 'rewards') and education (e.g. 'inform', 'awareness-raising');
- Assumptions about power structures and dependencies between social actors: predominantly portrayed in terms of an active, agentic and powerful state and reactive, passive individuals;
- Normative and descriptive portrayals of relations of responsibility

Characteristics of the discourse

It is useful to preface here a detailed discussion with an overview of sub-types. As illustrated in figure 6.1, relational responsibility is mostly conceptualised in terms of a relationship whereby individuals are seen as responding to circumstances and (dis)incentives provided by the state/government. This generally presumes a rather passive role on the part of individuals. Less often, individuals are seen as active and influencing government; or as actively influencing other individuals.

Figure 6.1: Structure of relational responsibility discourse



Relational responsibility between individuals and the state (1): active government, passive individuals

In many cases, the discourse presumes a mechanistic view of society: social actors constitute interacting parts of a whole, each with different functions and influences. Government is commonly portrayed as having power to set systemic conditions, with individuals responding to these. In this way, government is frequently seen as having agency and being active; individuals as more passive and reactive.

At times, this is alluded to in strikingly deterministic and hierarchical terms, for example in the following where the exercise of 'control' results in 'falling into line':

> They're the ones that control the laws of the land, so they should say: 'right, do this, do that' and then everybody would fall in line and if they don't, carry out their threats, big fines (P21-2007)

Assumptions about power relations are important here: individuals are construed as lacking agency whereby "we as people can't do anything because they've got the last say. The government and the council they've got the last say" (P3-1997).

Such a view is again made explicit where P13-2003 argues that "changes in behaviour need to be stimulated I think, and that's the relationship between [the] public sphere and the private sphere. Individually you... can do very little".

Active/passive distinctions may be made, for example: "government are supposed to lead us, and pull us in a direction" (P35-2010); "I think that people need to be led and I think that that's what the government's there for" (P2-2007); and "it's up to the government to tell us what to do" (P38-2007).

More explicit still, are participants' use of the metaphors of cogs (as in a machine) and pawns in a game of chess, to convey the notion of the relations of responsibility:

> …effectively we are all cogs which could be put into motion to make sure that something happened (P18-2010)

> P57-2007: …it all comes down to government. If you want to do something it all depends what they what to do.
> P49-2007: We're just the pawns in their big chess game.

State:Individual relations – Enforcement

The *enforcement* by government upon individuals to act in an appropriate pro-environmental manner is frequently characterised as necessary and desirable. A variety of verbs are used to describe versions of enforcement, for example: to stop, force, ban, deter, sanction, make (people) pay, impose, control, limit, penalise, and to restrict.

In particular, the term '(en)force' is used across the datasets, as illustrated by the following examples (emphases added):

> They've got to try and **force** people… by putting prices up to stop people, you know **force** them to use other forms of transport (P8-1997)
>
> Hopefully the governments will you know introduce measures to encourage people, even you know **force** people, to behave more environmentally responsibly (P18-2003)
>
> High-energy light bulbs were taken off the market… they're no longer something you can use. You don't always have to use a mallet, but I still think you need to **enforce** things on occasion. (P33-2010)

Enforcement may come in different forms, though commonly entails regulatory or financial penalties. In the case of restricting car travel, for example, P10-1997 discusses "making it more difficult to have a car, or more expensive"; equally P18-2003 suggests that "we have to think of coercive measures… make cars so horrendously expensive to run or something".

Whilst enforcement is portrayed often as desirable, a recognition of the limits to individual acceptance of this are raised also. For example, following a participant's suggestion of restrictions on flying, a second participant questions how practicable this may be:

> P29-2007: Stuff like flying, I mean if they restrict it maybe to one holiday a year, I think that's reasonable…
> P23-2007: People aren't going to do that though… People are just not going to want a state [where] you're completely controlled and governed.

P22-2010 also draws attention to the difficulty arising from espousal of enforcement on the one hand, and a likely reaction against it on the other, noting that "we live in a nation whereby the government says something and everyone goes: 'nanny state, you can't tell me not to do that'".

Similarly, a 2002 participant, having suggested that enforcement is desirable, subsequently (and almost immediately) then remarks that there is actually 'no way' this could happen:

> P23-2002: Do you think we should be made to recycle? … I think we should be made to re-cycle.
> P19-2002: But how do you enforce that?
> P23-2002: I don't know, there's no way you can enforce it.

Changes in responsibility-as-enforcement

Changes in the character of relational responsibility specifically in the context of state:individual enforcement, are difficult to detect across the datasets. Earlier instances, however, are characterised entirely by hypothetical, normative assertions, whereas later instances *also* entail reflections upon concrete, descriptive accounts – including the appraising of actual instances of enforcement.

In the earliest accounts (1997 and 2000), participants for example suggest that "you've got to… ban cars" (P1-1997), that "there should be a limit" to household waste permitted (P1-2000), or that "they probably do have to put in some form of sanction" (P18-2000).

Later accounts do still incorporate these forms of normative assertions, however recycling behaviour in particular has come to be considered in terms of an extant (present tense) and as directly experienced. Thus P15-2007 for example remarks that "there is… a step going on and there's a fine imposed if you don't put your cardboard and things like that in the right bags".

Similarly, P12-2010 reflects upon the present and likely future context of this enforcement:

> If I can't get the lid down on my bin then I'm going to get fined, so I make every effort to recycle as much as I can… I think it can be enforced... I think it will be enforced.

A participant in another 2010 group, makes a similar claim to the one above, extending its implications by analogy to restriction of car use:

> If somebody told you that you couldn't get in your car then you wouldn't do it. It's like with the recycling… [in the] North [of England], if [recycling] wasn't in the particular sections of the box … you'd get fined. So if they turned round and said: 'well actually you're not allowed to drive a mile' <i.e. a short distance>… you wouldn't do it, but I think it would have to be enforced, for a lot of people. (P45-2010)

State:Individual relations – Encouragement

Relational responsibility between the state and individuals is also often conceptualised in terms of government proffering incentives and assistance for pro-environmental behaviour. Terms used include incentives, rewards, subsidy, payment and lowered prices, help, assistance, enabling, and the 'making easy' of pro-environmental behaviour.

An example from an early group is that of P1-1997 who proposes the means by which government may encourage use of electric vehicles:

> The governments can **make it easy** like if you've got an electric car **you don't pay tax**, your insurance is less or whatever. They can **make it an incentive** that way. (emphases added)

As in the case of enforcement, assertions of encouragement tend often to be normative. For example, P8-2003 states that "there's probably got to be some sort of incentive to [deal with climate change]… individuals tend to be very apathetic, so unless they're given some kind of incentive… they're probably not going to do it".

With reference to taxation, P53-2007 suggests that "the government could help cut down the emissions and things, maybe give people a tax break"; in terms of encouraging smaller car engines, P4-2002 argues from experience that "it's working with the government giving us our car tax for half price, because my son's just bought a car deliberately with a smaller engine… so if they give us more incentives I should imagine we'd… do it".

A view of the state offering financial rewards and incentives persists into the most recent 2010 group discussions. For example, P18-2010 and (in a separate group) P6-2010 assert the value of encouragement, as being a necessary and reasonable part of the social contract between individuals and government:

> You should be given the right decisions to make and then be rewarded for that, because you are contributing, you are helping (P18-2010)

> At the moment… there's an incentive to fit solar panels on your roof, and… things like that I think will slowly creep up and more and more people will take that on board. (P6-2010)

More generally, pricing of products and services may be used to influence behaviour: "Ecologically sound products, they shouldn't be more expensive than things that aren't because that discourages anyone from buying them" (P7-1997). More explicitly, people may receive a 'reward' for lowering

domestic energy consumption, as proposed by P9-2002: "the other way [to lower emissions] is [by] rewarding [people] in some way for doing it. If your electricity bill went down by 10% over a year you got it 10% cheaper or something".

In addition, the notion of government facilitating appropriate action by individuals may entail adjustment of structural conditions, particularly in respect of travel behaviours. A typical means of asserting this view of relational responsibility is given by P7-2000 who suggests that "a good public transport system" would "encourage people to get rid of their cars"; similarly P39-2010 argues that "if the powers-that-be really wanted you not to use your car… you'd have options, you'd have good public transport".

Changes in responsibility-as-encouragement

A trend is evident in an increase in the variety of pro-environmental behaviours considered appropriate for encouragement, as well as a move (as per the enforcement aspect considered above) from hypothetical, normative assertions to more concrete, descriptive accounts.

In the first two datasets (1997/8 and 2000) there are no references made by participants to encouragement in descriptive/concrete terms – though numerous references are made suggesting its desirability in normative ('should') terms. Across these two time periods, it is notable that any reference to home energy use (in the context of relational responsibility) is also absent (coded references refer mainly to travel behaviours, or are non-specific).

By 2007 and 2010, however, there are several references to domestic energy consumption, specifically contextualised in terms of a system of state:individual encouragement. By 2010, there is also a greater proportion of references to encouragement in descriptive terms, including in respect of domestic energy use. Thus P34-2010 argues for encouragement of pro-environmental behaviour with reference to that which is already in place: "B&Q <a hardware store> is doing discounted, subsidised insulation, and the government is doing insulating, so there can be encouragement". Likewise, P31-2010 reports the outcomes of a bike-to-work scheme at his place of work, including in terms of the appeal of such programmes:

> The government has a scheme where you can get a tax incentive for buying a bike… in my firm thirty people bought bikes… and that incentive changed their behaviour… [so] things like that do make a big difference… and so more like that would be really useful.

State:Individual relations – Education

A third means by which the state may be understood to exert influence over individuals is through provision of education. A number of notions are used in this regard: educating, informing, awareness-raising, being told or given information or guidelines, and campaigning by government.

Education may be construed as awareness-raising for its own sake: for example, "maybe they should educate you more to let you know what's going on" (P8-1997); "the government needs to educate the citizens" (P16-2007); and "providing people with the information they need, because otherwise you're in ignorance" (P37-2010).

Education may also be advocated with the specific intention of making people more aware or 'conscious'; for example participants from 2002 and 2010 separately argue:

> The Government don't make it a major problem to us, they don't make us aware... if we had it on the news and we had a prompt every day then perhaps we would be more aware and be a bit more conscious. (P16-2002)

> They need to sort of bring it into our consciousness I think, sort of mainstream. (P36-2010)

Awareness-raising may be seen in instrumental terms, to 'push' people to 'realise' climate change is occurring – "it should be pushed enough so that people realise that it is happening" (P14-2000) – or to 'point out' the consequences of one's actions: "It's up to the government or the media to bring it home to them. It's got to be pointed out to people their actions will affect the world" (P19-2000).

The assumption – implicit or stated – is often that were the state to execute its responsibility to citizens of provision of information and other awareness-raising, then individuals in turn would be able and/or motivated to carry out their own responsibilities. This instrumental view may indeed be clearly framed in 'if-then' terms, for example: "we should all be made aware... if we do know what's causing it and, you know, we should all do our bit" (P23-2007).

Education it is suggested will lead to ('so that') more pro-environmental behaviour in young people: "there should be more public awareness in regards to climate change for young people... so that they can treat the world, treat everything, with respect" (P14-2010). The converse of this argument is that where individuals are *not* informed, then they will be unable to understand or act appropriately; as P40-2007 suggests: "too much leaving the kettle on and all that and leaving your telly on standby, things like that. You've <sic> got to educate people haven't we?"

Change in responsibility-as-education

There is a distinct change in the character of these ideas over time. The idea of education as generic awareness-raising dominates in earlier transcripts. An emphasis upon education as a mechanism for influencing behaviour, emerges in the later transcripts.

Early instances (1997) are almost entirely concerned with awareness-raising for its own sake: to 'educate' and 'make aware'. There is just one instance of education proposed for a specific purpose, but even here the assumption is of generic awareness-raising where there is seen to be a lack of knowledge.

There are few references to 'education' ideas altogether in 2000, though of the two instances coded, these refer again to lifting levels of knowledge in relatively generic terms: one participant does though make reference to heightening understanding of the links between 'actions' and their consequences (as per P19-2000's quote above[58]).

It is only in 2002, that the first references are made to education used for the specific function of *influencing behaviour*, with awareness-raising talked of in terms of something in existence rather than asserted in solely normative terms. For example, a participant refers to the fact that "we are now told to switch lighting off… and make sure things are switched off at weekends" (P7-2002); another that "they [are] doing it like educating children into being more aware of climate change" (P5-2002). Nevertheless, for the most part references allude to education for its own sake.

By the 2007 focus groups, a dominant focus has emerged upon education contextualised towards influencing behaviour; P22-2007 asserts for example that to "help you not to pollute the environment… give us the information that we need to do it"; and P80-2007 argues that it is necessary for there to be "more information out there for people, because there is a big confusion over what you're allowed to recycle or not".

Finally, within the 2010 group discussions, the majority of references to education are contextualised in terms of influencing behaviour. Ideas about education and awareness-raising have taken the form of providing information or 'guidelines' specifically to enable or promote pro-environmental behaviour, for example:

[58] "It's got to be pointed out to people their actions will affect the world".

> It should be taken to a much lower level of these are the things that you can do to ease pollution and use of resources and food miles and all this sort of thing, and really clear guidelines, and people can choose to do it or not. (P11-2010)

In a separate group, P36-2010 argues that "it's just about information… knowing what we can do… it's education and making sure our children are responsible for turning lights off and things like that". P1-2010 asserts that "the government has taken adverts to try and encourage us to use our cars less… I think that's wonderful"; and P7-2010 in response asserts the value of such a top-down approach to behaviour change, using the analogy of campaigns against drinking and driving: "Think of how… campaigns against things like drinking and driving have been very successful over recent years".

State:Individual relations – State as exemplar

A final (though less common) case of 'active government/ passive individuals' entails government setting an example through its own actions.

The earliest coded instance is that by P7-1997 who criticises the lack (in 1997) of recycling facilities, arguing that "maybe that means that the government doesn't care… so it they don't think that's high priority, why should we?"

Equally, P2-2002 suggests government could signal the importance of climate change:

> If the government went on television and said… we are going to do this on a big scale… you would feel that the government is doing something and if they're doing it and they're getting into action then we should

Two further instances are presented whereby the actions of one particular government minister was seen to be setting a bad example – which emerged in two separate research projects four years apart:

> When you read about [John] Prescott and all these Jags [Jaguar cars] that guzzle the fuel very rapidly and spew out all the emissions… everybody says 'well, if he does, why shouldn't we?' which is understandable. Definitely leading by example is a way forward. (P17-2003)

> P24-2007: …you see our politicians getting in a helicopter to go 500 miles.
> P21-2007: Prescott.
> P24-2007: What incentive is that? 'Oh he can do it, so can I then'. You know.

Relational responsibility between individuals and the state (2): active individuals, responsive government

Far less prominent than an 'active government/ passive individuals' understanding, but nevertheless appearing across datasets, are instances portraying individuals as active participants, with (potential) influence over government.

The most straightforward means by which this is considered to occur, is through voting. Thus for example, P1-2000 argues "we need to… inculcate into political masters that it <re. discussion of pollution and use of fossil fuels> is important to voters, that we want them to take considered action… presumably by voting is one way".

Further references to the vote emerge in 2010, e.g. where P33-2010 places an onus on citizen participation:

> We vote for them… so we deserve the government that we get, and everybody who says: 'I'm not going to vote for so-and-so because they're going to put my taxes up'… that's really sad.

Other public sphere behaviour is also referred to. As with P33-2010's argument for need for voter support for enforcement measures, P18-2000 asserts that "what the public can do is support the politicians in order to be able to make those difficult decisions". It is also argued that car fuel consumption "could be much better, but will only start getting better when people demand it" (P8-2000).

A forthright assertion of the necessity and potency of public weight of opinion, serving to influence government decision-making in the national context, is given by P47-2010, who argues:

> If there is a mass of people, you can go forward with an idea, and if we were all saying: 'yes, we want green power, we want wind turbines… and… to hell with it being in my back garden, this is going to be the norm'.

Excerpts such as the one above are of a far rarer sort, however, than the portrayal of relational responsibility in terms where it is government which is active, and the citizenry which is passive/reactive.

Relational responsibility between individuals

For the most part, the assumption behind this version of the discourse is that individuals are responsible for influencing (and able to influence) the actions of others. An early instance of this is where P4-1997 argues:

> If you're really going to become serious about it you should consider what you can do as an individual to try and encourage others. If I'm only going to go to the shops round the corner I won't jump in the car, I'll walk.

It is of note here, that at least a part of P4-1997's own actions are seen as potentially influential ('to encourage') over others. Similarly, P13-2000 recounts personally challenging people who 'leave their engines running': "Occasionally I'll pluck up courage and I'll say to them, 'do you really need your engine running now?' … you are just adding to the pollution unnecessarily, or you're just burning up your own money".

This reporting of 'citizen activism' is rare however. More common is a view of influence of a less direct kind. This may be in terms of influencing family and friends, as P11-2007 notes: "If we all started being energy conscious, that'll pass on to your family and it'll pass on to their friends… you start talking about things and it spreads that way". Similarly, P7-2010 suggests "it's going to be a mixture of people making individual decisions about their conscience and influencing their friends".

Influencing others is also conceptualised in terms of the education of children, as where P5-2002 proposes "if we all said tonight: 'right, we've got to start going green as much as we can, how long would it be before our children's children thought green every day?", and P17-2002 suggests "it's up to me and my generation to say to you: 'come on, let's get these kids sorted"'.

Relations between nations

On a number of occasions participants offer perspectives on the relations between different countries and governments – particularly in terms where climate change is seen as an international collective problem. This may be framed in terms of reciprocity obligations, for example where P7-1997 notes "if we were doing something then we'd expect other countries to do the same". Equally, in 2010 the argument is made that expectations of other countries are unreasonable, where this is not acted on closer to home[59]:

> If we want to set an example to these other countries it's no use saying well we'll just carry on as we are and give you some money to squander on whatever you want. It's only if we change our lifestyles that other countries like India and China or wherever are going to pay any attention. (P28-2010)

[59] This argument was made in the context of international carbon trading, hence the reference to 'give you some money'.

The notion that action is required to be international and multilateral, is affirmed where P2-2003 argues: "we've got to take… more responsibility and not just sweep it off to another part of the world… The Western world has a responsibility for the rest of the world… because we can't just do it in isolation".

The notion that incentives require to be offered from Western to developing nations is also made in a 2010 group, where P2-2010 argues: "We can't prevent Africa and Asia and all of these less-developed countries becoming more and more technology-focussed. We need to offer them something that's not burning fossil fuels".

Other relations of responsibility

Other social actors are referred to in the context of interacting responsibilities, however more rarely so.

Examples include a role for environmentalists to engender concern among the public, such that "they make a big song and dance about it and people will… start to listen" (P1-1997) and for environmental NGOs to 'pressure' government, whereby "I think the pressure would come from the environmental groups to the government to do something about it" (P59-2007).

Functions and consequences of the relational responsibility discourse

With regards particularly to individual:government relationships, this discourse is used to put forward practical and reasonable means by which climate change is considered able to be addressed. Questions of scale, power and the relative inefficacy of single individuals are (implicitly) recognised in the discourse. By proposing the many reward/punishment scenarios, participant accounts are used as a means of resolving these, with individuals and government *both* characterised as playing a role (albeit more usually with the former a passive one).

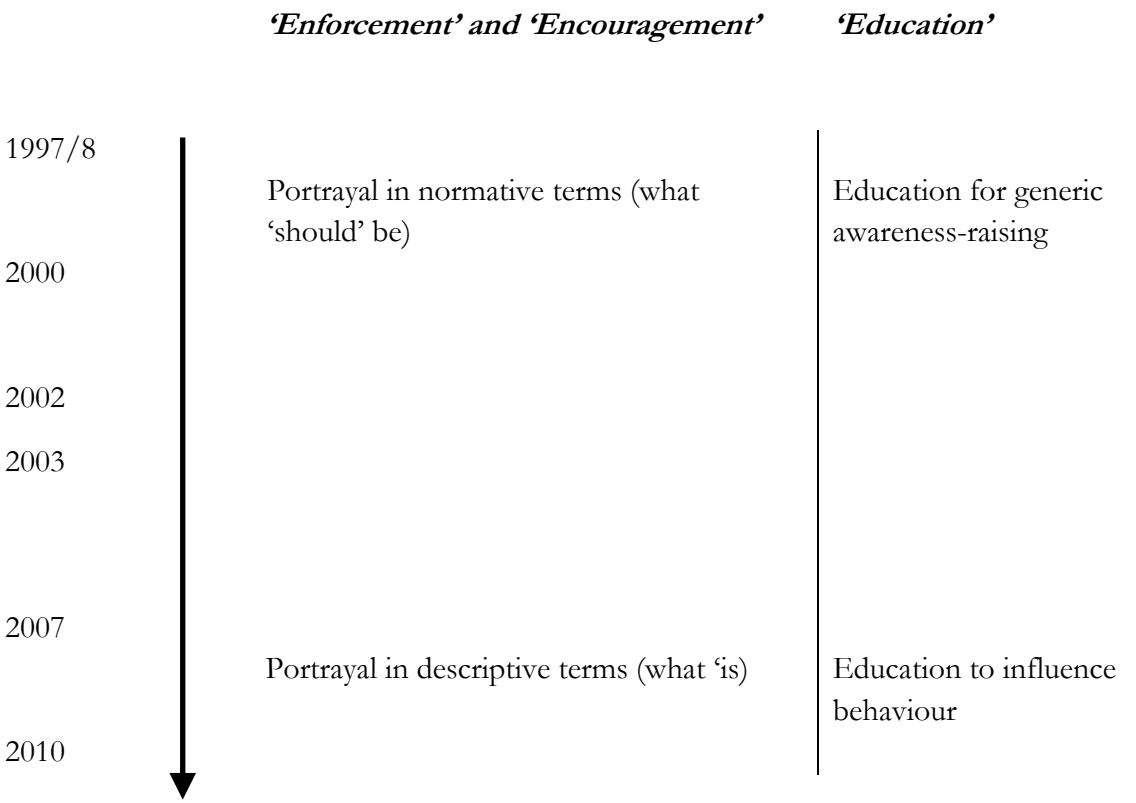
It would be possible to argue, that 'passive individual' versions of the discourse in fact act to direct responsibility away from people themselves: that this discourse is being *used* to deny or deflect personal obligations. I do not wish to make this argument here, however. It is more important, I suggest, to recognise that the means by which climate change is contextualised to society, here results in a rather more candid attempt by individuals to find a way through what is otherwise a highly problematic set of circumstances for people themselves. Personal responsibility is not

considered in isolation from the conditions in which people find themselves: the relational responsibility discourse argues that reciprocity and assistance are necessary to meet the demands of individual responsibility.

SLQ summary: changes and continuity of the discourse

Figure 6.2 illustrates changes in the discourse, as considered above.

Figure 6.2: Change in *relational responsibility* discourse across datasets



6.3 Lifestyles and social practice

Overview: main characteristics and ontology of the discourse

The lifestyles and social practice discourse emphasises features of modern life which are considered to underlie climate change. Climate change is understood primarily as a cultural phenomenon – it has arisen from, and is perpetuated by, culturally-situated ways of living – a case in point frequently cited is consumerism. The cultural antecedents of climate-relevant behaviour are not seen as fixed, however. It is argued both that culture has become harmful (e.g. increasing materialism) and more responsive to environmental concerns (e.g. normalisation of pro-environmental behaviours).

Metaphors, rhetorical devices, recurrent motifs

- Climate change causes contextualised in terms of 'consumerism', 'capitalism', 'materialism' and 'Western' and 'modern' society
- A metaphor of 'pressure' in terms of time, finance and work
- Lifestyles and ways of living that are problematic
- Cultural change over a generational time period (both positive and negative)

Characteristics of the discourse

i. Western lifestyles and 'pressured' living

Western lifestyles are frequently referred to as driving forces of climate change. This may be in general terms, such as where P7-2002 notes that "in terms of climate change the thing that strikes me is… I think it's very much a thing that's associated with the West"; and the argument of P18-2000 that "the Western world… has contributed to climate change through… the lifestyles that we have". Similarly, P31-2007 remarks that "it is the way that we live that is causing climate change", and P19-2003 refers to "this way of living" which is "linked in with the way economies work and the way societies work".

At times lifestyles are portrayed as matters of choice – for example, P6-2000 refers to "us choosing to live in a certain way", and P9-2010 to "the lifestyles that some of us choose to live". However, the more usual sense given is of lives structured and directed by social and cultural circumstances.

The pressure of time in the context of modern living is a recurring theme in the discourse. Thus P62-2007 suggests she does not attend to energy conservation in the home "because life is too fast… trying to do ten things at once", and P41-2010 explains that "with the pressures of our lifestyles and our time and money and our resources… I could walk to [the supermarket] but I don't because I don't have the time". In the earliest of the datasets, P4-1997 suggests that "things are going at a faster pace for some reason. The time seems to run out on you".

The pressures of working life, are often referred to as underlying the inability to engage with climate change. As P16-2002 explains, "we haven't got a lot of time. A lot of us work full time and run homes… you don't want to recycle… you just get it in the bin". In respect of travel mode, P18-2000 makes the point that with work pressures, relinquishing one's car is difficult: "the working world has got incredibly tough in this country… climate change takes time. If you're going to cycle sometimes that takes longer than if you drive".

In parallel to the idea of people subjected to time pressures, reference is made to a growing sense of immediacy in the way social activity is conducted. P22-2002 for example argues that "we want everything right now just as quick as you can… we've gone crazy, absolutely crazy. And because of that… we've sped up this effect [climate change] haven't we on our planet". It is suggested also that this immediacy of living is 'part of culture' that distracts from attending to responsibilities connected with climate change:

> I think sometimes we live in the moment too much, and we don't think about what's going to happen in the future. That's part of the culture these days to be like that, so we don't, we just think about now. (P24-2010)

ii. Consumerism

One of the dominant means used to explain the cultural context of climate change-causing lifestyles, is consumerism. 'Consumerism' is so directly implicated, that it may be used simply as shorthand for the causes of climate change. Thus for example P43-2010 argues that in respect of climate change "that's the fundamental basis of it, it is getting worse because of the drive for profit and over-consumerism", and P9-2000 refers to "Western society, Western consumerism" as being to blame for climate change.

How climate change is seen to derive from consumerism may vary. P4-2000 for example argues that harm is caused directly by demand for resources, and indirectly through its leading to a social isolation that negates acceptance of personal responsibility:

> This gross commercialisation that we live in, where everybody is after 'the mobile phone', first of all [that] has implications in terms of resources but also … if you take that as a view on your own life… [if] you just see yourself as an individual, then you … become self-centred and selfish and therefore you absolve your responsibility if you like.

Often people's demands for the products and services provided through consumer society are emphasised. As P55-2007 portrays the matter, "we are partly to blame… people want everything"; P15-2003 remarks that "we all consume… we all have needs and desires which affect the environment"; P6-2000 talks of a "more more more society", and of "this whole world we have which is always dissatisfied and always wanting more".

Situating consumer demands in the context of economic development, P1-2010 suggests that whilst climate change could potentially be addressed "if we made very few demands on this world" nevertheless:

> As soon as people get rich, well relatively rich, what do they want? They want a car, and as soon as they've got a car they want to travel, and they all want refrigerators, and they all want steaks, and they all want fancy clothes.

The cultural context of consumerism is explicitly emphasised by participants. Thus P5-1997 argues that "we're in a culture where having a car is a status thing"; P9-2000 refers to "collective consumerism"; P33-2010 argues "we're born... into the West, we're born into this life, so you can't exactly change it"; and P34-2010 suggests "we've been trained to be consumerist". The idea that Western lifestyles are part of cultural structures is alluded to in the term 'locked into' by an interviewee in 2003: "we're very much locked into convenience, clean simplified lifestyles" (P13-2003).

As participants in this culture, it is argued that these ways of living have become part of *how we expect to live*: "you just take it for granted that's the way we live" (P32-2007). P8-2010 explicitly emphasises cultural aspects where she asserts "it's not just about science, it's about human behaviour and people's expectations and the way they're used to living… and lifestyle, and all of those sort of human factors".

The notion that we have grown 'used to' such lifestyles emerges elsewhere, as where in a separate 2010 group P45-2010 asserts that society has become accustomed to energy-intensive lifestyles, which in turn renders people resistant to change:

> Over time humans have created and invented new technologies and got used to a way of life, and we pretty much do what we want, when we want... I don't think that that's anything that anyone can change, because it's what we're used to.

As well as people's own cultural expectations, the expectations *upon* people are also emphasised: it is argued that "people are expected to travel" (P18-2000), and that it is problematic *not* to fly, because "people automatically assume that you will fly anywhere, that it's OK to… there's no consideration that you'd actually not *want* to fly" (P33-2010).

Often it is the *excessiveness of demands* made by people in a consumer society, which are seen to be associated with environmental harm. For example, P23-2007 argues that "we're responsible" because "we've all got three, four cars per family… we have become very wasteful and greedy". *Money-orientedness* of people as part of a consumer/capitalist society, is also seen as driving climate change through disregarding the consequences of one's actions, as in P37-2010's argument that "everyone steps on everyone to make money, and the consequences aren't really called into question because it's all about making the buck".

The notion of the 'throwaway society' is used across the datasets, to draw attention to cultural contexts of wastefulness. P15-2000 for example asserts that "we are a throwaway society… every day I have a pile of leaflets… and it's been manufactured, it's caused carbon dioxide". P19-2003 suggests that "it's easier for us as a society to just throw things away… but it's not good for the planet". P65-2007 similarly argues "I think it's a wider thing, I think it's… excess and waste. It's endemic in this throwaway society and… I don't think it's good for the planet". P28-2010 also refers to the "throwaway society", and in a separate 2010 group P31-2010 suggests that "stuff you would fix years ago, we just don't now. You just throw them away, buy a new one".

iii. Temporal perspectives on culture

Temporal perspectives on consumerism and related developments in Western society, are often applied to explain why problems have emerged over time. For example, P26-2010 suggests that "[in] the last twenty or thirty years… consumerism has gone through the roof"; in a separate 2010 group, P12-2010 refers to "consumerism becoming more and more extreme in the last hundred years… causing climate change to become more and more extreme".

Changes over time to culture and society, regarded as relating to climate change, are often seen in a *generational* or *historical context*. In terms of increased vulnerability to a consequence of climate change (flooding), P1-2000 talks of the "madness" of building on flood plains being driven

ultimately by cultural change: "the days when we all moved in with granny… we get this social break-up of families whereby we get more single parents who need premises on their own, this is all pressure". In terms of reliance on car travel, this is also positioned also in terms of cultural shifts, for example:

> When I was growing up… you went to shops where you were and you bought things. Nowadays it's a pretty automatic reaction for lots of people, jump in the car and go to the out of town shopping centre. (P13-2003)
>
> People used to work where they could walk to their work. Now they drive 50 miles across the country and back… a car wasn't a necessity 50 years ago. (P52-2007)

Other illustrations of negative change over time emerge across the datasets. In the context of domestic energy use and its connection with cultural change, P13-2002 comments: "Electricity… has it made us more lazy? … I can remember my mother, doing the washing in the kitchen with a copper stick… now you have all these plastics, chemicals… is that doing any good to the world?" P73-2007 also refers to a change in expectations and behaviour over time, in respect of domestic energy consumption for heating: "30, 40 years ago… everybody started to put their electric fire up, turn their heating up".

iv. Change across datasets: perspectives emphasising positive cultural change

As well these ideas about historical cultural shifts which characterise the present in unfavourable terms, a temporal perspective may also point towards *positive cultural changes*. This may be seen as something happening at the present time – as change in motion: for example, P33-2010 portrays cultural change in past and future contexts: "people can change their lifestyles, we went from 1940's, 50's, 60's ways of living… and then 70's, 80's, Maggie Thatcher and that sort of consumerism and stuff, and now it's changing… our society changes over time".

An increasing emphasis on positive cultural change reflects the sole – though important – means by which the *lifestyles and social practices* discourse is identified as developing across datasets. This emphasis shifts from some limited reference (in 2000/2002) to the notion that there is *increasing awareness and acceptance* of climate change/ environmentalism in society, to (in 2007 and especially 2010) reference to *normalisation and acceptance of pro-environmental lifestyles.*

For example, in an early dataset P9-2000 refers to increasing *awareness* of climate change by noting, "it's a fairly recent… phenomenon. Mid-80's there was some lonely voices in the desert saying 'the climate's changing'. The greenhouse effect was a word looked at with some disdain and now it's accepted". By 2010, however, there are a range of remarks characterising changes to *lifestyles* and *behaviour*, such as:" [Previously] it was an issue that stood apart from your life… you made certain changes to be green, rather than that they were what you did in your everyday life which is the way that I think people approach it now" (P22-2010).

Further detail is given in table A6.1 within Appendix 6 to illustrate this identified trend. In this table are shown all identified transcript excerpts which (i) refer to temporal change as part of the present discourse and (ii) characterise this as moving in a pro-environmental direction.

It should be noted that two different *types* of temporal perspectives are identified here. In the first place (section iii above) *participants themselves* (in all years) talk in terms of cultural changes (e.g. growth in consumerism) leading to detrimental ways of living. The second finding (section iv) is a *trend identified across the datasets* whereby in more recent data participants asserted that pro-environmental ways of living were becoming more commonplace.

Functions and consequences of the discourse

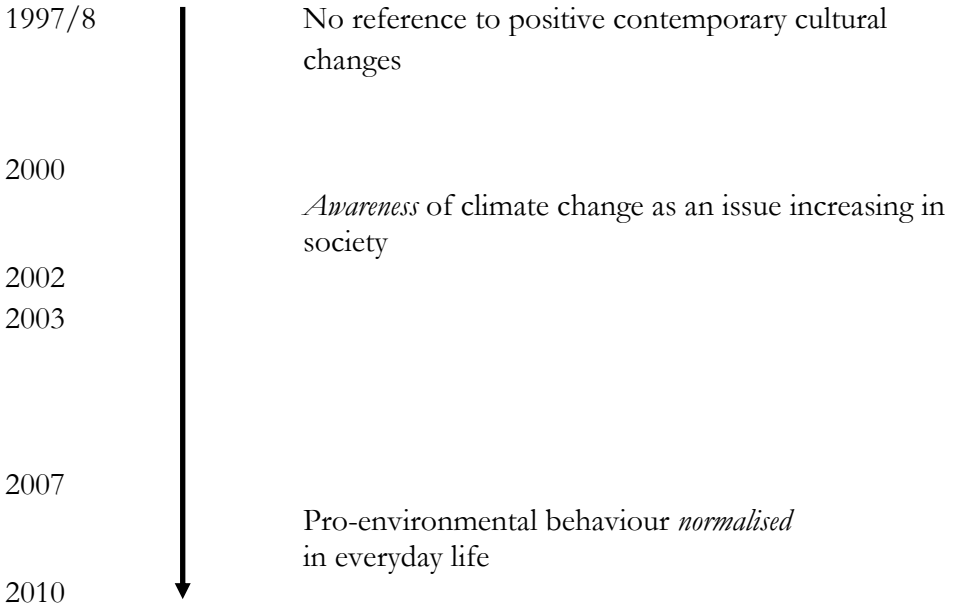
As with the social dilemma and relational responsibility discourses, the present discourse has the function of situating the individual in their wider social context. Here, this is presented in cultural terms: that our actions must be seen in the context of the ways that we live at this point in time and in the West. Such ways of living are presented as constraining or directing people's actions.

A consequence of the discourse is that climate change is seen in terms that extend far beyond ideas of individual responsibility at particular points in time or space. However, given the often critical view of social practices and lifestyles asserted, it may be argued that the discourse also acts as a form of 'cultural critique'. In the context of climate change, aspects of consumerism, for example, are portrayed as damaging – whilst other cultural shifts are portrayed in a more positive light.

SLQ summary: changes and continuity of the discourse

Figure 6.3 illustrates changes in the discourse, as considered above.

Figure 6.3: Change in *lifestyles and social practices* discourse across datasets



CHAPTER 7 QUALITATIVE FINDINGS (III):

PERSONAL AND FOLK-PSYCHOLOGICAL DISCOURSES OF CLIMATE CHANGE

The discourses reported in this chapter are concerned with the understanding of climate change at the individual and personal level. Climate change is understood with respect to the psychology and motivations of others (a 'folk psychology'; section 7.1), and with respect to one's own actions ('accounting for climate-relevant behaviour'; section 7.2).

This chapter reports a ***summary interpretation*** *of findings. The main characteristics of the personal/ folk-psychological discourses are presented, as is evidence in the form of excerpts from across the datasets from 1997-2010. For an* ***extended interpretation*** *and additional excerpts, the interested reader should refer to Appendix 7.*

7.1 Folk Psychology of climate change

Overview: main characteristics and ontology of the discourse

Responding to climate change is understood as contingent upon people's psychology and motivations. Whether and how climate change is addressed is related to folk psychological concepts, such as attention to one's immediate interests, levels of awareness and education, personally-held values (or lack thereof), and willingness or resistance to change.

Metaphors, rhetorical devices, recurrent motifs

- Behaviourist notions: e.g. tendency to respond to reward and punishment; to take the path of least resistance (to do that which is 'easy')
- Cognitive notions: e.g. 'awareness', 'consciousness', 'education', (not) 'thinking'
- Value-oriented notions: e.g. willingness to help, 'concern', 'selfishness', 'laziness'
- Humans as 'creatures of habit'
- Folk-psychological notions of 'denial'

Characteristics of the discourse

i. Acting upon that which affects us: continuity across the datasets

Whether and how climate change *affects* us on a day-to-day basis, is portrayed as an important determinant of people's responses. Where climate change is seen to be relevant to people, this is usually in terms of indirect effects (e.g. cost of fuel). The idea of direct effects are referred to exclusively for their absence, i.e. that because *climate change does not directly affect people*, they will not act in a corresponding pro-environmental manner. As P26-2010 argues: "I tend to think that until the global warming, sea levels rise and it laps up to people's doors… people are going to be indifferent towards it".

The language used to convey ideas about the personal relevance of climate change, is often strikingly similar across the datasets – particularly the conditional construction and use of the verb '*to affect'* – for example:

> It's human nature… you don't really act on something unless it's affecting you (P7-1997)[60]
>
> P7-2000: When it affects people we'll see a change
> P6-2000: Until it affects you, you don't think it matters
>
> It doesn't affect us so we don't bother about it (P5-2002)
>
> If it does not affect you directly then you don't bother with it (P49-2007)
>
> I don't think that anyone's going to do anything unless they feel it affects them (P37-2010)

Across the datasets, the idea recurs that people act according to their own interests. For example, P10-2000 suggests "we don't really do anything unless it's in our interest to do it… if it's raining and you want to go into the city… can you say you've never ever driven?"

An important motivation, frequently cited, is 'cost' – whether in financial terms, or referring to time or convenience costs. P9-2002 for example portrays costs as taking precedence over other concerns, with this seen as part of a universal 'human nature': "we're all very good at lip service, [but] when it comes to hurting us in the pocket then we don't want to know. That's human nature". A corollary of this argument is that avoidance of cost could lead to lower energy consumption, as P28-2010 argues: "Generally speaking things do happen when it's time to put your hand in your pocket. Finance does make people curb their extravagances and curb their behaviour... And that's what'll happen with energy I'm sure".

[60] This remark was not strictly concerned with climate change, but with environmental issues in general.

A related argument, is that if an activity is affordable (as well as desirable) then people will act accordingly. Thus for example P7-2010 argues with respect to flying: "Most people can afford to fly. So if it's affordable and it's quick, it's just almost logical to do it".

Analogous to ideas about financial costs and incentives, are those concerning time costs and convenience. For example, with respect to travel mode, P13-2003 remarks that "I entirely understand why people don't [use public transport] because it's so much easier to just walk out of the house, get into the car, and it's a door-to-door service".

ii. Acting upon knowledge and awareness: continuity and change

Knowledge and awareness about climate change, are also portrayed as important determinants of action. P18-2003 for example argues that "information is what people need to make a proper position about their own behaviour". The idea that behaviour is contingent upon 'information' is also asserted by P15-2000 where he states that "for individuals it's down to the information they get. If they're given information… they see that's something they do can make a change".

A related idea, is that 'education' of various sorts is required, and will be efficacious – the logic (implicitly or explicitly) being that where people are aware/educated then they will respond accordingly. Ideas of being 'conscious', or actively giving thought to climate change, recur in a number of places.

It is particularly in the most recent groups (2010) that the idea emerges that there is an awareness about climate change which has taken hold – and that this is influential upon behaviour. In this, the folk psychology discourse overlaps to a degree with the lifestyles and social practice discourse.

An example of such an assertion is P23-2010's reflection on how awareness has developed over the years:

> I think it's ignorance in the past from the person on the street... We are now more aware and able to perhaps in our small way help… we're all going 'whoah' don't use your tumble dryers and that, don't do this, don't do that.

In a separate 2010 group, P8-2010 also argues that both awareness and pro-environmental behaviour has increased over recent years:

> Going shopping, deciding what journey to take, going on holiday, whatever you do you can do it with an ethical mindset and I think that certainly for me the way I thought about things ten years ago and the way I think about things now are completely different. It's a

> consideration that is just getting stronger and stronger and I think is shared by a growing number of people.

This said, the suggestion that awareness is (or has become) widespread and acted upon is rare overall. More commonplace is the idea that there remains a *lack* of awareness and/or day-to-day consciousness about climate change.

Interestingly, P32-2010 suggests that contemporary awareness is in fact linked to a *lack* of engagement: "because everyone's aware of [climate change] now it is a background issue, that everyone kind of knows about, but it comes to the forefront at particular times and then it'll kind of retreat back".

A more general reference to a lack of active awareness of climate change is referred to elsewhere across the datasets. As P10-2002 puts it, "as individuals, one minute you feel responsible, then it's easy to not <sic> when you get in your car… I think we all do that, we don't think about walking". P55-2007 similarly talks of such concerns as being 'in the back of your mind':

> You're still going to go... buy the bigger car or whatever it is… I still think we should all be trying but again, if it doesn't affect you really there and then, it'll be in the back of your mind and you'll think about it sometimes, but you'll still do it.

iii. Action in the context of values: continuity across the datasets

A folk psychology characterised by value-oriented language is commonplace across the datasets. More often, this is in negative terms – the proposal being that people do not act to address climate change because of a lack of ethics or negative characteristics (e.g. selfishness, laziness).

A common example of a negative characteristic, leading to inaction on climate change, is that of 'laziness'. This term is used repeatedly across the datasets. P10-2000 for example suggests individuals do not relinquish their cars because "people are basically lazy"; P22-2002 argues that "because of… our laziness and our greed and everything we've sped up this effect haven't we on our planet"; and P24-2007 remarks "some people are really lazy. I've seen people get in a car and take their kids two blocks to school".

Other commonplace pejorative terms used to explain people's inaction are 'greed' and 'selfishness', these again recurring across the datasets. For example, P7-2002 suggests that "I think we're just selfish and rich and I think there's not enough awareness"; P23-2007 argues "we have become very wasteful and very greedy human beings"; P41-2010 states "you get in your car, because

human beings are selfish at the end of the day"; P14-2003 states that "humans are instinctively selfish"; and P4-2000 argues that "we've gone inwards and selfish".

The idea that there is inadequate interest is expressed by the idea that people 'can't be bothered' or 'don't care', such as where P4-2002 argues that "I think we're all aware but I don't think that anyone can be bothered". Equally, P27-2010 talks of people not being 'too bothered', even given – indeed related to – an acceptance that climate change is serious:

> Obviously… [climate change] is happening… but it seems like we've all kind of accepted it… we probably have… a hundred years to save the planet. Well if we have a hundred years to save the planet, no one seems to be too bothered, really. The world has just sort of accepted it.

Despite such pessimistic prognoses, participants do also refer to positive values underpinning pro-environmental responses. The sense that there is a desire to effect change for the better is asserted for example by P11-2007: "we want to improve… the effects on climate change. You know, we want to make things better… people want to make a difference even if it's a small one". Similarly, P2-2010 suggests that: "I don't think anybody likes to think of themselves as nothing but a consumer who just sits there, using everything up".

In responding to other participants' assertions that people are 'selfish', P44-2010 argues that fundamentally ('the essence of humanity') human nature in fact runs counter to this:

> I don't think we are selfish, I don't think we could have six billion people on the planet if we didn't cooperate. I think the essence of humanity is that we can cooperate with each other. And I think all of us trying… to do a bit of recycling, a bit of walking or not driving as much and things like that, I think it's all because we do feel that kind of collective need to want to do the right thing.

iv. Resistance to change and habitual behaviour: continuity across the datasets

In a number of places across the datasets, the assertion is made that resistance to change underlies lack of response to climate change. In explaining people's attachment to car travel, for example, P18-2000 argues that "trying to get people to use their cars less is just impossible in this country. Put up the price of petrol and there's an outcry". Also with respect to car travel, P16-2002 suggests that people tend to revert to habitual behaviour: "we have this discussion now but I can imagine in two weeks time we'll probably go back to the way we were. You'll get in your car and you'll drive to work and you'll think nothing of it".

In a 2010 group, P1-2010 also notes that people are 'fighting' the requirement placed by local councils to recycle: "people are fighting it, and this is what I find interesting, that people are saying 'no, I will *not* recycle… I will put as much as I like in my bin"'.

v. Folk psychology of 'denial': a recent view of climate change psychology

It is notable that in the case of the most recent research project (2010), there is found a particular emphasis upon a reactive psychological process best approximated as 'denial'.

The salient feature of this denial, is an intrapersonal process portrayed as diminishing the salience of climate change – at the same time as which its actual importance is 'really' known about. Within three of five 2010 groups, direct or implied reference is made to such denial. Where questioned by the moderator about people's stated lack of concern, it is argued for example that:

> Sometimes it's like a backing away from knowledge. It's not even- they sort of know but they're so not going to go there … it's like a protection, you can just say… 'no, I'm not bothered, you know, it's fine'. (P33-2010)

Similarly, the colloquial phrase 'to bury your head in the sand' is used to explain a perceived inertia in responding to climate change:

> P1-2010: We've only just started waking up to doing something about it. Now, why has it taken us so long, I've no idea…
> P8-2010: ... It's because it's much easier to bury your head in the sand... than it is to confront it.

A separate participant in this group elsewhere uses the term 'denial' directly[61]:

> The capacity of the human race to just block stuff out when they don't want to listen to it, is very very terrifying… so we'll probably be in denial until it's too late. (P32-2010)

These types of accounts are particularly prominent in 2010, suggesting a relatively recent provenance. There is one instance of note as early as 2002, however, where P22-2002 argues that:

> I think we put the values up in our own minds a lot of the time… sometimes we just don't want to bring those barriers down we['d] just rather live in this insular world

[61] The notion of 'blocking' information was applied to climate change, but also in the context of an analogous situation with AIDS.

Also in 2002 – though less definitely aligned with the above quotes – participants suggest "we seem to think it will affect our kids more than it does [us]. So we… just sort of push it away" (P16-2002) and that "we've all got the blinkers on" (P5-2002).

Functions and consequences of the discourse

The folk psychology discourse is used to make sense of climate change as a personal and behavioural phenomenon. It explains why people in general terms do or do not act on climate change.

A consequence of the discourse, is that responding to climate change becomes associated with ideas of personal morality and capabilities. The prototypical individual that responds to climate change is one who is 'good', mindful of their responsibilities and well-informed; those who do not respond are associated with pejorative or immoral characteristics, or are ignorant. In terms of ideas about 'denial', the suggestion is somewhat more complex: but there is still a sense that this constitutes a psychological impediment or flaw.

7.2 Accounting for climate-relevant behaviour

Overview: main characteristics and ontology of the discourse

Climate change is understood in the context of climate-relevant behaviour at the personal/subjective level. Specifically, there is a concern with accounting for one's actions – that is, offering explanations for one's own behaviour with respect to reasons, justifications etc.

Accounts encompass explanations for both the presence and absence of pro-environmental behaviour. Factors offered as influential in these accounts may be intrinsic/personal or extrinsic/structural (e.g. stated lack of concern, prohibitive cost). A variety of behaviours are subject to participants' accounts, however most prominent are those concerning transport mode, domestic energy use, recycling and consumption activities.

Metaphors, rhetorical devices, recurrent motifs

- Justifications and reasons for behaviour, e.g. using 'cost-benefit' analysis
- Moralised and normative language such as 'guilt' and 'should'
- Self-deprecating terms such as 'lazy', 'uneducated', 'selfish', 'hypocritical'
- 'Agentic' language such as 'conscious' action, 'feeling' responsible
- Compromise and reconciliation of normative pressures with self-interest

Characteristics of the discourse: continuity and change

One of the most common ways in which environmentally-significant behaviour is explained – particularly in the earlier datasets – is through reference to *external or structural factors* motivating or restricting personal choices.

Participants refer to choices directed by necessity, comfort and convenience. For example, P2-1997 asserts the "need" for a car but also explains that she did not drive the evening of the focus group because it was "easier just to hop on a bus"; P4-1997 also explains not using public

transport due to its associated lack of comfort in terms of "stand[ing] on a cold corner" waiting for buses.

In the 2000 data, cost explanations are cited for the ostensibly pro-environmental action of careful electricity use (e.g. "to keep the bills down", P9-2000) as are time costs associated with recycling, where P18-2000 notes "to me there is a sort of cost-benefit. If it costs me so much to recycle, then in terms of my time, I can't do it".

A frequent way of explaining behaviour, is through reference to a lack of capacity to act (i.e. perceived behavioural control): e.g. P21-2003 noting "the heating is always on, we have no control over that"; and P75-2007 explaining car travel to work from there being "no other way of getting there".

External/structural explanations persist into later groups, although, relative to other types of explanation (discussed below) are less prominent. Nevertheless, as with participants in the 2000 groups, recycling behaviour is accounted for in terms of time 'costs' where P14-2010 argues that "when you're working full-time and have a baby, to get down to the recycling bit… there's no possible way of doing it, so it's just put it in the bin and that's it".

Over the time period there is however an emergence of more *intrinsically-motivated and moralised accounts*. These are revealed by pejorative self-appraisal (e.g. describing oneself as 'lazy', 'selfish' or 'thoughtless'); reference to normative (that which one 'should' do); and pro-environmental behaviour ascribed to conscious moral intent. Moralisation in accounts of one's own environmentally-significant behaviour first emerges in 2002; transcripts from 1997/8 and 2000 have been revisited and there is little evidence of environmentally-significant behaviour described in moralising terms at these times.

An example of the use of self-pejorative language is that by P2-2002. She describes herself as 'selfish', 'complacent' and not giving thought to her actions: "I'm so selfish and very complacent… I've always left [television] on standby. I don't think of the sort of emissions from the fridge… I just live in my own little world".

There is a persistence of this manner of *self-deprecation* and reference to thoughtlessness into the 2003 interviews: P21-2003 describes himself as "hypocritical because I drive my car too much"; (in)action is explained elsewhere by 'complacency' (P15-2003), "a guilty point of view" (P18-2003), and whether one is "virtuous" (P13-2003). This is not to say that reference to external factors, as employed in the earlier groups, is not also present: for example, P13-2003 accounts for his use of

public transport for its being "cheaper" and "more convenient" whereas P15-2003 refers to not using energy-saving lightbulbs because these "cost more".

By 2007, both intrinsic/personal and extrinsic/structural explanations are offered, however the former now dominating explanations for (in)action.

In terms of self-deprecatory accounts, in the 2007 transcripts reference is made by a participant to their being "lazy" and not having "had the guts to change" in terms of car use (P73-2007); another participant also refers to being "just too tired" to "fight the cause" (P4-2007). In 2010, similarly, P45-2010 talks of "guilt" and of personal flaws leading to lack of pro-environmental behaviour: "sometimes I will drive a mile down the road because I'm lazy or hungover, to be honest".

By contrast to these self-deprecatory accounts, particularly in the 2007 – and even more so in the 2010 transcripts – are also found accounts of *intrinsically-motivated pro-environmental behaviour*. Participants talk of being 'conscious' of action, such as where P6-2007 asserts (using the self-referent second person) that "you're conscious about how you feel about doing things… I don't drive anywhere, I'm quite happy to walk and catch a bus". P27-2010 also talks of 'thinking', being 'aware' and 'consciously' acting with respect to food miles (i.e. carbon emissions from food transportation):

> I've become in the last few years more aware than… any physical thing that I buy, it's food miles. It's the concept of looking at things and thinking: 'why do I need to buy something that's been flown from New Zealand?'… and I consciously look for the things that are grown locally.

P33-2010 also talks of personal change and the relationship between this and conscious, deliberate action:

> I think people *can* change and they *do* change… a couple of years ago I was whizzing about on aeroplanes and going 'oh yeah, bollocks, it'll be fine'… it's just a matter of... things coming to you and understanding things… we *can* do things differently.

In addition to these very efficacious-seeming accounts, are many accounts in later years (2007 and 2010) which imply a conflict – and often awkward reconciliation – between intrinsic and extrinsic factors. Accounts from 2007 draw on ideas about personal action that is seen as *reasonable and possible* given one's situation. P4-2007 for example asserts that "with running <sic> a one and a three year old… I do…what I can do within my home" and that "we're doing just as much as we can… but… I haven't got [the] power"; P2-2007 similarly argues "don't get me wrong, I do everything I'm supposed to do" even though the view is expressed that this may not be efficacious.

The sense is given in these and other 2007 accounts that there is a perceived expectation to act pro-environmentally, but that personal or external factors may impede its fulfilment. This contrast between normative and external pressures is also evident in P26-2010's account of supermarket visits: "I don't think about morals when I have to go round the supermarket… it's time versus cost. I get as much in before the kids start playing up and then get to the door".

The contrast between that which is morally desirable and that which is realistic or actually occurs, emerges in other places also. Thus P31-2010 reports that:

> I do feel guilty, that I don't take enough interest in it. I don't probably do enough… I don't do as much as I should.

Elsewhere, this same participant refers to himself as a hypocrite in respect of his regular flying: having noted that it is "worrying when you can fly somewhere just as easy as you can get a train", he nevertheless states "I can't really say much because I use it all the time, so although I think it's bad I actually use it, so I'm a bit of a hypocrite in that point of view".

P21-2010 similarly refers to "guilt" as a response to climate change "because I know that I should be doing more"; P1-2010 contrasts his own behaviour that evening with an implicit moral standard where he remarks "you know, I think of myself as pretty green but I drove here [to the focus group] in a car. I could have got the bus but didn't."

One participant's explanation given for acting pro-environmentally seems particularly pertinent in light of the contrasts made in accounts between ideal and realistic behaviour, which are situated in the context of a self-awareness in respect of this tension; P12-2010 reflects that:

> What I do allows me to not feel guilty basically. I drive most places, but I'll recycle, and in my head that's a kind of parallel.

This explanation suggests a *considered compromise* in terms of personal preparedness to act. It would appear that, by this participant's account, a conscious intention to 'not feel guilty' is associated with meeting one's obligations to a reasonable (but not perfect) extent.

Other participants too allude to such compromises, as weighing up relative personal preferences against attempting to meet perceived obligations; for example P36-2010 explains: "I think it's very personal. I mean I could give up my car but I could not live in a cold house".

From the same focus group (though speaking in the previous week) P35-2010 also explains:

> I think a lot of us do things because of convenience. So it's- you know, it makes us feel better. I- we, my wife and I recycle everything that can be, pretty much. But, I drive a three

> litre diesel [because] it's damn comfortable and that's why I drive it. And you know, as much as I try and do all my bits and be as good as possible, I'm not that great. And I will jump on a plane without thinking about it.

In this account can be detected a reconciliation between external/structural and intrinsic/moral reasons for acting and not acting pro-environmentally.

Justifications for the taking – and not taking – of flights occur at other points in discussions, with respect to a compromise position. Thus a participant, in respect of his climate change concerns, asserts "I don't want to fly… I'm not saying I'll never fly again, but if there's any way of getting somewhere by not flying I'll do that" (P25-2010). Conversely, flying is able to be justified by (P26-2010) in different but still very personal terms, here with respect to paternal concern:

> I want to fly, because I want to take my kids on holiday, and pay for them to have nice things. I have a concern about, obviously the environment but I don't want to stop my kids experiencing different things.

Further examples are found of such compromise positions across the 2010 focus groups, hinging on a recognition of what might be considered a social norm of pro-environmentalism – which is nonetheless reconciled with personal preferences.

A detailed reconciliation of these competing pressures, is given by P22-2010. This participant justifies her choices through asserting that her own time is 'precious', and that in a wider context ('compared with China') they are essentially negligible. Normative pressures (her account is anticipated as sounding 'selfish') are recognised, but nevertheless her choices are portrayed in a reasonable and pragmatic manner:

> My time is quite precious to me, you know, I know how selfish that sounds, but I sometimes think to myself: do I want to spend this time running up and down? In the back of my mind I'm going: well, what's my impact compared with China? … It's not healthy for one person to think like that, but the build-up, but the picture is that in the back of my mind I can counter it with: yes, my little bit might be impacting towards it, but also it might not be impacting that badly against it.

Climate change fatigue: a novel component in personal responses

A final type of personal response, identified exclusively in the 2010 focus groups, is that of 'fatigue' concerning climate change. By some participants' accounts, climate change has come to be seen as tiresome or tedious. One (middle-aged) participant's response to a very early moderator

question regarding initial impressions about climate change was "bored bored bored" (P20-2010); another reflected on their spontaneous use of the term 'scepticism' within a written exercise thus:

> I have [written] 'scepticism'. If I hear something, it's not that I don't agree with it… I [just] can't be bothered with it, I've heard it too much now to the point where I'm like, look we'll handle it, it'll be fine… (P9-2010)

A fatigued reaction against the placing of responsibility onto individuals was also asserted within two groups. One participant was indignant following her experience completing a carbon footprint calculator:

> I did an online exercise which said basically I'm a baby-eating world-dominating killer. So, even if I reduced my lifestyle down to knitting my own socks from locally-sourced nettles then I probably couldn't offset my own carbon footprint… It's just rubbish. (P18-2010)

Within this excerpt can be detected a vexed sarcasm and fatigued reaction towards ascription of individual responsibility. Similarly, a participant refers directly to the wider notion of 'disaster fatigue' in the context of climate change as follows: "you get disaster fatigue as well I think, you know: oh god, not another polar bear, whatever it is" (P3-2010).

Functions and consequences

The primary function of participants' accounts of their own actions, is likely to be connected to self-presentation. It can be assumed that most individuals wish to be seen as 'reasonable' people, and thus there is an onus upon the explanation of one's actions in these terms. Even (perhaps especially) where participants use self-deprecatory language, this may be argued also to serve a self-presentation function: as showing a willingness to acknowledge one's own flaws or to show humility. Where participants express a compromise position in how much they are prepared to personally do, this too presents one's actions in a reasonable light.

In these senses, this discourse in particular has a social and interactive function. This may be particularly salient in the context of a focus group, where a group of strangers are discussing the reasons for their own actions – but is likely to be relevant also for any number of possible social situations where people are motivated to present themselves in a reasonable light.

With respect to 'fatigue', it may be that a new type of response to climate change is coming to be acknowledged; that explains disengagement from climate change in terms related to one's own capacity to remain interested or concerned about the problem.

One possible consequence of the discourse, is that it portrays climate-relevant behaviour as having both a moral and pragmatic dimension. There is a sense given that whilst one's actions should 'ideally' be pro-environmental, nevertheless in the contexts of people's own lives and interests this is not always possible.

CHAPTER 8 QUALITATIVE FINDINGS (IV):

OVER-ARCHING DISCOURSES: ENVIRONMENTAL HARM AND ETHICS

This chapter reports findings concerning two further discourses which overarch considerations of physical, social and personal aspects. The first concerns climate change construed as 'environmental harm' (section 8.1), the second is concerned with ethics in a general or abstract sense (section 8.2).

This chapter reports a ***summary interpretation*** *of findings. The main characteristics of the discourses are presented, as is evidence in the form of excerpts from across the datasets from 1997-2010. For an* ***extended interpretation*** *and additional excerpts, the interested reader should refer to Appendix 8.*

8.1 Environmental harm

Overview: main characteristics and ontology of the discourse

Climate change is understood as an 'environmental' issue, specifically in terms of human harm to the natural world and changes to the physical world. Climate change is related to other environmental issues that are understood to be connected with it: pollution, stratospheric ozone depletion, and forms of environmental degradation (e.g. deforestation).

The *environmental harm* discourse is considered to be an over-arching or 'hybrid' discourse, on account of its incorporating material spanning concerns which are both physical (e.g. relating to the natural world) and social (e.g. relating to the role of human actions). It is nevertheless considered to constitute a discourse in its own right, for portraying climate change as a particular 'environmental' issue. This is represented diagrammatically in figure 4.3, chapter 4.

Metaphors, rhetorical devices, recurrent motifs

- Ozone depletion (e.g. 'ozone hole') and associated causes (e.g. 'aerosols', 'CFCs')
- 'Pollution', especially related to air pollution (e.g. 'smog', 'fumes') and its consequences (e.g. asthma)
- Harm inflicted upon the natural world, e.g. deforestation, damaging 'the Earth'

Characteristics of the discourse

i. Ozone conflation: continuity and change

Associations made between ozone depletion and climate change are of two main types: *lack of distinction* between the two phenomena, which may include association/conflation between causes (e.g. CFCs) and consequences (e.g. warmer temperatures); and a more *technical conflation*, whereby a conceptual model drawing on both phenomena is integrated (usually, relating to the notion of an ozone 'hole' permitting increased sunlight to permeate and so raise surface temperatures).

From the first groups in 1997, climate change is associated with ozone depletion. For example, "the ozone layer" is given as a stated explanation for why global warming is occurring (P6-1997). A clear example of technical conflation - wherein the notion of damage to a protective ozone layer permitting radiation to Earth which leads to the planet "warming up" is given by P1-1997:

> You've got the atmosphere… it protects the Earth from the sun's rays, they bounce off this ozone layer. Now we've got a hole in it, some of this heat, this extra radiation, is getting in. It's not letting any of it out because this reflective thing works both ways… so the planet is slowly warming up… That's what I understand as global warming.

In contrast to later groups, in 1997 the causes of climate change/ ozone depletion are aligned with more authentically ozone-depleting causes. For example, participants refer to 'CFCs', 'hairsprays', 'aerosols' and 'fridges' with reference to the causes of climate change.

In 2000, the ozone-climate association persists: for example, where asked by the moderator whether the ozone layer hole is "linked in some way" to climate change, P19-2000 replies "oh yes… it's a big cause, if it gets any bigger it's going to cause a lot of climate change".

A generalised ozone-climate association persists into 2002. P11-2002 for examples remarks "I don't know much about it [climate change] but I think I tend to interpret it as the hole in the ozone and just rays from the sun and all that kind of thing" (P11-2002).

Limited references to ozone and ozone depletion occur across the 2003 interviews, though references are still made in terms of a technical conflation (emphases added):

> The reduction in ozone layer… **allows more of the sun's rays to penetrate**… and to dry up certain parts of the Earth… (P2-2003)
>
> As far as my understanding is, there will be **more powerful sun rays get through**, and the temperature on Earth is rising gradually and possibly the polar ice cap is melting. (P18-2003)

2007 excerpts reveal that this type of conceptual model endures. One exchange indicates that this is indeed socially shared to the degree that it is able to be developed in conversation:

> P12-2007: The ozone layer…. acts like a blanket protecting the Earth and it's the ozone layer is being depleted so it allows more…
> P12-2007: UV rays.
> P11-2007: UV from the sun.
> P12-2007: Heating the Earth up.
> P18-2007: That's why allegedly it's supposed to be hotter in the summer.

A number of references continue in 2007 to be made to typical ozone-depleting actions, for example: P56-2007 refers to "aerosols and things like that"; P23-2007 to "hairsprays and perfume"; P11-2007 to "cans of deodorant".

Behaviours and activities more associated with climate change are applied to ozone depletion: for example, car use, aeroplanes, power generation and recycling all feature in one participant's account:

> I can't see how doing recycling is going to change anything, when they've got more cars, more aeroplanes, and more stuff adding to it, power stations. So by me recycling and no car, I don't think it's going to make much difference to the ozone layers is it? (P2-2007)

Evidence for a further linkage between climate-relevant behaviour ('4X4 cars') and ozone depletion emerges in a separate 2007 group, where P71-2007 asserts in response to the moderator prompt "what do you think about the climate change idea?": "That's different things like the ozone layer and stuff like that, isn't it… emissions from these 4x4 cars and stuff like that… deodorants squirting under your arms and stuff".

A clear dissociation between climate change and ozone depletion only becomes noticeable in 2010. Ozone is rarely mentioned – not appearing at all in two of five groups. In a third group, mention is only made briefly in passing. In the remaining two instances where ozone is referred to, a distinction is made by participants between the two phenomena. In the following exchange,

participant P25-2010 responds to another's remarks by arguing that the now-resolved matter of ozone depletion in fact illustrates that addressing environmental problems is possible:

> P23-2010: …aerosol cans and things like that now, you very rarely see them. But there was a time it was the latest thing, we all used aerosol…
> P25-2010: The aerosol thing is something that shows we can actually change things, because they stopped using aerosols, they stopped putting them in- CFCs in fridges, and the ozone layer has been repaired.

A second passage from a separate 2010 group refers to the matter of ozone depletion as something which has 'disappeared', and contrasts this specifically with climate change:

> no one mentions that hole in the ozone layer any more. I thought it was some kind of precursor to the whole climate change thing… So… what's happened to the hole in the ozone layer? It's disappeared from the news. It's all climate change now… what's happened to the hole and is that just irrelevant or was that a red herring?

These excerpts, particularly participants' own reflections upon the passing of 'ozone' as an issue, and the lack of spontaneous emergence in the 2010 groups – in contrast to ozone featuring in discussion in the majority of pre-2010 transcripts – suggests that ozone-climate conflation has diminished by the most recent transcripts.

ii. Pollution: continuity and change

An association between climate change and 'pollution' is found across the transcripts. The main way in which this occurs is through connection with ideas concerned with air pollution. There are many instances of climate change being equated with 'fog', 'smog', 'fumes' etc.

For example, P18-2000 makes a direct connection between climate change, and with wider environmental issues including those connected with ozone depletion ('skin cancer') and air pollution ('asthma'):

> P18-2000: ...skin cancer is close to my heart, but what I was thinking of was the sort of asthma and allergies… those sort of health things and how much of that might have to do with you know with the atmosphere…
> Moderator: Do you qualify pollution as part of the climate change?
> P18-2000: I think, yes, I think they're related.

The idea that climate change is connected to more general notions of pollution, is expressed again in a 2002 group. After the moderator's introduction to the topic of climate change, the discussion between participants turned to a variety of matters, concluding with the following exchange:

> P2-2002: I think, sort of a local environment issue regarding… power and waste. You know the canal which runs at the back here... over the last… thirteen years, the pollution... All of a sudden it went from clear to disgusting.
> Moderator: So in a way this whole kind of climate change is part of a bigger pollution…?
> P2-2002: Yeah, oh yeah.

There are many other instances across the 2002 groups where air pollution of various sorts is referred to. Associations between (air) pollution and climate change also persist into the 2003 interviews. For example, P21-2003 remarks (possibly making a technical linkage) that "it's all linked, it's the whole air pollution includes greenhouse gases, which promote global warming". P17-2003 also notes that addressing climate change entails dealing with "forms of pollution, which presumably are a contributory factor".

Connections between (air) pollution and climate change, are also found in the 2007 focus groups. As P31-2007 puts it: "I just think it is the way that we live that is causing climate change, all the stuff we're polluting into the atmosphere, I think that's why it's changing".

A connection between 'smog', air pollution and climate change is again made in a 2007 group:

> I'd probably say the biggest cause of, if you want to say that we're to blame, would be coal. Coal has been burned for many years. It used to cause the famous smogs, like the London smog… Years ago there was more pollution than what there is now, I'd say coal was probably the biggest cause of it.

In a separate group, with respect to action which could be taken on climate change, P71-2007 suggests that: "You see some of these taxis driving around, you know, the fumes coming off them, you think that can't be right".

Across the 2010 groups, there is less spontaneous reference to pollution as associated with climate change, than in previous years. When it does emerge, there seems to be a more dissociated or technically-oriented connection. For example, P32-2010 notes that: "aircraft are quite a symbol aren't they of pollution and climate change. People see more and more planes in the sky, and… easier and cheaper to get places, then aren't we polluting the planet more for that simple reason?"

In a separate 2010 focus group, participant P28-2010 asserts that reducing pollution in itself is important for addressing climate change, where he argues that: "We have to reduce pollution… by curbing our lifestyles…. Pollution including waste and landfill… I'd classify that as pollution".

Overall, however, these sorts of associations between 'pollution' and climate change are less prevalent in 2010 than previously.

iii. Harm to the natural world: continuity across the datasets

A further means by which climate change is associated with a wider environmental harm discourse, concerns ideas about damage to natural environments and deforestation.

Scientific/technical connections are acknowledged by participants. For example, P16-2010 asserts that the following are to 'blame' for climate change: "Industry in the developed world, industry in the developing world, and nations that are now large-scale burning rain forests".

Elsewhere, however, associations are made which draw upon more general ideas of what constitutes 'harm' to the natural world. P59-2007 for example asserts that:

> Because they're chopping all the trees down you're losing the animals that were there, and you're changing the whole of the Earth… and to me it's all wrong, they shouldn't be allowed to do the deforestation that they're doing, because I think it's harmful to the planet.

In a separate 2007 group, P68-2007 refers to 'logging' in response to a question about human responsibility for climate change – the associations made are beyond simply 'causes' of climate change, however:

> I thought of tree logging and… the environment and the people who suffer for it, like the tribes who [have] lived there for years and now they've got to move and go into cities.

Similarly, in 2000 P5-2000 refers to "spoiling all the habitats not only for wildlife but… also for the old [indigenous] Indian families and cultures that exist there".

The idea that 'using up' the Earth's resources is intuitively harmful – to 'the planet' as well as the climate – emerges again in other places. Thus P41-2010 argues that:

> People [are] using up the Earth's resources and creating a huge amount of waste, and using up resources, taking it away from the animals which are then becoming extinct and it makes sense to think that if you're depleting the Earth of its resources and creating a huge amount of waste, that you're going to have an impact on climate.

Similarly in a 2007 group, P80-2007 argues that "we have a huge impact on everything" and then in response to another participant's question ("that's making a mess of the planet, but is it actually

changing the climate?") states: "yes, I think it is. Look what we're doing to the rainforests. If you take one thing from one you're mucking around with the balance constantly".

Functions and consequences

With climate change seen as an 'environmental' issue (by the mass media and even indeed within the academic literature) it is not surprising that it has come to be associated with ideas such as ozone depletion, pollution and deforestation in people's perspectives. The 'environmental harm' discourse seems to be a means by which various salient environmental concerns are integrated in an intuitive and common-sense manner with climate change.

A consequence of the discourse is that climate change is classified as such: it is an 'environmental problem' in a manner similar to other environmental problems. A further set of consequences (well-known in the literature) concern conflation: inaccurate models of what climate change 'is' are influenced by the ozone-depletion understanding. The idea that damage and despoliation inflicted upon the Earth is a characteristic of climate change, is also a consequence of this discourse.

8.2 Ethics and climate change

Overview: main characteristics and ontology of the discourse

Climate change is interpreted as an ethical matter, with the causes, consequences and responses to it seen in terms of value judgements and moral principles. These may be abstract and absolute (e.g. concerning justice and fairness) or more personalised and concrete (e.g. that one has an obligation to act with consideration towards others).

A discourse of ethics permeates many of the other discourses previously discussed – particularly those concerning personal and social dimensions of climate change – and as such is considered an overarching set of ideas which are often subsumed within the personal and social domain (see figure 4.3, chapter 4). Nevertheless, the ethical dimension to climate change understanding is also often made explicit in relation to abstract principles such as justice. As such, it is useful to consider how these ideas are discussed and applied in their own right, within a self-contained ethics discourse.

Metaphors, rhetorical devices, recurrent motifs

- Universal ethical principles, applied to climate change (e.g. justice, regard for others)
- Ideas about correct living (e.g. sustainable consumption, minimising waste)
- Normative assertions (e.g. 'duty', 'obligation', 'responsibility')
- Ethical failures as causes of climate change

Character, change and continuity in the discourse

i. Custodianship

A theme commonplace across all the datasets is termed here *custodianship*. This represents an ethical obligation upon people to protect the planet and its environment, and by extension the climate.

A view of custodianship is often asserted as an absolute principle to which people should adhere. As P5-2000 asserts:

> I was brought up to believe that you came into this world and you lived in it for a certain length of time but then you were the custodians of this world… you [have] a great responsibility towards it and how you [leave] it… you're only a custodian of whatever you have in this world.

Similarly P52-2007 argues "we have a duty to protect [the Earth]. We don't have a duty to change it or destroy it" and P44-2010 that "we should start taking… responsibility for the whole planet". The problem of climate change may indeed be seen to arise from a failure to act on this ethic, whereby "we the human <sic>, the inhabitants of this community… are out of synch with nature, have abused our custodianship" (P4-2003).

The idea recurs that one's moral duty extends beyond one's own lifespan. For example, P16-2002 asserts "for my lifetime it probably won't matter, but obviously it's of concern for the future of the planet", and P47-2010 that "when you're dead and buried, [material concerns] mean nothing. You want to be creating something for future generations".

This perspective is contextualised (and personalised) in many places to participants' own real or potential family. Thus P5-1997 explains "my concern basically is a very human concern. What about my grandchildren and what about their children, what are we doing to preserve the world for them?"; P14-2000 that "I think [climate change] is very relevant for my grandchildren which I'd like to do something about"; P2-2007 expresses 'worry' "not so much for us, but our kids' kids' kids"; and P34-2010 states that he is "frightfully aware" that "I'm not going to be impacted by [climate change] but I know my kids and their kids potentially will be".

In several places custodianship is connected with versions of a precautionary principle, such as in a 2002 group:

> P22-2002: We should just do something anyway. It's only going to make things better isn't it.
> P24-2002: It's not going to make anything worse.
> P21-2002: If we're not sure then you shouldn't just carry on, should you.

A precautionary approach is advocated even where the likelihood of a climate disaster is considered to be low, where P25-2010 argues "even if it was a ten percent chance of the world becoming uninhabitable, then I think it's up to us to do something about it".

ii. Justice and fairness

A second ethical framework through which climate change impacts and responses are commonly understood, is in terms of *justice and fairness*. However, whilst ideas in respect of custodianship are used almost exclusively to make the case that action on climate change is important, justice and fairness arguments may at times be presented in terms of a moral dilemma: action on climate change may sometimes be seen to be in direct contrast to questions of justice.

A case in point is the argument that addressing climate change at an international level could impinge economic development in less developed countries. This is articulated by P15-2003: "You're effectively asking… developing economies not to develop because basically we've caused climate change… it's a double standard argument". P7-2002 similarly argues that "they're growing like billio, these countries… they all want what we've got, and you can't blame them".

A participant in a 2010 group also alludes to the notion of double standards applied internationally, using the analogy of "hippy parents" to emphasise an economic justice argument:

> The attitude of the developing countries seems to be that the developed West, having already polluted the world, is now telling them they can't join in... It's like sort of middle-aged hippy parents telling their children they can't smoke dope. 'We did it but you mustn't!' (P7-2010)

In a separate 2010 group, P34-2010 similarly refers to China and India to suggest that "their argument is: we're only just catching up… why should we pay the price when America has had this for the last fifty years?... So you can understand their position, and… they've got 1.5 billion mouths to feed."

The consequences of climate change are themselves seen as breaching principles of social justice. For example, P65-2007 notes "the very poorest people… don't consume enough resources and have enough power to be polluters, and they're quite often disproportionately the victims of a lot of this"; and in a 2010 group, P9-2010 proposes that "it doesn't matter what issue you're talking about it affects the poor people most".

Questions of justice and fairness at an international scale are also applied in a number of instances in the particular context of carbon trading schemes. With recourse to similar arguments as those made above, carbon trading and payments are for the most part seen as unfair. For example, P16-2003 describes such a system for a rich country as "just passing the buck" and "buying their way out of trouble". Even in the earliest of the datasets, where the idea of carbon trading is introduced to participants this is argued to be analogous to "somebody who's smoking can't smoke at home

and they go next door and they say 'can I smoke in your house, here's £5'… that's wrong isn't it" (P5-1997).

A similar argument is made by a 2010 participant who uses the analogy of 'offsetting infidelity' to assert that carbon offsetting is unreasonable: "If I am faithful to my partner does that mean that you can cheat on your partner because I will still be faithful to mine, so it equals out?" (P15-2010). In a separate 2010 group, P27-2010 suggests that emissions trading is "completely wrong. It just gives wealthy countries a rubber stamp to continue to over-produce".

In a similar way – though at a national level – the idea of taxing and charging for emitting behaviours is argued against by a 2010 participant because this would leave such behaviours as the preserve of the rich:

> You talk about cars and stuff, and taxing and things like that, to stop people doing it… I think what will end up happening is cars will be the privilege of the rich… I just don't think it's the right way to approach it (P32-2010).

iii. Correct living

An ethics discourse is also reflected in more practical terms, entailing assertions about what constitutes proper conduct at the personal and social level.

Correct living is often construed simply as *taking responsibility*. As the following participants argue: "everybody should take responsibility for themselves and think of the bigger picture" (P38-2010); "everybody's got to take responsibility for their actions" (P19-2000); "we have choices through life, and one of those is responsibility for your actions" (P3-2002); "everyone has an individual and joint responsibility to do something about [climate change] because we all live here" (P11-2010); and "we have to be accountable for our decisions" (P60-2007).

Interestingly, the moral obligation to 'take responsibility' is used in a number of places across datasets to counter a commons dilemma-type argument (see chapter 6). For example: "But you can't go: 'well why should I do it because they're not doing it' … you should do it because you should do it… you should do it because it's the right thing" (P41-2010); "you can't think 'oh well I won't bother because if they're not doing it'... I think you've got to keep trying" (P6-2002).

There are a number of more concrete cases of the exercise of responsibility which recur across the datasets. One of the most commonplace is the obligation to *minimise waste and resource usage*. As P14-2002 argues "we're all going to use electricity… but we've got to use it more efficiently… using

less and recycling things more"; P15-2007 similarly suggests that there is a benefit "if we can do more recycling and things like that and sort of waste less electricity and things"; and P17-2010 argues "if people just did their things better, improve waste, make sure they're not wasting energy… it's got to be good".

Avoiding waste may be framed as an explicitly ethical matter, such as where P42-2010 states "I think definitely the idea about switching lights off, it's immoral". Minimising waste may also be portrayed in terms of frugality and a particular 'mentality', as where P23-2010 argues: "it's that mentality of re-use… my natural instinct… is to save things, we don't go out and buy a bag of string, we save it, we've got a bag of it".

Participants also portray *reduced materialism* as an ethical approach relevant to climate change. P8-2000 suggests that whilst "everything around us is still very oriented towards a more more more society" nevertheless this "is not sustainable… we need to [try] to make people happy, be content with what they've got". P17-2002 draws an explicit contrast between a proper, ethical approach to living and that of materialism, where asserting "this world… is not about money, it's not about material things… big houses or fast cars or yachts and aeroplanes, it's about people".

Pro-environmental living is also emphasised in various guises in the context of a discourse of ethics: as being 'green', 'sustainable', 'ethical' or having 'respect'. For example, P6-1997 asserts "if everybody tried to be more green… it would help", and P8-2000 that "it's only prudent to try to live in a kind of way that… will be as sustainable as possible".

Being 'green' can of course also be conceived as an umbrella term for pro-environmental behaviours with an ethical dimension, as where in a separate 2010 group P44-2010 suggests:

> If we can have a society where we create less waste, I think if we can have a society where we think more about the consequences of our actions, then that'll do for me, and if they're going to call that green, then I'll be green.

At times, linkages are made between more abstract ethics, and more concrete cases of personal/social obligations. For example, the ethic of custodianship leading to an obligation to minimise resource use is emphasised by P14-2000: "I've recently acquired, if one can, a grandchild, and I find I am even more focused and I try in my own life to use as few resources as possible". Similarly, P14-2003 refers to "not using resources so future generations can use it". In a 2010 group, an obligation to minimise waste is connected to the idea of custodianship, as well as scientific uncertainty:

> No matter what we believe we still have a responsibility to live- not as frugally as possible, but just to minimise waste…. whether people think global warming is a five minute fad, and the ice age is going to come and this that and the other... every action has a consequence and we're making the situation worse by not taking care of the things around us. (P26-2010)

In terms of a justice/fairness ethic warranting action, P25-2010 also asserts that "as we are one of the nations that per capita consumes an awful lot, it's very necessary for us to [act] compared to [for example] Uganda".

iv. Failures of ethics

At a global scale, the United States of America and other Western nations are often portrayed as culpable, not just in technical (i.e. quantity of carbon emissions) terms but moral terms also. P22-2002 argues that "America[n] culture is to be greedy, to be lazy and to destroy the world"; in a separate 2002 group, P16-2002 states "they [USA] don't care what anyone else is doing, as long as they're alright"; P20-2010 asserts that "the highly developed economies like ours and the United States are just saying: 'well we're OK, pull up the rope, Jack'". In these remarks is reflected a failure in an ethical sense both to act as custodians ("destroy the world") and to consider social justice ("as long as they're alright").

Ethical failure also emerges with reference to the actions of politicians, including with reference to the Copenhagen Conference. Importantly, the coded instances of this appear to be less connected with ability to achieve meaningful outcomes, than with respect to *hypocrisy*. Discussing previous climate negotiations, P7-2002 remarks that this constituted "a jolly-up for two weeks in Johannesburg" which was "all at tax-payers expense" and P5-2002 complains "you were saying about the global emissions and that, and they all turn up in these big limousines, you know what I mean, and it seems a bit like <unfinished sentence>". With reference to the Copenhagen conference, participant remarks from 2010 echo this suggestion that political action on climate change was lacking in ethical terms, for example:

> You've got fifteen thousand delegates… all flying to Copenhagen and they're all in five-star hotels no doubt, talking about climate change, but creating a lot of climate problems just by actually being there. (P31-2010)

> I get confused with some of the opinions and some perhaps hypocrisy that goes on where they have these big conferences and people fly into these conferences, creating more global warming, it might seem. (P26-2010)

v. Cooperation

As discussed also in chapter 6, one means by which an ethical discourse is used to counter the social dilemma of climate change is in the emphasis on *cooperation*, made in a number of places across the datasets. Here, participants draw attention to the social nature of climate change as affording the potential for action (rather than as a barrier). The following excerpts emphasise both the necessity of cooperation, but also draw upon the notion of an intrinsic capacity for cooperation (e.g. 'standing together'):

> I think, unless we all think of it as a global problem we haven't got a chance. And that's the hope I have, that we will come together on this one issue, and think 'well we live in the same world and we'd better start getting it right'. (P12-2000)
>
> I think if we all stood together there is the wherewithal to change things. (P4-2002)
>
> It's a world as a whole, it should work at it as a whole to deal with the issue… we're all responsible for the planet. (P39-2007)
>
> People need to muscle together in the spirit of the human race. (P9-2010)

Change in the discourse across the datasets

Inspection of the coded instances of the discourse of ethics, reveals no detectable change across years. In terms of references to custodianship, these are made in a similar fashion from 1997 to 2010: concerns are expressed in terms of future generations and in general terms. In terms of references to justice/fairness also – applied to subjects such as carbon trading/offsetting, and international economic development – there is consistency across years as to how this is portrayed. The means by which correct living is portrayed – as instantiations of more abstract ethical principles, such as wasting less and being 'green' – also appears very similar across years.

Functions and consequences: summary

The discourse enables climate change to be interpreted in terms of certain universal principles, such as justice. By applying these ideas, the rights and wrongs of climate change and of the different means of responding to it, can be evaluated.

One consequence of the use of this discourse, is that some of the commonly-proposed means of addressing climate change – even of addressing climate change at all – may fail ethical consideration. Particularly in terms of approaches which impede the development of developing

countries, these may be considered inherently unjust. A further consequence, however, is that in many places action on climate change is argued to be imperative and ethically required: particularly in terms of a universal obligation to future generations and to the world itself.

CHAPTER 9 SURVEY METHODOLOGY

This chapter describes the use of survey methodology as part of the mixed methods approach of the thesis. This is the third research phase, following phase 1 (conduct of 2010 focus groups) and phase 2 (secondary longitudinal qualitative analyses).

An online survey was designed to investigate longitudinal changes in views towards climate change, through replicating items from previous surveys. In addition, items were designed that represented ways of understanding climate change portrayed in the discourses identified across the datasets.

A number of 'cultural theory' items were included, as a means of examining linkages between individual views on society and perspectives on climate change.

9.1 Use of a questionnaire survey to research public understanding of climate change

For the purposes of the present thesis, I will outline the constructs and items used according to the types of research question they are intended to explore. Some of the items used have previously been applied in the research literature (or are amended versions of these); others were developed for the purpose of the thesis.

The main objectives for which the survey was designed were:

i. To investigate longitudinal trends in public perspectives (where possible);

ii. To measure prevalence, determinants and predictive power of key concepts developed from the qualitative stage of research (viz. climate change discourses).

The full survey used is shown in Appendix 9.1 Note that this is not the exact format in which the survey was presented to respondents, who completed the survey online. Not all items in the survey are reported in the thesis, however the full survey is provided for completeness.

Mixed methods approach: incorporating a survey methodology

The use of survey methodology enables the examination of longitudinal dimensions of public understanding. The survey in the thesis replicates items from prior research conducted in 2002, 2003 and 2010, and also questions respondents as to their own perceived changes in views. Such measures as are obtained here are seen as an 'enhancement' (Bryman, 2006:106)[62] to the qualitative work carried out previously, by providing data that further informs findings about changes (and continuity) in perspectives over time.

The replication of items from previous surveys provides a unique opportunity to measure change in perspectives over time. However, the selection of items is necessarily restricted to those which have been previously administered. In addition, the selection of items is restricted to those surveys for which there is availability of full datasets for comparative analysis[63]. Where possible, theoretical considerations are made as to which items to re-use; replicated items are also selected for their correspondence to important themes and concepts in the literature (e.g. levels of concern and beliefs about anthropogenic causation).

As well as replicating previous survey items, the survey methodology aims to complement the discourse analysis more directly. Some epistemological concerns are important to address here.

Within the literature review and qualitative methodology, I proposed that the notion of a discourse as used in the present thesis is that of a socially-shared way of understanding the world or a 'commonplace' mode of interpretation. The discourses identified in the preceding chapters encompass this characteristic: various participants across different research projects are repeatedly found to drawn upon the ideas contained within these discourses. The objective of the discourse analytic approach used previously, has thus been to outline in detail the "ensemble[s] of ideas, concepts and categories through which meaning is given to social and physical phenomena" (Hajer and Versteeg, 2005:175).

This said, it is problematic to quantify the prevalence of such ideas through qualitative methods. Simply counting the number of participants that express certain ideas would only detect those that had expressed such a view. In addition, there is a difference between 'drawing on' a discourse

[62] Bryman proposes 'enhancement' as a criterion for mixed method research thus: "[enhancement] entails… making more of or augmenting either quantitative or qualitative findings by gathering data using a qualitative or quantitative research approach".

[63] For example, polling companies were approached with a request for provision of datasets from previous years, but the cost entailed was prohibitive.

(using some aspect of it in interaction or to justify an argument, for example) and holding a more stable viewpoint concerning these social and physical aspects of climate change. Thus, whilst it is possible to say at this stage that a number of commonplace ways of understanding climate change have been identified, their relative salience is as yet unclear: just how widespread are these ways of understanding climate change at the present time?

As discussed within the Methodology chapter, the discourses outlined are not considered to be 'bound' to an individual. Nevertheless, it is reasonable to assume that such shared understandings will be 'subscribed to' to a greater or lesser extent by a given individual. For example, many people are likely to recognise the character of an argument that proposes people are fundamentally selfish and unwilling to act collectively to address climate change, and will be able to relate to this discourse in a discussion – but the extent to which they personally accord with such a perspective will vary.

As noted previously, the present thesis is a 'qualitative dominant' study employing discourse analysis, and as such detailed investigation as to the psychometric properties of public perceptions (e.g. whether these constitute 'attitudes' or 'beliefs', and the valence with which views are held) are considered outside the scope of the study[64]. Nevertheless, the survey methods employed here do aim to provide some indication as to the salience of the perspectives revealed through the discourse analysis. It will be of value to ascertain whether these ways of understanding climate change are widely-held, or whether they are more marginal.

The discourses outlined in the preceding chapters are complex and incorporate multiple concepts: it is problematic to measure an individual's accordance with 'a discourse' overall. Instead, survey items are designed to convey a *central feature* of a particular discourse. Measuring accordance with a discourse-corresponding item thus provides a measure of the degree to which a person subscribes to such a perspective.

9.2 Longitudinal trends: items and constructs

A number of survey items were replicated, or specifically developed, for the purposes of analysing change over time in public perspectives.

[64] It is for this reason that I have tended to adopt the more neutral terminology of 'perspectives' and 'viewpoints'.

Relative importance of social and risk issues: 2002 vs. 2011

Eight items were replicated from a 2002 survey (Poortinga and Pidgeon, 2003), which were originally devised to measure the 'importance' of several risk issues, relative to each other and other social and personal issues. For the present thesis, the objective was to ascertain whether climate change had changed in the absolute and/or relative importance ascribed to it. The risk issues to which climate change was compared included the economy, terrorism, and genetically modified food. See Appendix 9.2 for the full list of risk issues and question wording used.

As well as a measurement of the personal salience of climate change, a theoretical underpinning for asking about relative importance is Weber's (2006, 2010) argument that people possess a 'finite pool of worry' meaning that increased importance placed upon one risk will be accompanied by decreased importance ascribed elsewhere. It might be expected, for example, that where perceived importance of the economy increases, importance about other issues (such as climate change) may decrease.

Levels of concern, informedness and interest in climate change: 2002 vs. 2011

Further items were replicated from the 2002 survey, measuring levels of concern, self-reported levels of how 'informed' people saw themselves as being, and level of interest in climate change (see Appendix 9.3 for these items).

Whilst there is debate (and inconsistency) in the literature as to what exactly environmental 'concern' is (Fransson and Garling, 1999) nevertheless it constitutes a widely used attitudinal measure in the climate change literature. It is of interest particularly to the present study because it was anticipated that there may have been a decline in concern across the 2002-2011 time period; (recent work has pointed to a decline in concern from 2005-2010 and so the present measurement extends this analysis.) A measure of concern is also considered to constitute a useful outcome variable (i.e. as being determined by a range of factors such as perceptions of scientific consensus, values etc.).

The measure of how well-informed people saw themselves as being was replicated: it was anticipated that over the ten year period, and with a great deal of media exposure, people would see themselves as being better informed about climate change than previously.

The measure of level of interest (the extent to which people are 'bothered' about the risk cases) was additionally replicated: Poortinga and Pidgeon (2003) argued that the original item used

comprised a measure of affective evaluation of risk cases; affect has been shown to be an important component of risk perception, including with respect to climate change (Oppenheimer and Todorov, 2006; Loewenstein et al., 2001).

Image association: 2002 vs. 2011

In their 2002 survey, Poortinga and Pidgeon (2003) used an open-ended item, asking participants to report 'the first three things that come to mind' in respect of one of five risk cases (e.g. climate change, GM food). This method was based on that described by Slovic (2000) intended to gauge which associations or images are closely associated with a risk issue. As discussed in the literature review, image associations have been found to underlie climate change risk perceptions and to be associated with affect (Lorenzoni et al., 2006; Leiserowitz, 2006).

In the present study, participants were again asked to report the first three things that come to mind, for the case of climate change only. This was to enable a comparison between affective image associations between the two time periods. The question asked in the 2011 survey was: "Which three things, if any, come to your mind when you hear the phrase 'climate change'?"

For the purpose of analysis, a coding system for responses was developed and applied both to the 2002 and 2011 data. This is described subsequently.

Perspectives on climate science, natural systems, uncertainty, media portrayal and severity: 2003 vs. 2011

Whitmarsh (2005)'s survey included items measuring a range of constructs, eight of which were replicated in the 2011 survey.

Five items were selected for replication because of a close correspondence with the central characteristics of the discourses identified in chapters 5 to 8. Four of these aligned closely with the 'status and practice of science' discourse (concerning uncertainty about climate science and evidence, and natural/human causation), and a further item with the notion of a social dilemma of climate change.

Additional items found by Whitmarsh (2011) to have changed over the period 2003-2008 were included, to examine for further change and/or stability. Items connected with climate 'scepticism' were replicated, given that – as discussed in the literature review – public scepticism has, it has been argued, increased in recent years.

See Appendix 9.4 for the full list of items replicated from Whitmarsh (2005) and for further details on the purposes of inclusion in the present survey.

Perspectives on impacts, responses and personal action: 2003 vs. 2011

In her 2003 survey, Whitmarsh (2005) used several open-ended items, three of which are replicated in the 2011 survey. These items ask participants the following:

- What impacts, if any, do you think climate change may have?
- What (if anything) do you think can be done to tackle climate change?
- If you personally regularly take, or have taken, any action out of concern for climate change, what action do you take?

The first two items are replicated exactly. In the case of personal action, this is amended slightly[65]. The purpose of replicating these items is to assess whether perceptions of the impacts, and possible and personal responses to climate change, have changed across the time period. For the purpose of analysis, a coding system for responses was developed and applied both to the 2003 and 2011 data. This is described subsequently.

Perspectives on causes of climate change, exaggeration, environmental identity and concern: 2010 vs. 2011

It is not anticipated that any substantial change in public perspectives will be found between items administered in early to mid 2010 (Spence et al., 2010) and the survey used for the thesis, administered less than a year later in February 2011.

The replication of 2010 items was carried out in part to compare results obtained via an online methodology in 2011 with the larger-scale and face-to-face 2010 survey work, as well as to compare perceptions across this (almost) one year period.

Results which were seriously divergent may indicate a methodological effect (in the absence of any reason for attributing change to other time-related factors), as such the re-use of items is used as a test of method reliability.

[65] The original survey consisted of two items, the first asking "Have you ever taken, or do you regularly take, any action out of concern for climate change?" The second asked "If yes, what did you do/ are you doing?"

One item replicated from 2010 was concerned with environmental identity. This was included because whilst identity has been found to be a predictor of climate change concern and climate-relevant behaviour (Swim et al., 2010) it was assumed that across a representative sample environmental identity should *not* be found to change over a one year period or to vary according to survey administration method used.

Further items replicated from 2010 related to perceptions of trend, attribution and impact scepticism (as discussed in the literature review; cf. Poortinga et al., 2011).

See Appendix 9.5 for the full list of items replicated from Spence et al. (2010) and for further details on the purposes of inclusion in the present survey.

Retrospective views on changes in personal viewpoints

In addition to measuring changes in perspectives *between* research projects, I also asked respondents to the 2011 survey to indicate whether their own views concerning climate change had altered over the period of time that they had been aware of the issue. The use of self-report measures *within* a single sample entails a different approach to the other longitudinal comparisons described above.

Items concerning self-reported changes in views, were used to provide data on a range of indicators corresponding to physical and social/personal aspects of climate change (e.g. perceptions of personal responsibility, beliefs about human/natural causation) and were designed to complement other longitudinal measures. Participants are also asked to explain *why* their views have changed (if they had).

Example questions (rated on a 5-point agree-disagree Likert scale) include "I am less trusting of climate scientists than in the past", and "I am less interested in climate change than I was in the past". The full list of items used and explanatory text can be found in Appendix 9.6.

9.3 Correspondence with climate change discourses: item construction

As well as replicating some items considered to approximate certain aspects of climate change discourses (as described above), for the 2011 survey I also developed novel items specifically intended for this purpose. In particular, items were developed which were designed to correspond to discourses as identified, and which were not addressed through item replication as described

above. For instance, a number of items exist concerning perceptions of physical aspects of climate change (e.g. natural/human causation) but fewer with respect to the ideas portrayed within the 'folk psychology, 'lifestyles and social practice' and 'relational responsibility' discourses. Examples of items corresponding respectively to these discourses are as follows:

- Not much will be done about climate change, because it is not in human nature to respond to problems that won't happen for many years (folk psychology discourse)
- Climate change has come about because we are part of a society that requires us to consume more than we need (lifestyles and social practice discourse)
- In respect of climate change, it's up to the government to make individuals do the right thing (relational responsibility discourse)

See tables A9.7.1 to A9.7.3, within Appendix 9.7, for the full range of novel items included, in respect of the discourses with which these are intended to correspond. Participants were asked to indicate level of agreement/disagreement on a 5-point scale with these items.

9.4 Contemporary events: the UEA controversy and extreme weather

A particularly important contemporary event occurring just before the 2010 Bristol focus groups were conducted, and around a year prior to the administration of the 2011 survey, was the widespread reporting of allegations of impropriety at the University of East Anglia's Climatic Research Unit, dubbed (by sceptics) 'Climategate' (Nerlich, 2010). At around the same time, extreme cold weather events occurred in the UK and elsewhere (Seager et al., 2010) which, as discussed in the literature review, some authors suggested may have lead to an increase in scepticism.

In line with literature suggesting that salient events such as these can affect public perceptions of climate change (Breakwell, 2010; Dessai et al., 2004) the present study thus sought to include measures to test this in light of these contemporary events – particularly given that empirical evidence for an effect of the UEA controversy/ cold winter is lacking.

With respect to discursive understanding, the UEA controversy is considered to be aligned with the 'status and practice of science' discourse; and cold weather events to the 'informal empiricism' discourse (interpretation of climate change through the 'evidence' of the weather).

Three items pertinent to the UEA controversy were included in the main part of the survey (e.g. "Scientists have hidden research that shows climate change is not serious"). See Appendix 9.8 for these items.

Respondents were also asked at the very end of the survey (so as not to influence previous responses) how much they had heard of this story, and what they had read/heard. They were asked first: "How much do you recall hearing or reading about news stories during late 2009/ early 2010, where it was alleged that climate scientists had acted dishonestly in the course of their research?" Responses categories varied from 'a great deal' to 'nothing at all'. They were then asked an open-ended question: "If you have come across this news story, what did you hear or read about it?"

With respect to cold weather events, the following items were constructed; because the winters of both 2009/2010 and 2010/2011 were especially cold (and the survey was administered during winter) items were included referring to a 'pattern' of cold winters as well as the 'late 2010' winter:

- The cold winter which occurred during late 2010, suggests that climate change may not be happening
- The pattern of cold winters in recent years, suggests that climate change may not be happening
- The cold winter which occurred during late 2010, suggests that climate change may now be a reality
- The pattern of cold winters in recent years, suggests that climate change may now be a reality

9.5 Cultural theory and 'myths of nature' items

As discussed in the literature review, cultural theoretical perspectives perceptions have been used to explain how climate change is conceived of both as a physical and societal phenomenon (Kahan et al., 2011). In considering the use of cultural theory measures in the present study, however, a review of the literature revealed some controversy as to its appropriateness as a measure of individual perceptions. A summary of considerations made prior to using cultural theory measures, is provided in Appendix 9.9.

Items were developed to measure the four cultural theory types, and myths of nature contextualised to climate change. It was anticipated that the 'individualism' and 'egalitarianism' types would be most closely connected to views on climate change, with individualist views

inversely associated with concern and acceptance of climate change and egalitarian views positively associated with these. As such, three items each were used for these constructs. A single item each was also used to measure 'fatalism' and 'hierarchism' (as these were not anticipated to be as important as predictors)[66]. These items were based on items obtained from Leiserowitz et al. (2010) and Rippl (2002). The items used in the 2011 survey are given in table 9.1.

Participants were asked to indicate level of agreement/disagreement on a 5-point scale with these items.

Table 9.1: Cultural theory items in 2011 survey

Cultural theory type	Survey item
Individualism	When I have problems, I try to solve them on my own
	People should be allowed to make as much money as they can for themselves, even if others are not able to
	If the government spent less time trying to fix everybody's problems, we'd all be a lot better off
Egalitarianism	The world would be a better place if its wealth were divided equally among nations
	Discrimination against minorities is still a very serious problem in our society
	In my ideal society, all basic needs (food, housing, education, health care) would be guaranteed by the government for everyone
Hierarchism	Order, structure and hierarchy is essential for society to operate well
Fatalism	There is not much point getting involved in politics – the ones in power only do what they like

Further items were adapted from Lowe (2006) who himself adapted the 'myths of nature' in the context of climate change, from the more general work of Douglas and Wildavsky (1982). Lowe's items were amended for the survey used in the present thesis, with wording changed particularly

[66] As Leiserowitz et al. (2010) note: "Prior research has found that the underlying cultural worldviews of egalitarianism and individualism are strongly correlated with climate change risk perceptions and policy preferences".

for the 'individualist' myth due to the very low response rate of only 1% obtained by Lowe[67]. A fifth item used by Lowe is also included.

The items used in the 2011 survey used to represent climate in the context of myths of nature are given in table 9.2 together with diagrams used. These diagrams have been widely used in the literature to represent in simple format the different ways of understanding natural systems – including climate change – in cultural theoretical terms; for example by Hulme (2009:189), Douglas et al. (1998:284), Thompson and Rayner (1998:284) and Lowe (2006). To clarify the meaning of these diagrams, survey respondents were also presented with additional wording prefacing this question[68].

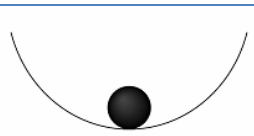
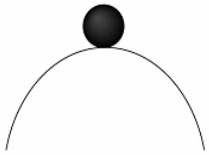
I proposed in the literature review that the concepts of cultural theory offer the potential to link fundamental worldviews (cultural preferences) about relationships in society, with views of nature (so-called 'myths of nature'). Survey items are thus expected to demonstrate that egalitarianism is more closely associated with climate change concern than individualism; conversely, individualism will be more closely associated with scepticism.

Egalitarianism is also predicted to be more closely associated with an ephemeral/fragile view of nature than individualism; conversely, individualism will be more closely associated with a resilient/benign view of nature.

[67] For this item, Lowe (2006)'s wording was "Climate is very stable. Climate change / global warming will have little to no impact".

[68] The question options were prefaced with the following wording: "Each of the five pictures here shows the climate system as a ball balanced on a line. They each represent a different ability of the climate to withstand human-caused climate change. Please select the picture which you feel best corresponds to your understanding of how the climate works."

Table 9.2: 'Myths of nature' contextualised to climate change

Myth of nature	Survey item	Diagram
Nature benign/resilient (Individualism)	The climate is fairly stable. Climate change will have little or no impact.	
Nature ephemeral/fragile (Egalitarianism)	The climate is in a delicate balance. Small amounts of climate change will have sudden and dangerous impacts.	
Nature tolerant within limits (Hierarchism)	The climate is stable within certain limits. If climate change is small, things will return to normal. If it is large, there will be dangerous impacts.	
Nature capricious (Fatalism)	The climate is random and unpredictable. We simply do not know what will happen with it in future.	
Unspecified	The climate is slow to change. Climate change will gradually lead to dangerous impacts.	

9.6 Socio-demographic measures

The following measures were obtained from the survey: gender; age; qualifications; working status; voting intention.

9.7 Specific predictions

A number of predictions are made, which have emerged from the qualitative research phase and/or from a consideration of prior research and theorising. These are discussed above, and are summarised as follows:

(i) There will be a significant decline in climate change concern between 2002/3 and 2011;

(ii) An observed decline in importance ascribed to climate change between 2002 and 2011, will be accompanied by an increase in importance ascribed to the economy;

(iii) An increase in science uncertainty and attribution of climate change to natural processes, will be observed between 2003 and 2011;

(iv) Cultural theory preferences will be associated with myths of nature, as contextualised to climate change;

(v) Cold weather events will be interpreted more frequently as pointing to evidence *for* climate change, than as disconfirmatory; the interpretation of weather events will be influenced by cultural theory preferences;

(vi) Cultural theory preferences will predict type of interpretation of weather events; cultural theory preferences will predict perspectives on societal and personal responses to climate change;

(vii) Recall of, and attitudes towards, the 'UEA controversy' will be associated with climate change scepticism;

9.8 Structure of the survey

Question ordering was an important consideration for the administration of the survey. This was firstly to match the structure of previously-administered surveys as closely as possible, for the purposes of comparison. Secondly, to preclude ordering effects, the majority of items were presented in a randomised order. Most of the survey items were able to be randomised using features of the online survey package used.

To enable close comparison with the 2002 survey, the first three questions presented to respondents were given in the same order in 2011 as in 2002.

Following these questions, respondents were asked questions concerning belief that the climate is changing (yes/no) and causes of climate change (natural/human). This ordering reflects that used

in the 2010 survey, where these questions were near to the start of the survey and directly following the 'concern' question.

The next questions asked were open-ended items concerning impacts, measures to address climate change, and personal action (replicated from 2003). These were placed close to the beginning of the survey, to avoid open-ended responses being influenced by the main series of closed-ended items.

The main part of the survey then followed. This was presented in six blocks of either eight or nine questions each. Within each block the order of questions was randomised and the ordering of the six blocks was also randomised. This meant that the main battery of 52 items was presented in a random order for each respondent.

Following these items, respondents were asked about their own change in views, with the ten statements again presented in random order. Towards the end of the survey, cultural theory items were presented (order randomised), followed by 'myths of nature' questions. Finally, respondents were asked about the 'UEA controversy' and given sociodemographic questions.

The full survey is provided in Appendix 9.1, with notation indicating which questions and blocks were randomised.

9.9 Practicalities, piloting and administration

The ethics submission obtained for the survey (online version and pilot version) is given in Appendix 9.10.

Pilot survey

The survey was piloted in November/ December 2010 with 81 Psychology undergraduate students. The purpose of the piloting was to ensure that items had reasonable psychometric properties (e.g. were normally distributed and had acceptable levels of variance), to ascertain whether cultural theory items factored as expected (i.e. egalitarianism and individualism items were distinct) and to estimate the length of time it took for respondents to complete the survey. Following piloting, some minor amendments were made to the survey.

Main online survey method: methodological considerations

As outlined above, a key objective of the survey method employed here, is to investigate changes in public perspectives over time. However, the surveys from 2002 and 2003 both used different methodologies for obtaining responses. Poortinga and Pidgeon (2003) used a market research company, which interviewed respondents in their own homes; Whitmarsh (2005) used a postal survey limited to the Hampshire area.

The survey for the present thesis used a different method again: an online survey administered via a market research company panel. An online survey was favoured for reasons of cost-effectiveness and to be able to reach a national sample. However, key concerns in the use of an online method are with respect to the representativeness of the sample and responses obtained, and regarding the equivalence of these methods with prior surveys.

One means by which sampling concerns can be addressed using online surveys, is via quota sampling whereby the proportion of a demographic is able to be specified in advance (Hewson, 2003). For the present study, a recruitment company was used to access an online panel of respondents according to age and gender quotas, thus ensuring that the sample was representative at least according to these variables (based on the 2001 UK Census). Respondents were drawn from across the UK, with attempts made to obtain a range of educational qualifications.

From a comparative study, Yun and Trumbo (2000) have suggested that there may be some types of variation in response characteristics obtained between online, postal and email-based surveys (e.g. email responses to open-ended items tend to be longer than on postal surveys). However, they also conclude that "we do not observe significant influences of survey mode in our substantive analyses". As noted also by these researchers, other work too has found "minimal difference" between approaches (King and Miles, 1995; Tse, 1998).

As a sampling check, nevertheless, the online survey also included a measure replicated from a nationally-representative face-to-face survey (Spence et al., 2010) corresponding to environmental identity. This measure is an important determinant of environmental (including climate change) concern, and yet was expected to be relatively stable in a national population over a one-year period. Thus, its measurement in the 2011 online survey and comparison with the 2010 survey results, permitted a further test of the representativeness of the 2011 sample beyond the standard demographic measures.

Data gathering procedures and respondent profile

The main online survey was administered using the web-hosted 'Qualtrics' software. This survey package was preferred for its professional presentation, and because of the ability to randomise blocks of questions, as well as questions within blocks. In addition, the Qualitrics software permits the export of data directly to SPSS. Example screenshots from the online survey are shown in Appendix 9.11.

The full online survey was administered between the 7th and 15th February 2011. Respondents were recruited via the panel database of the market research company Maximiles, who provided their subscribers with a link to an online version of the survey; the information sheet and consent to participate were obtained as part of the online procedure (the use of a market research company and use of online methods was referred to in the ethics submission and approved).

Funding was secured (via Prof. Nick Pidgeon's ESRC Fellowship) to recruit 500 respondents. From the initial response set, it was evident that a small number (n=12 or around 2%) of respondents had completed the survey in only a very short space of time and giving identical answers to all questions (usually selecting 'neither/nor' or 'don't know'). Having discussed this issue with the market research company, these responses were discarded and further responses obtained to bring the final sample to 500.

It should be noted that response rates as typically reported in survey studies do not apply in the case of online surveys. Firstly, this is not data which is provided by the market research company. Also, 'non-response' may entail a potential participant either not following the survey link provided in an email inviting them to participate, or they may simply not have read the email. Instead, the demographic profile of the sample obtained should be consulted for an indication of the representativeness of the sample.

CHAPTER 10 SURVEY RESULTS

This chapter reports the results of the online survey conducted for the thesis.

Following an outline of the respondent profile (section 10.1), longitudinal comparisons are made with items replicated from surveys conducted in 2002 and 2003 (sections 10.2 and 10.3).

Section 10.4 reports findings from analyses on the 2011 survey data alone.

Further detail on the survey results (e.g. descriptive statistics) can be found in Appendices 10.1 to 10.9.

10.1 Respondent profile

Respondent profiles are given in Appendix 10.1 (tables A10.1.1 to A10.1.3).

The final sample obtained is considered to constitute a very close approximation to national gender and age profile and to be representative for these measures (table A10.1.1).

It was not possible to specify (within funding agreed) a respondent profile according to educational attainment or working status, however the market research company attempted to provide as representative a sample as possible by these criteria. In the event, the profile matched quite closely that obtained by Spence et al. (2010) who used a face-to-face method that was representative of these measures. The 2011 survey obtained a sample that was however more qualified and more likely to be in full-time work (table A10.1.2).

The proportion of those voting for the main political parties reflected polling intentions at this time (February 2011) as measured by two national polling companies (table A10.1.3).

10.2 Longitudinal comparisons: 2002 and 2011

10.2.1 Relative importance of climate change: 2002 and 2011

Data were obtained as to the importance ascribed to a range of social and risk issues, in both 2002 and 2011. The figures used for comparison from 2002, were obtained from the original researcher (Wouter Poortinga) overseeing this survey.

Table 10.1 shows means obtained for importance ratings in 2002 and 2011 of climate change and the economy (ratings for 'terrorism' and 'GM food' are also shown for comparison). In table 10.1 the mean scores range from '1' (not at all important) to '5' (very important)[69]. Additional data analysis and descriptive statistics for the full range of risk and social issues compared between these years can be found in Appendix 10.2.

Independent sample t-tests[70] were performed to ascertain whether changes in mean scores were significant; effect sizes for changes were calculated[71].

Table 10.1 Comparison of issue importance between 2002 and 2011

Risk issue	$\bar{x}$ 2002 (SD)	$\bar{x}$ 2011 (SD)	$\bar{x}$ change	Effect size (t, df)
Climate change	3.84 (1.08)	3.68 (1.16)	-0.16*	.07 (2.0, 705)
The economy	4.22 (0.93)	4.35 (0.76)	+0.13**	.10 (-3.1, 1027)
GM food	3.29 (1.23)	3.15 (1.20)	-0.14 (ns)	.06 (1.6, 774)
Terrorism	4.42 (0.87)	4.12 (0.99)	-0.30***	.14 (6.4, 2027)

*** p<.05, ** p<.01, *** p<.001**

[69] Note that for data given in table 10.1, calculation of means and effect sizes, number of participants in 2002 is approx. 320 for ratings of climate change and GM food, and approx. 1500 for the economy and terrorism. For the within-participant correlations calculated, reported in the text, the 2002 subset of 320 participants (only those who gave a rating for both issues) is used. For 2011, n=500 (or just under) in all cases.

[70] Degrees of freedom depend upon the number of data points, but also as to whether assumptions of equal variance are met (where Levene's test is significant then equal variances are not assumed).

[71] The effect size shown in table 10.1 is calculated through the equation r= SQRT (t2 ÷ (t2 + df)) where t is the t statistic and df is the degrees of freedom. This equation is suggested by Field (2005) and Rosnow and Rosenthal (2005) for calculating effect sizes from t test results. I follow the convention used by Field (2005) of presenting the effect size as an 'r' coefficient. Cohen's (1992) criteria are used to comment upon whether effect sizes were 'small' or 'medium' within the text in this chapter.

A statistically significant *decrease* in importance of climate change was observed between 2002 and 2011, but this corresponded only to a small effect size of .07. As expected, the importance ascribed to the economy has *increased* over the same time period.

Contrary to expectations, however, there was a *positive* relationship between importance of climate change and importance of the economy in both 2002 and 2011 (comparing within individuals' participant scores). For 2002, r=.32 (p<.001) and for 2011, r=.15 (p<.01). This result suggests that the importance of climate change is *not* inversely related to importance of the economy.

10.2.2 Level of concern, interest and informedness about climate change: 2002 and 2011

On the basis of an independent-samples t test, there is found to be a significant ($p<0.05$) *decrease* in degree of concern about climate change over time, from a mean of 3.73 (SD=1.14) in 2002 to a mean of 3.54 (SD=1.10) in 2011 (where '5' is 'very concerned' and '1' is 'not at all concerned'). As with change in importance ascribed, this was not pronounced however: from a t statistic of 2.38 (df=810), a small effect size of 0.08 was obtained.

Applied as a measure of affective involvement/ level of interest (Poortinga & Pidgeon, 2003) responses to the item 'I am not that bothered about climate change' showed *no change* over the 2002-2011 time period (p=.4). In 2002 the mean for this item was 2.44 (SD=1.22) and in 2011 the mean was 2.52 (SD=1.21) where '5' represents a 'strongly agree' response and '1' represents 'strongly disagree'.

There was a significant ($p<0.001$) *increase* in how well-informed participants reported themselves being over time, from a mean of 2.65 (SD=1.15) in 2002 to a mean of 3.07 (SD=0.87) in 2011 (where '5' represents a 'strongly agree' response to the item 'I am well informed about climate change'). From a t statistic of -5.44 (df=539), a small-to-medium-sized effect of 0.23 was obtained.

Further descriptive statistics for these items can be found in the tables given in Appendix 10.3.

10.2.3 Multivariate analyses: 2002 and 2011 data

Further analyses were carried out to ascertain whether there was a main effect of the time period (survey year) upon climate change 'concern', where controlling for key predictor variables. The regression was also used to further examine whether importance ascribed to the economy would affect level of concern (as predicted by the 'finite pool of worry' hypothesis). As discussed in the

literature review, studies have identified gender, age and voting preference as predictors of climate change concern. Due to restrictions on the data available – that is, limited other feasible predictor variables – these were considered to be the most viable to include in a regression model.

Because of high correlations between variables measuring climate change *concern*, ascribed *importance*, and *interest*, these three items were treated as a composite score (α=.84) termed here climate 'engagement' and used as the dependent variable in the regression.

Multiple regression models

Two models were constructed, using stepwise regression. In the first stage, age, gender and voting preference were included (these variables are known to influence climate change attitudes). In the second stage, the measure of importance ascribed to the economy was included (it has been suggested that concern about the economy may inversely affect concern about climate change). Also in the second stage, a variable representing the year of the survey was included, to examine for an independent effect of the time period.

To enable the regression to be carried out, a dummy variable for age was constructed, with the middle age band as the reference condition[72]. A dummy variable was also constructed for gender, with 'male' as the reference condition; and for voting intention, with Conservative voters treated as the reference category (these tend to be less concerned about climate change). In the results below, 'dummy voting L' are Labour voters, and 'dummy voting D' are Liberal Democrat voters (other parties were not included as these had very small response rates). Finally, a dummy variable constructed for survey year, whereby 2002 was the reference condition.

Table 10.2 reports regression results. Neither gender nor age were significant predictors of climate change engagement. Voting preference significantly predicted climate engagement (Liberal

[72] Because the 2002 and 2011 surveys used slightly differing age bands, this was standardised. For example, the 2002 survey used an age band of 15-24 (the 2011 survey was 18-24) and the 2002 survey used an age band of 65+ (the 2011 survey used 65-74 and 75+). A further reason for collating age bands is that the relationship between environmental concern and age is not linear (both older and younger people tend to be less concerned than those of mid-age). For the linear regression, therefore, three age bands (treated as categorical variables) were used: 15/18 to 34 years (age band A); 35-54 years (age band B); and 54+ years (age band C). Dummy variables were constructed, with age band B (anticipated to have highest concern) treated as the reference category. In the regression results shown below, 'dummy A and 'dummy C' correspond to age bands A and C.

Democrat/ Labour voters have higher scores than Conservative voters). Where controlling for sociodemographic variables, the rating of importance ascribed to the economy was *not* a significant predictor of climate change engagement. The year in which the survey was administered was a significant predictor, of approximately the same power as voting preference. R^2 =.03 for step 1; R^2=.02 for step 2 (only a small amount of variance was accounted for by the models).

Table 10.2: Multiple regression of 2002 and 2011 items upon climate engagement

	B	S.E. B	β
Step 1			
Constant	10.49	.30	
Gender	.39	.27	.07
Dummy A (age)	-.55	.35	-.08
Dummy C (age)	-.21	.32	-.04
Dummy L (voting)	.81	.30	.13**
Dummy D (voting)	1.14	.39	.15**
Step 2			
Constant	10.19	.72	
Gender	.42	.27	.07
Dummy A (age)	-.47	.35	-.07
Dummy C (age)	-.16	.31	-.03
Dummy L (voting)	.92	.30	.12*
Dummy D (voting)	1.09	.39	.14**
Economy importance	.20	.15	.06
Survey year	-.82	.29	-.13**

10.2.4 Affective image association (open-ended items): 2002 and 2011

An open-ended survey item originally used by Poortinga and Pidgeon (2003) was repeated in the 2011 survey. This item consisted of the question "Which three things, if any, come to mind when you hear the phrase 'climate change'?"

A novel coding system was developed, to incorporate the main categories of response obtained from the two separate surveys. No coding system as may have been applied by the original researchers in 2002 was available; in any case, a novel coding system was considered necessary,

given there were responses found to be commonplace in the 2011 survey that were largely absent in 2002[73].

Four main coding categories were used, reflecting the nature of responses obtained in the 2002 and 2011 surveys. These corresponded to: consequences of climate change, causes of climate change, synonyms and apparent synonyms (especially 'global warming'), and scepticism. Table 10.3 shows the response categories, sub-categories, and response frequencies. Where percentages are given, this is as a proportion of total coded instances. These are given for more frequent responses (5% or over).

[73] For example, in the 2011 survey sceptical responses such as 'lies' or 'scaremongering' were relatively frequent, whereas these were almost entirely absent in 2002.

Table 10.3: Image associations with climate change in 2002 and 2011

Higher-level code (/subcategory)	2002 responses (n, %) total coded n=279	2011 responses (n, %) total coded n=480
➢ **Consequences**		
/changes to weather or seasons	77 (27.6%)	101 (21%)
/flooding	7	31 (6.5%)
/increased temperature	20 (7.1%)	25 (5.2%)
/decreased temperature	4	5
/temperature (other)	3	6
/rain (changes to rainfall)	15 (5.4%)	3
/ice melt (glaciers, ice sheets etc.)	8	47 (9.8%)
/sea-level rise	4	22
/human harm/ disasters (e.g. famine, earthquakes)	8	16
/harm to natural world	4	9
/consequences for future generations	4	0
/reference to 'polar bears'	0	4
➢ **Causes**		
/reference to 'emissions' (inc. 'gases')	2	12
/reference to 'pollution'	15 (5.4%)	11
/energy use	1	3
➢ **Synonyms or apparent synonyms**		
/reference to 'global warming' or 'greenhouse effect'	61 (21.9%)	84 (17.5%)
/reference to 'ozone'	42 (15.1%)	9
/reference to 'carbon'	1	23
➢ **Scepticism**		
/natural causation (e.g. 'it is natural')	2	8
/scientific uncertainty	0	14
/dishonest or flawed science	0	3
/dishonesty (other, e.g. 'lies', 'bandwagon', 'con', 'hype')	1	32 (6.7%)
/social actor motives (e.g. 'excuse to raise taxes')	0	3
/fatigue (e.g. 'bored of hearing about it')	0	9
TOTAL coded responses	*279*	*480*

Comparison of datasets

The majority of responses were able to be coded. Some responses were not included, however. For example, several respondents stated simply 'rainforests' – which could be a reference to deforestation causing climate change, a general association with the environment, or in respect of harm to natural environments from climate change.

Chi-square tests are performed for responses with relatively high frequency counts. These are carried out on sub-categories where numbers are high (e.g. reference to 'ozone') and also performed on main categories (e.g. scepticism).

Consequences of climate change

There was a small but significant *decrease* in prevalence of weather/seasons as a response between 2002 and 2011: a chi-square test shows a significant association between the survey year and the frequency of weather/season response ($p<0.05$) though this was not pronounced (Cramer's $V=0.08$).

Analysis also indicates an *increase* in reference to flooding (Cramer's $V=.09$, $p<.05$), to 'ice melt' (e.g. "ice caps melting") (Cramer's $V=.13$, $p<.001$) and sea-level rise (Cramer's $V=.08$, $p<.05$). It should be noted, that significant effects are found in large part because these items were very rarely mentioned in 2002, but did appear in 2011.

Causes of climate change

Only small numbers of participants referred to causes of climate change. However, a (relatively) larger number referred to 'emissions'-type responses in 2011 than 2002, and a relatively smaller number to 'pollution'-type responses. Chi-square tests are not performed because all frequencies are low.

'Ozone'

Chi-square analysis indicates a significant association between survey year and frequency of reference to ozone, representing a *decrease* in reference between 2002 and 2011 (Cramer's V=.25, p<.001).

'Global warming'

Chi-square analysis indicates the decrease in reference to 'global warming' or related terms was not significant (p=.14).

Scepticism

The number of participants indicating a sceptical response[74] of any kind were totalled: in 2002, 3 responses were coded as 'sceptical', and in 2011 there were 68 responses[75]. The 68 responses from 2011 constitute 14% of all responses obtained.

This appears at face value to constitute a significant increase in sceptical responses. Indeed, chi-square analysis supports this: there is a highly significant association between the survey year and the frequency of sceptical response (Cramer's V=.22, p<.001).

In 2002, the only three responses coded as sceptical were "con men – don't believe it", "climate change is cyclic research has been found to show this" and "a natural phenomena <sic>".

In 2011, many more sceptical responses (n=68) were obtained. Most notable are the increases in reference to scientific uncertainty and dishonesty. Example responses obtained from 2011 are as follows:

- "manipulation of 'facts'"
- "Bogus Science, from both pro and anti lobbies"
- "scientists at Norwich falsifying the data"

[74] 'Sceptical' responses were those that referred to lack of belief in climate change (reality and/or causation), or used pejorative language to refer to political or societal responses.

[75] In 2011, four possibly 'sceptical' responses were not counted: 'tree huggers', 'a waste of money', 'rubbish', and 'statistics'.

- "lack of genuine balanced scientific evidence"
- "lies" (four responses give this one-word answer)
- "hype" (11 responses use this term e.g. "overhyped")
- "con" (2 responses use this term, e.g. "This is the biggest con ever - its only result is to separate us all from our money")

10.3 Longitudinal comparisons: 2003 and 2011

10.3.1 Closed-ended survey items: 2003 and 2011

Data were obtained for a range of items from 2003 and 2011, concerning scientific uncertainty, beliefs about natural causation, media alarmism, severity of consequences and views of others.

The figures used for comparison from 2003, were obtained from the original researcher, Lorraine Whitmarsh.

Table 10.4 shows the summary descriptive statistics from responses obtained in 2003 and 2011[76]. Mean scores correspond to a range from '1' (strongly disagree) to '5' (strongly agree). Additional descriptive statistics for these items can be found in Appendix 10.4.

Independent sample t-tests[77] were performed to ascertain whether changes in mean scores were significant; effect sizes for changes were also calculated.

[76] Because a part of Whitmarsh's methodology was to vary question wording as to whether 'climate change' or 'global warming' was used, I report here the results for just the equivalent 'climate change' worded questions: the 2003 comparison data are thus a subset of Whitmarsh's full dataset.

[77] Degrees of freedom depend upon the number of data points, but also as to whether assumptions of equal variance are met (where Levene's test is significant then equal variances are not assumed).

Table 10.4: Comparison of survey items between 2003 and 2011

Item (n=1080)	$\bar{x}$ 2003 (SD)	$\bar{x}$ 2011 (SD)	$\bar{x}$ change	Effect size (t, df)
There is too much conflicting evidence about climate change to know whether it is actually happening	3.11 (0.89)	3.29 (1.13)	+0.18*	.09 (-2.3, 603)
The evidence for climate change is unreliable	2.83 (0.95)	3.06 (1.17)	+0.23**	.11 (-2.8, 587)
Experts are agreed that climate change is a real problem	3.44 (0.87)	3.44 (1.04)	0 (ns)	0 (.02, 578)
Climate change is just a natural fluctuation in earth's temperatures	2.93 (1.04)	3.30 (1.08)	+0.37***	.16 (-4.4,720)
The media is often too alarmist about [issues like] climate change	3.38 (0.99)	3.56 (1.12)	+0.18*	.09 (-2.2, 550)
The effects of climate change are likely to be catastrophic	3.45 (0.91)	3.44 (1.02)	-0.01 (ns)	0 (.1, 714)
It is already too late to do anything about climate change	2.22 (0.87)	2.65 (1.07)	+0.43***	.23 (-5.8, 590)
People are too selfish to do anything about climate change	3.76 (0.94)	3.70 (0.87)	-0.06 (ns)	.03 (.9, 739)

A consistent set of changes were observed with respect to items corresponding to 'physical' discourses: notably that the perception that the evidence for climate change is unreliable or conflicting has increased; similarly has the view that climate change is a 'natural fluctuation'. Interestingly, however, there is no change in a perspective on expert agreement.

A pronounced effect is also obtained for an increase in the view that it is 'too late' to act on climate change, and concerning media 'alarmism'.

10.3.2 Impacts and responses (open-ended items): 2003 and 2011

Unlike in the 2002/2011 regression models, a viable model was not felt to exist whereby an equivalent comparison could be made between 2003 and 2011. Whitmarsh used a different approach to measuring concern, and of the survey items considered above, none obviously presents as an appropriate outcome variable that could be used in regression models.

It was possible however to consider whether responses to open-ended items had altered over the time period. Three open-ended survey items originally used by Whitmarsh were repeated in identical or slightly modified form (due to space constraints) in the 2011 survey; see chapter 9, section 9.2 for details of question wording.

Coding responses

The 2003 survey utilised a complex hierarchical coding system (Whitmarsh, 2005:349-362). For example, in the case of the 'impacts' question there were eight top-level categories, and up to 27 secondary-level categories within each of these. For the purposes of assessing changes across years, however, it was felt more appropriate to have broader categories, so that response frequencies would be more comparable. A modified coding system was therefore developed for the present study, based upon Whitmarsh's original categories.

10.3.2.1 Impacts of climate change

Table 10.5 shows the coding frequency of responses for the open-ended question "What impacts, if any, do you think climate change may have?"[78] Where percentages are given, this is as a proportion of total coded instances. These are given for more frequent responses (5% or over).

[78] The 904 coded instances from the year 2003 derive from 436 respondents (an average 2.1 coded instances per respondent); the 597 coded instances from 2011 derive from 427 respondents (1.4 coded instances per respondent). This is because (for all open-ended items) the respondents to Whitmarsh's 2003 postal survey tended to give longer/ more complex answers.

Note that all open-ended responses from Whitmarsh's survey (using both 'global warming' and 'climate change' wording) are included. This is to enable an adequate number of responses to be compared between years, although it is acknowledged that there may be difference in response types between the 2003 data, according to wording used (cf. Whitmarsh, 2009a)

Chi-square tests are performed for responses with relatively high frequency counts – these are carried out on sub-categories where numbers are high (e.g. reference to 'increased temperature'). Analyses are also performed on main categories (e.g. natural world impacts).

Table 10.5: Comparison of 'impacts' associated with climate change between 2003 and 2011

Higher-level code (/subcategory)	2003 responses (n, %)	2011 responses (n, %)
➢ **Human impacts**		
/ food: farming, agriculture, crops	73 (8.1%)	43 (7.2%)
/ resources other: e.g. water shortages	14	8
/ economic e.g. increased costs, poverty, industry	16	15
/health	59 (6.5%)	10
/lifestyle or quality of life	34	20
/impacts on developing world (inc. war, population displacement)	9	12
➢ **Natural world impacts**		
/ species extinction, decline	45 (5.0%)	30 (5.0%)
/ other ecology effects e.g. biodiversity, animal life	95 (10.5%)	32 (5.4%)
➢ **Physical impacts**		
/flooding (inc. land loss)	119 (13.2%)	70 (7.7%)
/sea-level rise (inc. land loss)	94 (10.4%)	59 (9.9%)
/temperature/increased temperature	58 (6.4%)	53 (8.9%)
/temperature/decreased temperature	10	18
/impacts on weather, seasons	140 (15.5%)	138 (23.1%)
/impacts on sun (e.g. raised UVA)	7	1
/melting ice-caps, glaciers	55 (6.1%)	32 (5.4%)
/drought, desertification	52 (5.8%)	26
/disasters	23	16
TOTAL coded responses	904	597

Human impacts of climate change

A large number of responses in both surveys referred to the human impacts of climate change: 205 coded responses, equivalent to 23% of total coded responses in 2003; 108 responses (18%) in 2011. Chi-square tests show that this constitutes a significant decline ($p<.05$) however this was not pronounced (Cramer's $V=.06$). Furthermore, much of this decline can be attributed to a decline in reference to health impacts, which in 2003 often included ozone-conflated health impacts (i.e. skin cancer, sunburn) and air pollution impacts (e.g. asthma). Overall then, there is not considered to be an important change in reference to human impacts across the time period.

Natural world impacts of climate change

There was a statistically significant decline in overall reference to natural world impacts, though again this was not pronounced (Cramer's $V=.07$, $p<.01$). In 2003, 140 coded responses fell into this category (15% of total), in 2011 there were 62 (10% of total).

Physical impacts of climate change

The category into which the majority of responses were coded, was that of physical impacts. In 2003, 558 (62% of total) corresponded to physical impacts. In 2011 there were 413 coded responses (69% of total). Overall, this constitutes a small but significant increase (Cramer's $V=.08$, $p<.01$).

More specifically, statistically significant changes were found for references to temperature decrease: more responses mentioned decreasing temperature as an impact of climate change in 2011 than did in 2003 (Cramer's $V=.07$, $p<.01$) – though this may be connected to the inclusion of 2003 'global warming' items in this analysis. There was however also a significant increase in references to the weather and/or seasonal change (Cramer's $V=.10$, $p<.001$). The change in reference to flooding was *not* significant ($p=0.4$).

10.3.2.2 Action on climate change, general (open-ended items): 2003 and 2011

Table 10.6 shows the coding frequency of responses for the open-ended item "What (if anything) do you think can be done to tackle climate change?" Chi-square tests are again performed for responses with relatively high frequency counts (categories and sub-categories).

Table 10.6: Comparison of ways of tackling climate change (general) between 2003 and 2011

Higher-level code (/subcategory)	2003 responses (n, %)	2011 responses (n, %)
➢ Responsibility		
/ international	64 (10.7%)	21 (5.1%)
/ government, national	47 (7.9%)	14
/ industry, business	47 (7.9%)	16
/ individuals, public	34 (5.7%)	32 (7.8%)
➢ Large scale energy and emissions		
/ increase renewables, nuclear	41 (6.9%)	38 (9.3%)
/ reduce pollution, emissions	127 (21.2%)	130 (31.9%)
/ ozone-related (e.g. CFCs)	21	8
➢ Government regulation and institutional action		
/ taxes, charges, laws, incentives	43 (7.2%)	12
/ research	5	3
/ education, awareness-raising	29	13
➢ Transport		
/ reduce cars, electric cars	43 (7.2%)	20
/ public transport (increase, improve)	15	5
➢ Recycling	21	16
➢ Energy conservation, usage	29	13
➢ Environmental		
/ (de)forestation, conservation	24	25 (6.1%)
➢ Lack of efficacy, utility	8	42 (10.3%)
TOTAL coded instances	598	408

Coding responses: problematic comparisons

Of the four open-ended items used in the longitudinal analyses, the responses to this question presented the greatest challenge in achieving a meaningful comparison. This was in large part because in the 2003 survey respondents tended to give longer and more complex answers than the 2011 respondents. (The average number of words used in answering, was 13 for the 2003 respondents, but only 1.6 for the 2011 respondents[79]). Also, the diversity of answers was such that the constrained categories used were less reflective of answers given than for the other items. It is possible that differences which appear to be manifest between years, may therefore be influenced by these matters. This is borne in mind when interpreting differences between years.

Responsibility

Chi-square tests indicate that the proportion of responses asserting international, national and industry responsibility decreased between 2003 and 2011: for each of these, the decline in response frequency was significant at the $p<.05$ level with a small effect size (Cramer's V was approximately equal to or just under .1 in all cases). However, in light of the comments above concerning coding, this should be interpreted with caution.

It is notable, however, that there was no significant change in the number of references to individual responsibility. Examples of assertions of this kind include:

- "we should all take this on board, when we going about daily duties and think what we are doing" (2003)
- "Everybody needs to take part in reducing their carbon footprint" (2011)

Energy and emissions

The most frequent responses, in both 2003 and 2011, referred to the reduction of 'pollution' and/or emissions. In 2003, these responses constituted 21% of the total; in 2011 they were 31%. This constitutes a small but significant increase from 2003 to 2011 (Cramer's $V=.12$, $p<.001$).

[79] Note that this excludes one 2011 'outlier' who wrote a 350 word answer. This respondent's answer was included in coding however.

The term 'pollution' was used in 75 responses in 2003 (13% of total responses) but just 30 responses in 2011 (7.4%) – a significant decrease over time (Cramer's V=.08, p<.01). By contrast, the term 'emissions' was used in 39 responses in 2003 (6.5%), and 60 responses in 2011 (15%) – a significant increase over time (Cramer's V=.14, p<.001).

The terms carbon[80] and CO_2 also show a change over time: just 23 responses (3.8%) used these terms in 2003, compared to 52 responses (13%) in 2011 – again, a significant increase over time (Cramer's V=.17, p<.001).

Regulation and institutional action

The slight decline, from 2003 to 2011, in the number of coded instances referring to government enforcement, incentivisation and research was found to be significant (Cramer's V=.10, p<.01). Here again, though, this may have more to do with respondents in 2003 giving longer answers (e.g. explaining a view that legislative enforcement of emissions controls was necessary, rather than simply noting 'reduce emissions').

Lack of efficacy

One means by which there does appear to have been a pronounced change between 2003 and 2011, is an increase in responses asserting that action is unnecessary, or would be ineffective/ pointless.

In 2003 there were just 8 responses coded in this way (1% of total). By 2011 this had risen to 42 (10%). This constitutes a significant and relatively sizeable increase in such responses (Cramer's V=.20, p<.001).

Responses suggested that action was pointless because climate change is natural, and/or that it is too late to act. Example responses include:

- "In many ways, probably too late!" (2003)

[80] Whilst there is some overlap in the usage of the terms relating to 'emissions' and to 'carbon' (e.g. 'carbon emissions') nevertheless these results appear to indicate a change in the use of terminology – specifically, here, in the context of responding to climate change.

- "It is too late to stop it now" (2011)
- "Nothing - regardless of what we do, we will only delay the inevitable" (2011)
- "Not much. The Earth is due another ice age" (2011)

10.3.2.3 Action on climate change, personal (open-ended items): 2003 and 2011

Table 10.7 shows the coding frequency of responses for the open-ended personal action on climate change question, "If you personally regularly take, or have taken, any action out of concern for climate change, what action do you take?"[81]

[81] Chi-square tests are performed for responses with relatively high frequency counts (categories and sub-categories). The 402 coded instances from the year 2003 derive from 185 respondents (an average 2.2 coded instances per respondent); the 527 coded instances from 2011 derive from 309 respondents (1.7 coded instances per respondent).

Table 10.7: Comparison of ways of tackling climate change (personal) between 2003 and 2011

Higher-level code (/subcategory)	2003 responses (n, %)	2011 responses (n, %)
➢ Transport-related		
/ walking	26 (6.5%)	21
/ public transport	8	15
/ cycling	14	7
/ limiting car use, eco-driving	63 (15.7%)	84 (15.9%)
/ reducing flying	2	12
➢ Domestic energy-related		
/ electricity reduction (e.g. switch off appliances)	13	22
/ lighting, bulbs	7	15
/ renewable energy supplier	7	8
/ limit heating	13	10
/ insulation	10	9
/ conserving, reducing (generic)	47 (11.7%)	93 (17.6%)
➢ Other pro-environmental action		
/ recycling	99 (24.6%)	176 (33.4%)
/ green purchasing	29 (7.2%)	17
/ ozone-related (e.g. CFCs, aerosols)	18	3
/ packaging	6	5
/ food-related (composting, grow food)	12	16
➢ Public sphere (e.g. political, educate family)	28 (7.0%)	14
TOTAL coded responses	402	527

Transport-related

The most frequent response with respect to transport-related behaviour, concerned limiting car use (and other actions, such as eco-driving or driving an efficient car). Overall, there was no significant difference between the proportions of transport-related references between 2003 and 2011. However, it is notable that whilst a still very small proportion, six times as many respondents cited limiting flying in 2011 as in 2003 (12 responses vs. 2). Example responses for this sub-category included "limit flights" (2003), "travel by train instead of flying" (2011) and "less journeys, esp[ecially] car and plane" (2011).

Domestic energy use

Whilst there is no change in most of the sub-categories of energy use, it is notable that more general or generic reference to conservation of energy in the home, or reducing 'energy' use, is more frequent in the 2011 survey. This increase in generic references is itself significant at a $p<.05$ level (Cramer's $V=.08$). Example responses include "try to reduce energy usage" (2003), "reduce energy consumption" (2011) and "conserve energy, fuel" (2011).

There are slightly more references to 'energy' as a term in 2011 than 2003 (65 vs. 38) though this is not significant.

Recycling

By far the most frequent response given in respect of personal action on climate change, is recycling. This applies to both 2003 and 2011, and has increased in prevalence (Cramer's $V=.10$, $p<.01$).

This apparent increase in reference should be interpreted with care, however. Whilst the number of 'recycling' responses as a proportion of overall coded references has indeed risen, it was still mentioned by similar proportions of people. In 2003, recycling was mentioned by 99 of 185 people (i.e. 54%). In 2011, 176 of 309 people (57%) mentioned recycling. The proportional increase has much to do, therefore, with more 2011 respondents giving an answer that *only* concerned recycling (often as a one-word answer).

'Ozone'-related action

The decline in ozone conflation, observed elsewhere in the thesis, is found again in a decline in reference to ozone-depletion-relevant behaviour (such as refraining from using aerosols). Whilst there were 18 such references in 2003, this had decreased to three by 2011.

10.4 2011 survey analysis

This section considers cross-sectional analyses carried out on the 2011 survey dataset alone. Some comparisons with items replicated from the Understanding Risk 2010 survey (Spence et al., 2010) are also given.

10.4.1 Items replicated from the 2010 survey

Four items were included from Spence et al.'s (2010) national survey on perceptions of energy and climate change.

For the two items measuring perceptions of 'exaggeration of climate change' and 'environmental identity', no significant differences were found between the two surveys. The means and standard deviations for the item 'the seriousness of climate change is exaggerated' were 2.93 (SD=1.29) in 2010 and 2.88 (SD=1.19) in 2011 – this was not close to significant (p=.4). The means and standard deviations for the item 'being environmentally friendly is an important part of who I am' were 3.54 (SD=1.08) in 2010 and 3.50 (SD=1.06) in 2011. Again, this was not significant (p=.4). Response distributions for these items are given in Appendix 10.5.

Whilst a very similar proportion of respondents answered 'yes' to the question "As far as you know, do you personally think the world's climate is changing, or not?" (78.3% in 2010 versus 76.5% in 2011) fewer participants in 2011 gave a 'no' response, and more gave a 'don't know' response; see table 10.8.

A two-sample z-test finds no significant difference between the proportion of 'yes' responses (z=.48, p=.63) however a significant difference is found between the proportion of 'no' responses (z=2.86, p<.01) (this latter result is likely connected to the higher proportion of 'don't know' responses).

Table 10.8: Proportions considering the climate is changing in 2010 and 2011

	2010 (UR) %	2011 (online) %
Yes	78	77
No	15	10
Don't know	6	14

A small but significant change was found between 2010 and 2011, in terms of the attribution of climate change to natural or human causes[82]. Response distributions are given in table 10.9. For original question wording see chapter 9, section 9.2.

For the purposes of analysis, the response 'entirely natural' was assigned a value of 1, and 'entirely human' a value of 5. 'No such thing' and 'don't know' responses were omitted from the analysis. The mean score obtained in 2010 was 3.15 (SD=.94) and in 2011 was 2.97 (SD=.94). Based on an independent samples t-test, this was significant ($p<.001$) although the effect size was small ($r=.08$). The change appears to have much to do with the 2011 sample having relatively fewer responses in the 'entirely human' response category (in 2010 6.5% of respondents gave this response versus 2.4% in 2011).

A one-sample t-test indicates that there is no significant difference between the proportion of respondents believing in human and believing in natural causes in 2011: indeed the mean of these responses is 2.97 ($t(477)=-.78$, $p=.44$).

[82] The question wording was: "Thinking about the causes of climate change, which, if any, of the following best describes your opinion? Climate change is…"

Table 10.9: Proportions considering climate change to be human or natural in 2010 and 2011

	2010 %	2011 %
Entirely natural	6	8
Mainly natural	12	16
Partly natural, partly human	46	43
Mainly human	24	25
Entirely human	7	2
No such thing	2	2
Don't know/ no opinion	3	3

The remainder of the survey analyses carried out in this section are cross-sectional, i.e. concern only the 2011 data.

10.4.2 Retrospective change in views

Respondents to the 2011 survey were asked to indicate the period of time over which they had been aware of climate change (mean=9.5 years, SD=8.3 years), and then to indicate how their perspectives had changed over this time period. Full descriptive statistics for the 10 'changes in views' items can be found in Appendix 10.6.

Table 10.10 shows the means obtained, and significance levels of one-sample t tests carried out to ascertain whether significantly more respondents agreed than disagreed (or vice versa) for each item – that is, to test whether the mean was significantly different from the mid-point. For most items, significant differences[83] were obtained (the direction of bias is indicated by whether the

[83] T-test results, respectively: 'increasingly concerned' (t(493)=3.84, p<.001); 'more sceptical' (t(489)= -1.57, p=.12 (ns)); 'more personal responsibility' (t(492), p<.001); 'less interested' (t(488)= -5.19 p<.001); 'more convinced' (t(489)=5.77, p<.001); 'less certain' (t(487)= -6.5, p<.001); 'less sure' (t(487)= -2.21, p<.05); 'more sure' (t(493)=6.30, p<.001); 'more of a tendency' (t(476)=7.08, p<.001); 'less trusting' (t(480), p=.12 (ns)).

mean is above or below the mid-point of '3'), Two exceptions were the items measuring change in trust in climate scientists, and increased scepticism: there were no significant deviations from the mean for these propositions.

Table 10.10: Changes in views of 2011 respondents

Survey item	Mean (SD)
I have become increasingly concerned about climate change over this time period	3.19*** (1.10)
I am more sceptical about climate change than in the past	2.92 (1.18)
I feel more of a personal responsibility to do something about climate change than in the past	3.24*** (1.06)
I am less interested in climate change than I was in the past	2.74*** (1.10)
I am more convinced than ever that climate change is a serious problem	3.29*** (1.12)
I am less certain than before that climate change is a real problem	2.68*** (1.10)
I am less sure than before that climate change is caused by human actions	2.89* (1.09)
I am more sure than previously that climate change is directly affecting the weather in the UK	3.30*** (1.06)
In the past, there was more of a tendency for the importance of climate change to be exaggerated	3.31*** (0.96)
I am less trusting of climate scientists than in the past	3.08 (1.08)

132 responses were obtained to the follow-up open-ended item "If your views have changed, please tell us why this may be" (not including the many responses indicating simply that views had not changed).

Of the responses obtained, there are several broad patterns. These reflect the means by which arguments characteristic of the main discourses explored in the qualitative findings are applied to explain changes in views (and in some cases, why views have not changed).

Changes in views in respect of physical discourses

A number of participants make reference to changed views in the context of perspectives on the mutability of climate and the natural world. For example, a respondent notes "[things like] changing climate in the past are in fact cyclical natural events", another that "the Arctic and Antarctic used to be the warmer places on the Earth, then ice age now it's time for the reverse to happen again, balance can be restored", and another that "it is just fuss about nothing, if you study the evolution of our planet, you will see that climate changes do happen anyway in patterns of hundreds of years".

Other examples referring to natural mutability include: "There always seem to have been fluctuations in the weather as evidenced in tree rings"; "the weather has always changed and is still changing"; and "I used to believe it was all because of humans and cars and cows, but then I learned about the planet's natural cycle, which seems like an inevitable change".

With respect to viewpoints referring to uncertainty or dissensus in climate science, responses include "too many conflicting opinions from so called experts", "My views have not changed in any dramatic sense but there does seem to be more and more conflicting evidence", and "I hear too much conflicting "evidence"".

Conversely, reference is made to consensus or evidence supporting the veracity of climate change, for example "the scientists appear to be more convinced that man is affecting the climate", "more evidence demonstrating that climate change is really happening", and "over time I have read or listened to various scientists and although sceptical at first I believe that the actual evidence points to climate change".

These sorts of perspectives are expanded in detail by other respondents, for example one who refers to evidence from 'temperature monitoring' (to support the idea that climate change is a reality) and another who refers to lack of 'rigour' in computer models to note that it is not:

- "The evidence seems to be stacking up towards climate change being a reality. The monitoring of temperature around the world and weather events across the globe point to climate change being a reality also"

- "The records being used and the computer models developed have not been rigorously tested enough. The data sets do not exist for a long enough period".

One respondent noted: "The evidence is piling up, but so is the public lethargy on the subject".

Responses in respect of 'informal empiricism' (the idea that climate change can be directly appraised and experienced) point to changes in views including the following examples:

- "I have become less sceptical as a result of the apparent increase in extreme weather conditions"
- "Before I wasn't too sure as the evidence wasn't right in front of our own eyes literally - recently with all the weather changes etc. I have began to believe in it much more solidly before I did believe in it but nowhere near as much"
- "Because I have personally seen a difference in the weather patterns changing which means it appears to [be] a real issue"

The notion that recent cold weather was evidence *against* climate change was found in only one response: "We have always been told that climate change is about Global Warming, but Britain has just been through two very cold winters in a row, so on the evidence available Global Warming does not seem to be happening".

Changes in views in respect of social discourses

A number of responses emphasise vested interests of social actors, especially the media and government. One participant (who reported being more sceptical) noted: "I changed my views when a scientist suggested it was for the government to charge more tax". Another who was also more sceptical ('strongly agree') noted: "Companies are using climate change to make extra profits - like airlines etc."

The social dilemma nature of climate change is referred to, such as by the following participant who notes: "Finding the bigger polluting nations are doing little or nothing (USA, China, India) what we can do will not help if they don't do anything". Another respondent who was more sceptical and less interested than previously, noted:

> "My views on climate change have not changed, yes humans are responsible but the capitalist and <sic> governments see it as a way to make money so the ones who don't believe it will carry on wasting resources and polluting the place up, whilst the believers will try and scam the public into paying through the noses in "green" energy taxes".

A response in the context of both personal responsibility and relational responsibility (the respondent reports being more concerned) is: "They've not really changed. I continue to do what I can within my budget and feel that legislation and innovation are still our best hopes of solving the problem".

Another respondent noted a moral/ethical aspect to social dimension of climate change: "I think that climate change is a natural occurrence but the enormous increase in the human population and greed has added to the problem".

Changes in views in respect of personal discourses

A particularly poignant response from one respondent (who was neither more concerned nor more sceptical) was in the context of his life experience: "Not really changed my views but at my age with the loss of my only child and no grandchildren I feel it's not relevant". This response contrasts sharply with that by another respondent, who asserts an ethical responsibility to future generations because of having their own child: "we have recently had a daughter and so I am more concerned about her future and what world she will live in"; another respondent similarly notes they are "more worried because I now have a child".

Participants do make reference to personal action (e.g. "I am more concerned than I used to be and I take as much action as I can") however it is notable that perhaps the majority of the personal responses are in the context of 'fatigue', for example:

- "I am not sure if they have changed I am just bored of it all";
- "Climate change fatigue... the media takes research and facts or disagreements out of context";
- "I think the media have created so many scare stories that over time one becomes immune to them";
- "It's happening, but I don't really care";
- "I just take less interest in it"

10.4.3 Perspectives on social aspects of climate change

A number of items were devised corresponding to social discourses of climate change outlined in chapter 6.

Descriptive statistics for these items are given in table 10.11; full distributions are shown in Appendix 10.7. As well as giving means and standard deviations, data are included on the proportion of participants (strongly) agreeing or (strongly) disagreeing; this reflects how 'commonplace' these viewpoints are. Items in the table labelled 'SD' correspond to a social dilemma interpretation of climate change (chapter 5, section 5.1); items labelled 'RR' to relational responsibility (chapter 5, section 5.2); items labelled 'LS' to the discourse of lifestyles and social practice (chapter 5, section 5.3)[84].

As can be seen, there are very high levels of agreement with the social dilemma item concerning people 'pulling in different directions'; but also with the '*anti*'-dilemma item concerning collective action ('if each of us did our bit to help…'). Similarly, only a minority agree that the actions of a single person are irrelevant in tackling climate change; and yet, large numbers assert a 'relational responsibility' perspective concerning the need for 'those in power' to provide rewards and penalties.

[84] A further item 'people are too selfish to do anything about climate change' is replicated from Whitmarsh (2005) and is considered above.

Table 10.11: 2011 survey respondent views on social aspects of climate change

	(Strongly) disagree	(Strongly) agree	Mean (SD)
The actions of a single person don't make any difference in tackling climate change (SD)	41	30	2.87 (1.17)
Climate change is so complicated, that there is very little politicians can do about it (SD)	36	34	2.95 (1.16)
Climate change is hard to address because there are so many people on the planet pulling in different directions (SD)	4	78	4.01 (0.79)
There is no point in me doing anything about climate change because no-one else is (SD)	55	13	2.39 (1.05)
If each of us did our bit to help, we could put an end to the problems of climate change (SD, 'anti' dilemma viewpoint)	24	41	3.18 (1.07)
In respect of climate change, it's up to the government to make individuals do the right thing (RR)	21	38	3.18 (0.99)
As members of the public, we need those in power to put in place rewards and penalties to help us act on climate change (RR)	16	55	3.49 (1.10)
Climate change has come about because we are part of a society that requires us to consume more than we need (LS)	12	55	3.60 (1.00)
We in the UK are prepared to change the way we live our lives to help stop climate change (LS)	28	33	3.03 (0.96)

10.4.4 Perspectives on folk-psychological and ethical aspects of climate change

A number of items were devised corresponding to folk-psychological and personal discourses of climate change as outlined in chapter 7.

Descriptive statistics for these items are given in table 10.12; full descriptive statistics are given in Appendix 10.8. There are high levels of agreement with the folk psychology view of 'denial' (that people have a 'head-in-the-sand' attitude towards climate change). Also, more people agree than disagree with the folk-psychological perspective about it not being in 'human nature' to respond; and around half of respondents accord with a moral impetus for individual action.

Table 10.12: 2011 survey respondent views on folk-psychological and ethical aspects of climate change

	(Strongly) disagree	(Strongly) agree	Mean (SD)
Not much will be done about climate change, because it is not in human nature to respond to problems that won't happen for many years	14	52	3.49 (0.94)
A lot of people have a 'head-in-the-sand' attitude towards climate change	9	66	3.79 (0.95)
Rather than spend my time worrying about climate change, I prefer to ignore it and just get on with my life	42	28	2.79 (1.17)
It is morally wrong if you don't take regular action as an individual to help tackle climate change	19	50	3.35 (1.11)

10.4.5 Ozone conflation

Note that items corresponding to 'physical discourses' are covered separately – e.g. acceptance of an anthropogenic component, and degree of scepticism about science – and so are not reported separately here. One item that is not reported elsewhere, however, relates to the measure of ozone conflation.

The prevalence of ozone conflation in the survey sample, is rather higher than expected. 44.6% of respondents agree (7.8% strongly agree, 36.8% agree) that 'one of the main causes of climate change has been the reduction (hole) in the ozone layer'. Only 14.6% disagree (5.4% strongly disagree, 9.2% disagree) that this is the case; whilst just under a third (31.4%) are at the 'neither agree nor disagree' mid-point, and a further 8.6% respond 'don't know/no opinion'. (Mean=3.36, SD=0.98.)

10.4.6 Cultural theory scale and predictions

Eight cultural theory items were used, which were intended to correspond to individualism (three items), egalitarianism (three items), fatalism and hierarchism (one item each).

Principal components analysis using Varimax rotation was used to ascertain whether the six egalitarianism/individualism items formed two factors[85].

Two components were obtained, the first containing the three individualism items and the second containing the three egalitarianism items (with a small negative loading of one individualism item in the egalitarianism factor). Table 10.13 reproduces the rotated component matrix for these items obtained from SPSS (values less than .2 are not shown).

[85] There were no problems with multicollinearity (no items intercorrelate at a value higher than .5). The KMO statistic (test of sampling adequacy) is acceptable at .64 for the six variables together (this should be a minimum of .5, for principal components analysis to be appropriate). The anti-image correlation indicates that egalitarianism items have higher scores on KMO than do individualism items, though all are above a minimum .5.

Table 10.13: Rotated component matrix for cultural theory items

	Component	
	1	2
Egalitarianism (1) **The world would be a better place if its wealth were divided equally among nations**	.799	
Egalitarianism (2) **Discrimination against minorities is still a very serious problem in our society**	.678	
Individualism (1) **When I have problems, I try to solve them on my own**		.790
Individualism (2) **People should be allowed to make as much money as they can for themselves, even if others are not able to**	-.352	.496
Individualism (3) **If the government spent less time trying to fix everybody's problems, we'd all be a lot better off**		.675
Egalitarianism (3) **In my ideal society, all basic needs (food, housing, education, health care) would be guaranteed by the government for everyone**	.778	

Reliability analysis performed on the egalitarianism and individualism scales, gives a low but acceptable Cronbach's alpha statistic for egalitarianism (.66) but a rather lower figure for the individualism scale (.40). For this reason, the factors obtained are treated as variables in further analyses (where I refer to 'individualism' and 'egalitarianism'), rather than using items in a combined scale.

It should be noted that due to there only being one item each for fatalism and hierarchism measures[86], these were not included in factor analysis (these items are not expected to factor with

[86] The wording of the hierarchism item is "Order, structure and hierarchy are essential for society to operate well"; the fatalism item is worded "There is not much point getting involved in politics – the ones in power only do what they like"

other variables). Where these items *are* included, hierarchism and fatalism factor with individualism items; egalitarianism is still retained as a single factor[87].

Cultural theory and myths of nature

It was hypothesised that egalitarianism would be associated with the 'ephemeral' myth of nature, and individualism with the 'resilient' myth of nature. It was also expected that fatalism would be associated with the 'random' myth, and hierarchism with the 'tolerant' myth.

Cultural theory types and myths of nature associations: binary logistic regression

To assess the degree of correspondence of cultural theory factors/items and myths of nature items, binary logistic regressions were carried out. The view of climate/nature was treated as the binary dependent variable, with cultural theory scores entered as independent continuous variables.

In the case of the 'climate is resilient' myth, as expected the most important predictor is the individualism factor ($B=.79$, $p<.01$); neither egalitarianism, hierarchism or fatalism are found to be significant predictors. In the case of the 'climate is ephemeral' myth, as expected the most important predictor is the egalitarianism factor ($B=.59$, $p<.01$); individualism is also a significant negative predictor ($B=-.37$, $p<.05$). For the 'climate is random' myth, fatalism is not significant (contrary to expectations); egalitarianism however is a significant negative predictor ($B=-.25$, $p<.05$) and individualism a significant predictor ($B=.26$, $p<.05$). For the 'climate is tolerant' myth, there are no significant associations found.

Cultural theory and climate change perspectives

There is a significant positive correlation between egalitarianism and climate change concern ($r=.32$, $p<.001$), as well as the level of importance ascribed to climate change ($r=.33$, $p<.001$);

[87] Further examination of the relationships between the egalitarianism and individualism factors and hierarchism/ fatalism items, shows that hierarchism and fatalism do not correlate significantly together, and that neither hierarchism/fatalism correlate with egalitarianism. The individualism factor does however correlate positively with hierarchism ($r=.30$, $p<.001$) and fatalism ($r=.31$, $p<.001$). This is to say, egalitarianism is most convincingly a separate factor; there is some evidence of association between individualism and hierarchism/fatalism.

egalitarianism also positively correlates with pro-environmental identity ('Being environmentally friendly is an important part of who I am'), r=.35, p<.001. There is, conversely, a significant negative correlation between egalitarianism and sceptical self-identity, measured through agreement with the statement 'I consider myself to be a climate change sceptic' (r=-.21, p<.001) and between egalitarianism and the measure of indifference 'I am not that bothered about climate change' (r=-.22, p<.001).

By contrast, there is a significant negative correlation between individualism and climate change importance (r=-.20, p<.001), and concern (r=-.21, p<.001). Individualism also correlates positively with sceptical self-identity (r=.31, p<.001) and indifference towards climate change (r=.31, p<.001).

Interestingly, individualism does not correlate significantly with pro-environmental identity (r=-.04, p=.4) – despite a strong correlation observed between the measure of pro-environmental identity and climate change concern (r=.48, p<.001).

The relationships between hierarchism/fatalism and these climate change items are revealing also. There is no significant relationship found between hierarchism and any of the climate change items referred to above, with the exception of pro-environmental identity (r=.12, p<.01). Fatalism however correlates negatively with perceived importance of climate change (r=-.18, p<.001), concern (r=-.21, p<.001) and pro-environmental identity (r=-.19, p<.001), and positively with sceptic self-identity (r=.33, p<.001) and indifference (r=.31, p<.001).

10.4.7 Interpretation of weather events

Four items were devised to examine whether the cold weather events of 2010-2011 had been interpreted as evidence for or against climate change, and if so by whom. Descriptive statistics for these items are given in table 10.14. One-sample t tests carried out to ascertain whether (strongly) agree statements were significantly more prevalent than (strongly) disagree statements were significant in all cases[88].

[88] T-test results are respectively: 'cold winter = climate change not happening' (t(478)= -10.68, p<.001); 'pattern of cold winters = climate change not happening' (t(478)= -9.89, p<.001); 'cold winter = climate change a reality' (t(477)=3.80, p<.001); 'pattern of cold winters = climate change a reality' (t(485)=6.57, p<.001).

Table 10.14: Interpretation of weather events

	(Strongly) disagree	(Strongly) agree	Mean (SD)
The cold winter which occurred during late 2010, suggests that climate change may not be happening	50	14	2.48*** (1.11)
The pattern of cold winters in recent years, suggests that climate change may not be happening	50	16	2.52*** (1.06)
The cold winter which occurred during late 2010, suggests that climate change may now be a reality	22	38	3.19*** (1.07)
The pattern of cold winters in recent years, suggests that climate change may now be a reality	19	45	3.32*** (1.06)

As can be seen from these results, the proportions of respondents agreeing with the proposition that cold winter(s) constitute disconfirmatory evidence of climate change is rather low. By contrast, over a third (38%) of respondents agree that the cold winter of 2010 'suggests that climate change may now be a reality', and almost half (45%) agree that the 'pattern of cold winters' suggests that climate change may now be a reality.

In respect of perceived personal ability to notice climate change via the weather, this also appears to be prevalent. Almost half (45%) of respondents agreed with the statement 'I personally have become aware of climate change, through noticing changes to the weather'; 27% disagreed, and a further 26% neither agreed nor disagreed.

Links between cultural theory perspectives and interpretation of the weather

Further analyses were performed to investigate determining factors of these contrasting modes of interpreting the weather. It was hypothesised that cultural theory type (as a fundamental 'worldview') would determine the means by which the weather is interpreted. Whilst the majority of respondents, it is assumed, will have experienced the cold winters of 2009/10 and 2010/11, it is expected that this would be interpreted differently dependent upon worldview.

Two regressions were conducted, the first incorporating the dependent variable measuring the viewpoint that cold winters show climate change is a reality, the second measuring the viewpoint that cold winters show climate change is *not* happening. In the first stage of each regression, the individualism and egalitarianism factors were entered into the model (as 'worldviews' these are found in the literature to underlie environmental perceptions). In the second stage, the measure of pro-environmental identity and dummy variables for the myths of nature 'climate resilient' and 'climate ephemeral' were entered into the model. Results are shown in tables 10.15 and 10.16.

Table 10.15: Regression of cultural theory and identity measures on cold winters as evidence against climate change[89]

	B (S.E.)	β
Step 1		
Constant	2.54 (0.05)	
Egalitarianism	-0.18 (0.05)	-.17***
Individualism	0.27 (0.05)	.25***
Step 2		
Constant	3.25 (0.17)	
Egalitarianism	-0.08 (0.05)	-.07 (ns)
Individualism	0.20 (0.05)	.19***
Pro-environmental identity	-0.21 (0.05)	-.22***
Climate ephemeral	-0.22 (0.15)	.14 (ns)
Climate resilient	0.99 (0.20)	.22***

R^2=.09 for step 1; change in R^2=.11 for step 2. *** p<.001.

[89] Question wording: 'The pattern of cold winters in recent years, suggests that climate change may not be happening'

Table 10.16: Regression of cultural theory and identity measures on cold winters as evidence for climate change[90]

	B (S.E.)	β
Step 1		
Constant	3.32 (0.05)	
Egalitarianism	.24 (0.05)	.23***
Individualism	-.14 (0.05)	-.13**
Step 2		
Constant	2.17 (0.17)	
Egalitarianism	0.09 (0.05)	0.09***
Individualism	-0.08 (0.05)	-0.07 (ns)
Pro-environmental identity	0.33 (0.05)	0.34***
Climate ephemeral	0.25 (0.15)	0.07 (ns)
Climate resilient	-0.69 (0.19)	-.16***

R^2=.07 for step 1; change in R^2=.15 for step 2. *** p<.001, ** p<.01.

Where egalitarian/individualist cultural theory types are considered alone, these are strong predictors of the means by which climate change is interpreted via the weather. Individualism is associated with perceiving cold weather events (specifically, the recent 'pattern of cold winters') as disconfirming the reality of climate change. Egalitarianism is associated with perceiving cold weather events as demonstrating the reality of climate change.

Where additional measures are included in the regression models, individualism remains a strong predictor of the discomfirmatory interpretation of cold weather; furthermore, subscription to a view of climate as resilient is also predictive of this. Pro-environmental identity is influential in the opposite direction.

In the case of the interpretation of cold weather events as demonstrating the reality of climate change, as well as egalitarianism as a significant predictor, additional predictors are pro-environmental identity, and (negatively) the view of climate as resilient.

[90] Question wording: 'The pattern of cold winters in recent years, suggests that climate change may now be a reality'

10.4.8 Scepticism and the University of East Anglia controversy

Respondents were asked towards the end of the survey whether they recalled anything about the so-called 'Climategate' controversy (though this term was not used in the survey)[91]. (Note that the survey was administered in early February 2011; the news story was perhaps most prominent in November/December 2009).

Just over half the respondents (52.4%) reported hearing either 'a little' (24.4%) or 'nothing at all' (27.8%) about this; 24.5% 'a reasonable amount', 13.9% 'a lot', and 9.2% 'a great deal'. There was no significant correlation between the amount people reported hearing about the controversy, and the measure of 'self-identifying' scepticism[92] ($r=.07$, $p=.13$); nor was there a significant correlation between the amount people had heard and egalitarianism ($r=.01$, $p=.82$) or individualism ($r=-.04$, $p=.38$). These results are contrary to expectations, but may be taken as indicating that the story was not attended to (or recalled) more by sceptics than non-sceptics, or according to cultural theory type.

Of the 200 respondents who gave an answer to the follow-up open-ended question, 108 of these referred to the content of the story or their perspectives on it (others noted simply "something on the news", "vague recollection" or similar). The full list of the more substantial 108 responses is given in Appendix 10.9. A majority of the responses (74 of 108) made reference to dishonest or poorly conducted science. Given that the question asked "what did you hear [about the story]?" it is not clear whether many of the responses given relate to participants' own impressions, or to the way they perceived the story as being reported. Nevertheless, a negative portrayal of climate science is found across these responses. Some illustrative examples are given below:

- "Certain data were exaggerated by scientists to back their claims"
- "Data was manipulated, statistics were misinterpreted"
- "False figures and scaremongering to get grants"
- "That they had fudged their results to fit in with the popular theory of climate change happening and it was all the human race's fault"

[91] Respondents were asked: "How much do you recall hearing or reading about news stories during late 2009/ early 2010, where it was alleged that climate scientists had acted dishonestly in the course of their research?" Responses varied from 'a great deal' to 'nothing at all'. They were then asked an open-ended question: "If you have come across this news story, what did you hear or read about it?"

[92] 'I consider myself to be a climate change sceptic'

A smaller 9 of 108 responses were in terms that emphasised the *reporting* of the story in negative terms, or the political dimension of it. For example: "One email taken out of context and blown up by the media"; "I only skim-read the article, dismissing it as alarmism".

There were also a small number of responses (7 of 108) emphasising support for climate science against scepticism/ 'denial', e.g.: "UEA scientists, this was conjured up by sceptics who were paid by oil companies to discredit them"; "I think there was misunderstanding about a certain document that led to climate change sceptics citing this as ruse to mislead the public".

Three items in the main part of the survey, were designed to relate to the UEA controversy. Two of these did not receive strong agreement, although minorities in accordance were still fairly sizeable: 17.2% agreed or strongly agreed that 'climate change is a scam' (around 60% disagreed); an identical 17.2% agreed or strongly agreed that 'scientists have hidden research that shows climate change is not serious' (31% disagreed). However, a higher proportion were of the opinion that 'scientists have in the past changed their results to make climate change appear worse than it is': fully 36% agreed/ strongly agreed with this statement, with only 21% disagreeing/ strongly disagreeing[93].

[93] Means and standard deviations for these items are as follows: 'scam' item: mean=2.37, SD=1.20; 'hidden research' item: mean=2.78, SD=1.02; 'changed results' item: mean=3.24, SD=1.08.

CHAPTER 11 DISCUSSION AND INTERPRETATION OF FINDINGS

This chapter draws together the findings from the qualitative and quantitative phases of the research, and interprets these in light of theory and prior research. Findings are considered in turn for each of the discourses identified, with an emphasis upon how public understanding of climate change has changed or persisted over time. Implications for theory, and for policy and communication are considered, as are areas for future research. Finally, I reflect upon the methodology applied to generate the findings of the present study.

11.1 Study aims, research questions and main findings: a summary

Before proceeding to discuss the findings of the thesis in detail, I review here its main aims and research questions, and summarise the key findings of the research.

The thesis aimed to understand the commonplace ways in which climate change is understood by members of the UK public, and how these have changed or persisted over time. As such, the overarching research question for the thesis has been: *How has public understanding of climate change altered, and how has it shown continuity, over the period 1997-2011?*

This research question was subdivided into three domains, giving rise to the following three sub-questions:

- How is climate change understood as a *physical* phenomenon, and what changes and continuity are observed in this over time?
- How is climate change understood as a *social and societal* phenomenon, and what changes and continuity are observed in this over time?
- How is climate change understood as a *personal* phenomenon, and what changes and continuity are observed in this over time?

I have argued that climate change is understood as a *physical* phenomenon with respect to its being seen as a 'scientific' problem, in terms of people's use of informal evidence to appraise its reality and causation, and with respect to how ideas about the natural world and natural systems are applied.

The present study finds that perceived levels of scientific uncertainty about climate change have remained high – even increased over time. I have pointed also to the emergence of a view that climate science is 'position-dependent', in that it is seen to be characterised by different 'sides' rather than as seeking a unitary truth. The 'UEA controversy' in late-2009 was recalled in negative terms, though limited evidence was found that this was a watershed event for public perception.

Over the past fifteen years, participants are found to draw on a range of informal evidence to appraise climate change. There has been a move away from the use of direct, sensory evidence (e.g. the weather) towards more abstracted/quasi-technical evidence. A concern with the *causation* of climate change has also become more important, relative to a concern with its *reality*. The study also finds evidence against the suggestion that recent cold winters were interpreted as evidence against climate change.

The idea that climate is bound up with natural systems, is identified across the data analysed. The notion of a climate 'myth', as proposed by some cultural theorists, is partially supported; however the present study argues for an amended version of this concept. As with the use of informal evidence, the study finds that a view of climate as part of nature is used increasingly over time to appraise the causation rather than reality of climate change.

I have argued that climate change is understood as a *social and societal* phenomenon with respect to its being seen as a social dilemma, in terms of the relationships between social actors in responding to it, and with respect to ideas about how lifestyles and social practices have given rise to climate change.

The present study finds that across the time period, climate change is consistently recognised as a complex social dilemma; but also that there has been an increasing politicisation over time in how this is construed (including with reference to the 'Copenhagen Conference' in 2009).

The primary means by which relations of responsibility are understood in the context of climate change, is in terms of state actors (government) having agency over a responsive and passive citizenry. There is some evidence however for a move over time towards an emphasis upon individual agency and responsibility.

Climate change is understood as an outcome of long-term trends in how everyday lives are lived, for example with respect to the rise in consumerism. Whilst climate change is often attributed to deleterious changes in ways of living, the study finds that pro-environmental practices, too, are coming to be seen as more normal.

I have argued that climate change is understood as a *personal* phenomenon with respect to the view that acting upon it is contingent upon human nature, and in terms of the ways in which people's own actions are seen as needing to be justified and explained.

The present study finds that across the time period, common sense ideas about the thinking about behaviour of others, are applied to explain and evaluate action on climate change. The idea of climate 'denial' is also found to have entered public discourse in more recent data.

An increasing emphasis is identified across the datasets upon a moral component to climate-relevant behaviour, and how this gives rise to a demand to account for one's own actions. However, a sense of climate change 'fatigue' is also observed in the most recent data.

Two further ways of understanding climate change are identified: in terms of its being an 'environmental' issue, and as an ethical concern (these are considered to be 'hybrid' discourses). Across the time period, climate change is consistently understood as an environmental issue, although the particular association between climate change and stratospheric ozone depletion has declined over time. There is continuity in how ethical principles are applied to climate change over the time period: ideas of justice/fairness, and intergenerational obligations are salient across the data.

11.2 Detailed discussion of findings

Public understanding of the scientific basis of climate change

Analysis of qualitative datasets from 1997 to 2010, shows substantial consistency over time within the *status and practice of science* discourse, concerning how perspectives on science are drawn upon to make claims about climate change. Whether to assert that climate change is uncertain and its origins unclear, or to attest to its reality, human causation and importance, participants from all years emphasise scientific concepts as underpinning their understanding. Evidence from the 2011 survey data, too, point to the salience of these concepts. In the majority of cases where respondents gave an explanation to an open-ended item accounting for their own changes in perceptions over time, this was articulated in terms of science-related concepts.

Albeit that the case has been made in a number of places now that climate change is more than 'science' (Pettenger, 2007), perspectives on (climate) science remain integral to public understanding. Moreover, the understanding of climate change as a scientific matter is aligned with a particular view of science. In both the qualitative and quantitative data, and across all years,

entirely divergent conclusions may be drawn about the very fundamentals of climate change – nevertheless, a view of (climate) science as a process which produces certainty (cf. Collins, 1987) is commonplace throughout. Public perspectives on climate change draw heavily on the (modernist) idea that science entails a rational and objective approach, which aims to determine a 'true' picture of the world (Bauer et al., 2000)[94].

A discourse which sees climate change as most appropriately the domain of experts with the authority to make definitive knowledge claims, is in cultural theoretical terms most closely aligned with a hierarchist worldview (Thompson et al., 1990; West et al., 2010); a perspective on climate science which is characterised by being "willing to defer to a higher authority" (Jordan and O'Riordan, 1997:32). This said, the unique position afforded to science here is restricted to the narrow question of determining physical causes and consequences; in the personal and societal domains, reference to scientific expertise is all but absent. Furthermore, any such deference to science even in the making of limited epistemic claims, is tempered by frequently expressed doubts about what climate science does – and can – know.

Given the centrality of science to public perspectives, it is important that the present study finds that perceived levels of scientific uncertainty about climate change remain high – and may even be increasing. Whereas not a single respondent in Poortinga and Pidgeon's (2003) original research referred to scientific uncertainty as a first association with climate change, this was the case for a minority in the replicated 2011 survey item. In addition, significantly more respondents perceived there to be 'conflicting' and 'unreliable' evidence in the 2011 survey data than did in 2003. In line with the findings of Spence et al. (2010) the present study finds that the proportion of respondents accepting even basic premises of climate science – that the climate is changing and that this is in part due to human activities – has declined since the mid-2000's. Across all years of the qualitative datasets, assertions can be found both that climate science is established and consensual – but also that limitations in the evidence base and capabilities of climate science mean that extensive uncertainty persists even on basic matters. Such findings are in line with longitudinal research by Smith and Leiserowitz (2012) in the USA, finding that 'naysayer' (i.e. sceptical) associations have risen over the period 2003-2010.

As I was careful to note at the start of the thesis, caution should be exercised where asserting there is 'consensus' among the climate science community in any blanket way. Nevertheless, agreement

[94] As Demeritt (2006:455) notes in the context of climate change: "although logical positivism is now largely exhausted as a philosophical project, the pious reverence for science it encouraged lives on".

among climate scientists concerning some fundamentals is very high: the vast majority are convinced that climate change is occurring now; most consider recent and near-future climate change to be driven (at least in part) by anthropogenic causes; a large majority are convinced that climate change poses a 'very serious and dangerous threat to humanity' (Bray and von Storch, 2010; Rosenberg et al., 2010). In addition, the IPCC position has strengthened in recent years on such matters[95]. What then might explain the persistence of public uncertainty about the science of climate change across the same time period?

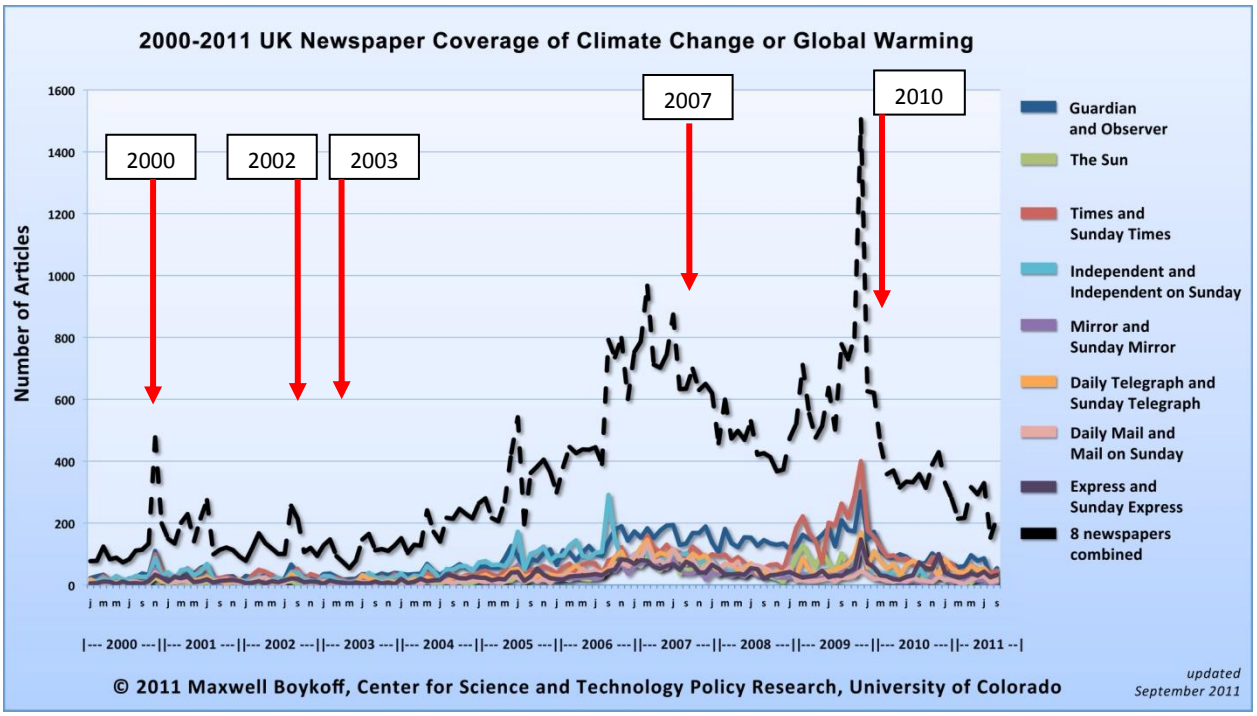
A novel finding of the present research is an increase in what I have termed 'position-dependence': that over time, knowledge about climate change has come to be characterised by opposing 'sides', each with their own *version* of the truth – rather than that such 'truth' is a singular entity to be attained. This, I suggest, represents a move from the model of (climate) science/expertise described above, where absolute certainties can be known, towards a model characterised by relativism and inherent uncertainty. In this, public understanding of climate change has followed a pattern which has been identified elsewhere in the sociology of science literature. As Sarewitz (2004) notes, the growth of bodies of scientific knowledge, created specifically to resolve dispute and uncertainty, has often been accompanied instead by growing controversy. In the case of climate change, a number of scholars have now argued that knowledge produced by science cannot be independent of value positions and how science is embedded in society (e.g. Jasanoff and Wynne, 1998; Lorenzoni et al., 2007b). What I argue here, is that a perspective of science in these terms has now also begun to enter *public* understanding of climate change.

With respect to the way in which the wider context may have influenced this trend, it is striking how the level of media reporting about climate change has altered over the past decade. As shown in figure 11.1, there have been dramatic changes in absolute levels of media coverage of climate change from 2000-2011[96].

[95] The most recent (2007) synthesis report states that: "warming of the climate system is unequivocal" and that "most of the observed increase in global average temperatures since the mid-20th century is very likely [90 to 99% probability] due to the observed increase in anthropogenic greenhouse gas concentrations", with a range of effects on human and natural systems more than likely (with most, though not all, of these being detrimental).

[96] The figure is used with permission of the University of Colorado at Boulder, Center for Science and Technology Policy Research, and is cited as Boykoff (2011).

Figure 11.1: Newspaper coverage 2000-2011 and timing of research projects



As Boykoff and Smith (2010) note, climate change coverage up to 2010 underwent a 'hockey-stick' type transformation: whereas media reporting was generally below 200 articles per month across all UK newspapers until the middle of the decade (i.e. corresponding to the 1997-2003 datasets), prior to 2007 this accelerated to between 800 and 1000 articles per month; followed by a new explosion of media interest at over 1500 articles per month towards the end of 2009 – directly preceding the 2010 Bristol focus groups.

Given that climate scientific knowledge is frequently portrayed by the media in contested terms (where voice is given both to 'sceptic' and 'believer' perspectives: cf. Boykoff and Boykoff, 2004) the multiplying effect of an increased volume of such portrayals is likely to have contributed cumulatively to a view of a contested, confused – and possibly even irreconcilable – field of climate science. According to Leahy and Mazur's (1980) 'quantity of coverage' theory, it is not detailed coverage of news stories that people attend to, but rather the extent of coverage, and the repetition of simple images and ideas; Mazur (2006) argues in the context of this theory that a range of environmental issues demonstrate an alignment between levels of coverage and public attitudes. Recent research by Brulle et al. (2012) in the USA, using time-series analysis of public opinion, media reporting and other data, suggested that media coverage of climate change had an important effect on public perceptions (although these authors argued that media coverage was itself largely a function of elite cues and economic factors). With respect to the comparable issue

of biotechnology, Gaskell et al. (1999) have argued that the consistent upward trend in media coverage in the second part of the 1990's was influential upon public opinion, including in terms of changes over a three-year period in the salience of 'menacing images' of biotechnology.

In the case of climate change, not only has there has been a huge expansion of news coverage (albeit abated since 2011) but the tone of a portion of this coverage has been in terms of science controversy and dispute; the discourse of sceptics has in particular attacked the authority of climate science (Nerlich, 2010). Given the media is a primary source of information about climate change (O'Neill and Nicholson-Cole, 2009; Butler and Pidgeon, 2009) this character and quantity of reporting will likely have played a part in maintaining a view of uncertainty in climate science, even as more formal institutions such as the IPCC become ever more unequivocal.

A specific event occurring in late 2009/2010, that goes to the heart of questions of science practice and credibility, was the controversy surrounding the conduct of the Climatic Research Unit at the University of East Anglia (UEA). Allegations of impropriety at UEA were much-reported (Gavin and Marshall, 2011) and it has been argued (e.g. Spence et al., 2011a)[97] that this may have influenced public perceptions about climate change. However, there has previously been little or no direct evidence to this effect (a partial exception in the USA is Leiserowitz et al., 2010).

In the 2010 focus groups, held only shortly after the UEA controversy was prominent in the news, views were also expressed that point to an adverse effect on perceptions, although these were relatively rare. Equally, the retrospective change in views item on the 2011 survey found that the sample overall did *not* indicate they were less trusting of climate scientists than in the past, although the story was recalled in terms which often portrayed climate science in negative terms. Surprisingly, the survey found no direct link between how much people reported hearing about the story and self-declared scepticism or levels of climate change concern, nor between exposure to the story and cultural theory type – suggesting that the UEA controversy was neither demonstrably deleterious to climate perceptions, nor was it selectively attended to or recalled by people. Nevertheless, it was unexpected that levels of agreement about scientific conduct in general terms were high: fully 36% of respondents (strongly) agreed that 'scientists have in the past changed their results to make climate change appear worse than it is'; a lower 17% (strongly) agreed that 'scientists have hidden research that shows climate change is not serious'.

[97] These authors suggest that: "the media controversy generated during the winter of 2009–2010 concerning e-mails from climate scientists at the University of East Anglia… might additionally have served to reinforce uncertainty and scepticism amongst some sections of the public" (Spence et al., 2011a:2)

In line with the 'asymmetry principle' of trust (Slovic, 1993; Poortinga and Pidgeon, 2004) such negative events as the UEA controversy are likely to undermine trust in climate science more than will equivalent positive events reinforce it – though the results of the thesis suggest that the consequences of this particular event should not be overstated. Instead, I suggest that it is important not to portray public understanding as uniformly doubtful: an additional novel finding of the present study is that, exclusively in the more recent (2007 and 2010) qualitative datasets, percentage figures (e.g. "90% of scientists") are used to assert levels of scientific certainty and consensus by research participants; similarly, whilst *un*certainty remains high, still large majorities recognise that climate change is both occurring and has an anthropogenic component.

Direct experience and appraisal of climate change

It has been previously noted in the literature that there is a tendency to relate weather to climate. This has been variously suggested to be connected with 'image associations' (Lorenzoni et al., 2006); to constitute a commonplace notion about the impacts of climate change (Whitmarsh, 2009a); that people "confuse weather and climate" (Upham et al., 2009:7); and to be an incorrect 'conflation' (Bostrom and Lashof, 2007).

Drawing on social representations theory, Smith (2009) argued that the notion of strangeness and unpredictability of weather in the UK functioned to make climate change tangible and concrete – in social representations terms to 'anchor' climate change to pre-existing mental schema. Smith argues that the idea of a 'contravention of the natural' is central to people's social representation of climate change, with local impacts in terms of weather and seasonality particularly salient. Nicholson-Cole (2005) has also suggested that a reliance on personal experiences (including the weather) may be an attempt to identify the abstract nature of climate change with the familiar and concrete[98].

The results of the present study partially support these ideas. Across the qualitative datasets, participants referred to changes to, and abnormality in the weather and seasons: such as to seasonal 'merging', or reference to weather being 'haywire'. In addition, almost half (45%) of 2011 survey respondents agreed that 'I personally have become aware of climate change, through noticing changes to the weather'. However, I also argue that reference to these notions are situated within a wider discourse which incorporates a range or other direct, proxy or vicarious evidence –

[98] This author does not explicitly refer to social representations theory, framing her results instead in terms of 'visual representations'.

and importantly, that this evidence is *used* in a variety of ways to appraise the veracity and characteristics of climate change, in a way not explained by social representations work.

The results of the discourse analysis in the thesis, suggest that people are applying what Tytler (2001) has termed 'informal evidence': that which is concerned with common sense, circumstantial evidence and personal experience. At times informal evidence is used to illustrate the self-evidence of climate change and its effects, but frequently is applied to critically appraise climate change to draw conclusions in a common sense manner. The use of this everyday, 'informal empiricism' (as I term it) is akin to the practical reasoning processes undertaken with respect to other environmental issues. Horlick-Jones et al. (2007:83) have suggested for example that practical reasoning (here in the context of GM food) entailed "lay people… utilizing various modes of reasoning and making use of a range of interpretative resources at hand to interrogate evidence" which in their character "appear to have certain similarities with the work of everyday scientific investigation".

The difference between the use of an informal empiricism discourse as 'practical reasoning' applied to climate change, and of a social representations interpretation is demonstrated by a further distinction between the present study and Smith (2009). Both the present study and Smith's research finds that people compare present weather patterns to those remembered from the past. Smith (2009:236) argues that as a social representation, this is best conceptualised as nostalgia, whereby "individuals construct a representation of idealised weather based on romanticised recollections of the past", the nostalgic characteristic of which can function as a coping mechanism. I argue however that comparative reference to weather is again part of an appraisal of the veracity of climate change, where the past is contrasted with the present to gauge levels and types of change[99]. These two interpretations of the presence of weather-related notions (social representations and informal reasoning) are not necessarily mutually exclusive, however do emphasise different *functions* of how commonplace ideas about people's immediate experiences and knowledge are applied.

The longitudinal analysis also finds that there has been a gradual move away from the almost exclusive use of direct, sensory evidence (especially the weather) in earlier qualitative data, to incorporate various quasi-scientific and more technical/ abstracted/ vicarious material. In later groups, participants refer, for example, to the hypothesis that sun spots are behind climate change; to acquaintances' assertions about the 'real' meaning of temperature readings; to the quasi-

[99] For example, a 2000 participant asserts their doubts about climate change by arguing: "not that many years ago… we all said 'oh dear, climate change is going to mean desert everywhere' [and] of course we have this summer roll up and… there's lakes all over the place".

experimental situation after 9-11 whereby a widespread grounding of planes was argued to have lead to temperature increase; to a common sense reasoning that given the planet has spent millions of years sequestering carbon then consequently its release via fossil fuels will be harmful; etc. The trend identified in the qualitative data is partially supported by evidence from longitudinal survey analysis: significantly fewer respondents in 2011 than 2002 made reference to weather/seasonal notions as a first association with climate change; whilst this result does not point directly to the application of these ideas, it does suggest a decrease in the salience of a view of climate-as-weather.

The move away from an appraisal of climate change largely in terms of the weather, to one incorporating a more eclectic range of sources and ideas, points to a diversification of the ways in which climate change is understood as a physical matter. Albeit that increased knowledge of the physical aspects of climate change need not necessarily be 'correct', nevertheless the present study indeed also finds a sharp increase over time in how well-informed people consider themselves to be over the past ten years; this is in line with work by Reynolds et al. (2010) who find an increase to 2009 in levels of awareness and understanding of physical causes of climate change.

It seems highly likely that the broadening out of public understanding in this way is connected to a process whereby climate change has over time become a more familiar and popularised issue – whether in terms of increased coverage in the popular press (as discussed above) or through other channels such as in film, internet and celebrity involvement (Reid, 2009; Gavin, 2009; Boykoff and Goodman, 2009). The paradox arising from the findings of the present study, however, is that as people have over time incorporated a more complex range of ideas about climate that go beyond a simple (and erroneous) association with 'weather', at the same time these notions may be used in ways that are themselves problematic, as people find they are empowered to interrogate and challenge the received wisdom about climate change.

A case in point, and a parallel trend identified in the informal empiricism discourse over the research data, is its application to question the causation of climate change. A distinction is found between the earlier datasets, where informal evidence mostly corresponding to weather-related events is used to demonstrate or question the *existence* of climate change, and the later datasets, where informal evidence is used to question the *causation* of climate change. The conclusions of the practical reasoning employed in this manner may vary (i.e. inferring that climate change is human or natural) but I argue that it is significant in itself that these considerations are seen as a domain appropriate for practical reasoning. I also argue that this application is also distinct from a visual or social representation (or an association or conflation) because it treats informal evidence as part of

a structured argumentation, whereby conclusions can be drawn about climate change in common sense ways.

One way in which practical reasoning processes may have been expected to be employed, is with respect to the anomalously cold winters in the UK in 2009/2010 and 2010/2011. Some have suggested (or assumed) that the experience of these events may have underlain an apparent decline in belief in climate change, with cold weather seen as counter-evidence to a supposed 'warming' effect. Griggs and Kestin (2011:140; writing in *Climate Research*) for example refer to "the relatively cold and snowy winter of 2010 in Europe and the eastern United States, which was used to bolster arguments that the world has not warmed since 1998"; and Perkins (2010:38; writing in *Nature Climate Change*) suggested that "the icy conditions of winter 2009/2010 in Europe caused some public confusion over the extent to which the climate is changing".

It is an important finding of the present study that this line of reasoning is *not* found to be prevalent. In the Bristol 2010 focus groups, there was very little suggestion that recent cold weather events (most focus groups were held in March) were interpreted in this manner. It was for this reason that items were included in the 2011 survey to examine how cold weather events were interpreted. As predicted, more people saw these cold weather events as suggesting that climate change is a reality, than as being some form of disconfirmation (by a ratio of around 3:1).

Further analyses also reveal that – as predicted – the means by which these weather events were interpreted, were influenced by environmental identity and cultural biases: individualism was a strong predictor of the view that cold winters are evidence *against* the reality of climate change; egalitarianism and pro-environmental identity were strong predictors of the view that cold winters are evidence *for* the reality of climate change. That identical weather events are interpreted in differing ways dependent upon pre-existing values, points to biased assimilation (cf. Lord et al., 1979)[100], an effect which has already been demonstrated in the interpretation of expertise in climate science (Kahan et al., 2011; Xenias et al., 2011) but not previously for the interpretation of weather as evidence for/against climate change.

[100] These authors note that: "people who hold strong opinions on complex social issues are likely to examine relevant empirical evidence in a biased manner. They are apt… to draw undue support for their initial positions from mixed or random empirical findings". (Lord et al., 1979:2098)

Climate as part of a mutable natural order

The idea of climate – and of climate change – conceptualised as part of discrete 'myths of nature' has been previously proposed by a number of authors, particularly as an extension of cultural theory (cf. Hulme, 2009:188; Thompson, 2003; Thompson and Rayner, 1998). By this framework, people are seen as understanding climate change either as 'ephemeral' (fragile, delicate, vulnerable to human influence), 'benign' (stable and resistant to perturbation), 'perverse/tolerant' (resilient to a point, if suitably managed), or 'capricious' (fundamentally unpredictable). These myths of nature are theorised to be present as correspondences with particular worldviews, as ways of legitimising different social relations and perceptions of risks.

Despite an extensive literature proposing these characteristics and connections with respect to climate change, there has however been a very limited amount of empirical testing or exploration of the theory in these terms (Meader et al., 2006). Whilst Lowe (2006) did obtain limited support for the typology described above using survey methodology, less work still has explored whether the four myth types are found to map onto people's understanding of climate change in an unprompted (i.e. qualitative) manner.

The present study finds that public understanding as part of the *climate as nature* discourse is consistent in some ways with characterisations in the literature. As predicted, there was a significant association between 2011 survey respondents' scores on cultural theory preferences and the particular climate myth to which they subscribed (egalitarianism corresponded to a 'climate ephemeral' myth; individualism to a 'climate resilient' myth). However, the qualitative data suggest that the most commonplace ways of conceptualising climate change have qualities which differ from the prototypical 'myths' derived from cultural theory. Participant portrayals across the datasets regularly incorporate notions of *cyclicality* and the intrinsically *mutable* nature of climate, neither of which are proposed by cultural theory. Nor indeed does the myths of nature paradigm point to routine portrayals of climate change occurring across very long *timeframes* (e.g. incorporating ideas about ice ages and planetary evolution) – which may consequently portray humanity in rather diminutive terms.

In addition, whilst portrayals of climate change would be expected to correspond in roughly equal measure to the four 'myths' proposed, there is instead substantial similarity both within and between years in participants' structuring of these concepts. Analysis of the 2011 survey data furthermore suggests that propositions characteristic of the *climate as nature* discourse, are prevalent and have become increasingly salient over time. An item measuring the extent to which climate change was seen as 'just a natural fluctuation in Earth's temperatures' showed a marked increase in

agreement between 2003 and 2011; a new item designed to correspond more closely to the discourse identified above – stating that 'current climate change is part of a pattern that has been going on for millions of years' – was (strongly) agreed with by over half the sample (55%)[101].

The substantial – and increasing – level of accordance with these ideas, is problematic to account for in terms of cultural theory; as O'Riordan and Jordan (1999) note, it is unclear by this framework why individuals would adopt a particular myth of nature, or change from one myth to another during their lifetime. From a social representations perspective, the alignment of the features described above, may be argued to constitute an 'anchoring' of the (previously unfamiliar) idea of climate change to more familiar, pre-existing concepts of nature, such as its transformation over geological timeframes. Indeed, the results of the present thesis suggest that within public discourse underlying notions of 'natural' climatic variability are salient, and grounded in long-lasting cultural ideas. In addition, a further trend identified from the longitudinal qualitative analysis, was a change over time by which the *climate as nature* discourse was increasingly applied to challenge an anthropogenic component to climate change: this suggests a potentially important role for these ideas in contributing to doubts about human causation of climate change.

The idea of an understanding of climate change aligned with a nature 'myth' is thus supported by evidence of thesis, but shows important variation from prior conceptualisations. Future research and theorising, I suggest, would benefit from modification of myths of nature characterisations, where used in the particular context of climate change. The concepts used and accorded with, by participants in the present study instead have features in common with a 'flux of nature' metaphor outlined by Ladle and Gillson (2009) whereby nature is seen as "dynamic, changing and complex" (Ladle and Gillson, 2009:230).

Climate change as a social dilemma

That climate change constitutes a social dilemma, whereby the collective good of maintaining a stable climate is undermined by the 'self-interested' actions of many individuals, is well-recognised in the literature (Irwin, 2009); research paradigms drawing on the social dilemma literature have been applied to test and explain individual behaviour under these circumstances (e.g. Milinski et al., 2007). The idea of a social dilemma of climate change has also been argued to feature in the public's own understanding; for example, Lorenzoni et al. (2007a:451) identify a social barrier they

[101] Only 11% disagreed, and just 1% strongly disagreed.

term "worry about free-rider effect", and Fischer et al. (2011) argue that people regard human ability for cooperation to be limited; Whitmarsh (2005) also found that research participants saw climate change as a collective problem at the same time as having little faith in others sharing responsibility.

As with previous research, the present study finds that public understanding of the social and societal nature of climate change recognises problems of free-riding and informal notions of climate change as a 'tragedy of the commons' (cf. Hardin, 1968). In addition, the complexity of a social dilemma interpretation is elucidated in new detail by the present study: social dilemmas are seen to derive from fundamental (even Darwinian) human nature; as rooted in privileges of wealth or power (such that where one's own position is secure, there will be lack of concern for others); as having multiple loci (e.g. different nations have a variety of reasons not to cooperate); as rooted in conditional reciprocity ('I won't unless you do') and the consequences of lack of reciprocity ('I can't if you don't'); as operating across multiple scales (individual-individual but also individual-nation and individual-global); as rooted in inequity; and as relating to the conflicting interests of multiple social actors. The portrayal of climate change in these terms is found to be consistent across the 1997-2010 period. In addition, from the results of the 2011 survey it is clear that a general social dilemma view of climate change is plausible and commonplace: fully 79% agreed or strongly agreed with a novel item designed to portray a dilemma of 'conflicting interests', with just 4% of the sample disagreeing[102].

Despite the prevalence of social dilemma perspectives, I also argue based on both the qualitative and quantitative findings, that a pronounced 'anti-dilemma' perspective can be identified: an important and hitherto underreported feature of public understanding. Across the 1997-2010 datasets, are found assertions that individual action, even in the context of a wider social dilemma, is both normatively and instrumentally important. The salience of this perspective is supported by results from two further survey items designed to test the prevalence of 'anti-dilemma' perspectives, both of which receive high levels of agreement. Indeed, near-universal recognition of climate change as a social dilemma in *general* terms is not paralleled in *personal* terms: less than one in seven (13%) of survey respondents (strongly) agreed that 'there is no point in me doing anything about climate change because no-one else is', and more disagreed than agreed that 'the actions of a single person don't make any difference in tackling climate change'.

[102] 'Climate change is hard to address because there are so many people on the planet pulling in different directions'

These findings run counter to arguments made in the literature that the recognition of climate change as a social dilemma necessarily undermines self-efficacy, as proposed by Lorenzoni et al. (2007a). A similar argument is also made by Gifford (2011) who states that because climate change is a collective action problem (cf. Olson, 1965) consequently individuals believe that personal action is irrelevant (i.e. self-efficacy is lacking); Pidgeon et al. (2008) also suggest that the collective and complex nature of climate change is likely to result in perceived low personal efficacy.

The unique insight offered from a discursive perspective, is that *both* ways of understanding climate change are compatible: it is built into the complex nature of public understanding that climate change is at one and the same time a seemingly intractable social problem; but also that there remains an imperative and purpose to individual action even where this social dilemma is acknowledged. Discourse analytic perspectives emphasise that people adapt their accounts dependent upon circumstances, and that as such there need not be consistency in how these accounts (in this case, accounts of the social nature of climate change) are constructed (Willig, 2008). Potter and Wetherell (1987) point out that this variation is linked to the function to which discourse is put, and that these may be both descriptive and/or deliberately applied in argumentation. With respect to climate change, its general nature therefore may reasonably be *described* as a collective dilemma (as indeed is often done by scholars) and yet responses may be *advocated* in terms which emphasise the need for, and obligation upon, individuals to contribute to its resolution. The assertion made across datasets in different years, that one should 'do your bit' is presented in terms of such an advocated response: as being both cumulatively meaningful and in connection to personal responsibility within wider society.

The differing discursive constructions of climate change as a social dilemma, also point to different ways of conceptualising efficacy at the individual and collective level. For example, the 'anti-dilemma' perspective identified in the present research corresponds in part to the notion of 'collective response efficacy' (judgements as to whether collective actions can achieve collective goals) which, as Koletsou and Mancy (2012) note, has so far received limited research attention in the context of individual mitigation actions towards climate change. It also expresses a personal obligation to act on behalf of others as well as oneself, which as Myers (2007) has argued is a commonplace argument used by people where responding to moral and social dilemmas.

I argue that public understanding of the social dilemma of climate change is complex, yet has shown consistency over the time period over which data is analysed here. However, one means by which a change over time can be identified, is in terms of an increasing politicisation in the way in which the social dilemma of climate change has been portrayed. Particularly in the more recent

(2007 and 2010) focus groups, reference is made to social dilemmas at national level: these include the arguments that whilst reduced consumerism may be beneficial for mitigating climate change this would be at the expense of national economic growth; and that financing international climate mitigation schemes (such as avoided deforestation) would be problematic for being at the expense of domestic spending.

The permeation of these types of consideration into the social dilemma discourse, is likely a reflection of a process of increasing politicisation and attention by policy makers to climate change. Over time, an accumulation of political activity within the UK and internationally has kept climate change on the political agenda: Hulme and Turpenny (2004) trace the development of policy initiatives from the UK's signing of the Kyoto protocol in 1998, to the publication of the UK's first national climate change policy programme in 2000, and the 2003 Energy White Paper (including a 60% national emissions reduction target). More recently, in 2008 the Department of Energy and Climate Change was instituted and the Climate Change Act became law (now including a legally-binding 80% emissions reduction target). Lorenzoni et al. (2008) suggest that a hallmark of the New Labour government (1997-2010) was an engendering of an environmental politics that saw 'green' policies as commensurate with economic considerations. Jordan and Lorenzoni (2007) furthermore argue that following the publication of the influential *Stern Review of the Economics of Climate Change* (Stern, 2006) there was an upsurge in the level of media and public (particularly activist) interest in climate policy.

It is almost impossible to detect directly within the qualitative transcripts reference to *particular* legislative or policy episodes. It is reasonable to propose, however, that a cumulative politicisation of climate change at a legislative level, has now begun to manifest in public discourse in the UK. In addition to the detectable instances in the more recent qualitative focus group data, responses to the 2011 survey also point to this interpretation. In response to an open-ended survey item concerning changes in one's own views, respondents refer, for example, to government use of energy taxes as a means to raise revenue, and the place of legislation in addressing climate change. In addition – and an exception to the lack of direct reference to political events – the Copenhagen Conference is referred to in social dilemma terms on a number of occasions in the Bristol 2010 focus groups.

The politicisation of climate change more generally has been noted by a number of authors (e.g. Weingart et al., 2000; Berkhout, 2010; Pidgeon and Fischoff, 2011), and the polarisation of public opinion has also been described in terms of a process of politicisation (particularly in the USA; McCright and Dunlap, 2011). However, the emergence of a perspective that climate change

constitutes not just a *social* dilemma, but a *political* dilemma also, has hitherto not been emphasised in public discourse: the present study's identification of this evolving set of ideas therefore represents a novel finding with respect to the development of public understanding over time.

Responsibility for responding to climate change

Public perceptions concerning responsibility for causing and addressing climate change have been a focus of previous research, including of the original studies whose data were re-analysed for the thesis. To a large extent, the theme of responsibility threads through many of the ways of understanding climate change, such as the social dilemmas discussed above. However, in the context of public understanding of individual responsibility in *relation* to other social actors, the present study identifies a salient and durable discourse across the 1997-2010 datasets. Following authors such as Bickerstaff et al. (2008) and MacNamee and Gergen (1998) I term this *relational responsibility* to reflect that the interdependencies between social actors – particularly between individuals and the state – are central to how responsibility is conceptualised within the discourse.

The most striking feature of the means by which relational responsibility is portrayed across the datasets, is that this is most commonly in terms of state actors and government having agency and authority over a passive and reactive citizenry. There are numerous depictions across the time period of qualitative data analysed that take this form; these assert that enforcement, encouragement, and education are the main tools at the disposal of governments to bring about change by individuals. At times these portray the relationship between individuals and government in rather stark terms: people are 'pawns' or 'cogs' that government should bring into motion. Two items in the 2011 survey designed to measure accordance with this type of understanding of responsibility were broadly accepted: twice as many respondents agreed than disagreed that 'in respect of climate change, it's up to the government to make individuals do the right thing'; and a still higher proportion agreed that 'as members of the public, we need those in power to put in place rewards and penalties to help us act on climate change'.

In cultural theoretical terms, the discourse of relational responsibility for the most part reflects a strongly hierarchical perspective on the societal response to climate change. As Thompson (2003:5111) argues, a hierarchist perspective on climate governance is one where people are considered "malleable... [and] redeemable by firm, long-lasting and trustworthy institutions" the function of which is to institute statutory regulation. Similarly, Jordan and O'Riordan (1997) note that the relationship between the body politic and public on the matter of climate change, is in

hierarchist terms one whereby people expect to be 'judged' and 'directed' and to accept the application of rules. These structures are argued to be *preferred* for maintaining a particular pattern of social relations corresponding to the hierarchist worldview. Douglas, for example, argues that the attribution of risk for environmental problems reflects underlying cultural biases held by individuals and groups (Douglas, 1992).

Whilst the relational responsibility discourse corresponds closely to one way of understanding societal relations as proposed by cultural theory, nevertheless it is problematic to account for the near absence of other ways which would be expected to manifest. Social relations as might be expected from cultural theory in terms of individualism, egalitarianism and fatalism, are rarely encountered in the qualitative data. There are some limited instances of research participants asserting a role for citizen activism or influence over politics, but even here this tends to be constrained to voting. A place for a self-organising and non-hierarchical exercise of responsibility – a characteristic egalitarian response – is restricted to the suggestion that one may influence acquaintances through encouragement or by setting a personal example.

Nevertheless, the finding of the present study – that a hierarchist understanding of responsibility is predominant – is aligned with other recent research: Bellamy and Hulme (2011) report that research participants most commonly advocated a 'top-down' approach to governance entailing regulatory approaches to address climate change – they conclude that this view is characteristic of hierarchist values. Räthzel and Uzzell (2009) have also noted that British research participants situate solutions for environmental problems at the level of government, in terms of its instituting incentives, laws and penalties[103]; and Bickerstaff et al. (2008) that participants placed responsibility upon government in terms of education, persuasion, and incentives, for the purposes of shaping people's behaviour to respond to climate change.

In discursive terms, it is possible to argue that these types of portrayal of relational responsibility, serve the function (for the speaker) of deflecting or attenuating personal responsibility. Clarke and Agyeman (2011:1773) for example have argued in the context of global environmental change, that research participants "shift environmental responsibility away from the individual onto 'institutional others'... to excuse or justify little or no personal action". Kurz et al. (2005:613) likewise argue that people's discursive constructions of energy act to "move responsibility away from the individual consumer". In the context of people's explanations for long-haul air travel,

[103] These authors contrast these British views with those of Swedish participants who are more inclined to assert individual responsibility; similarly, Harrison et al. (1996) find less active involvement of British citizens with environmental issues than is found in the Netherlands.

there are argued to be "powerful discourses that deny responsibility" (Dickinson et al., 2010:485). Whitmarsh (2005:222) also argues that "blame is used [by people] to deflect personal responsibility for climate change"; and Giorgi et al. (2009:49) suggest that among the public there is a "tendency to push the blame/responsibility onto others outside their immediacy".

An alternative explanation, is to suggest that rather than (or as well as) 'deflecting blame', public perspectives are also underpinned by a recognition of the complex interdependencies in society and the place of the individual therein; in other words, they reflect a view of the proper relationship between individuals and the state in the context of the large-scale, complex problem of climate change. Across the qualitative data analysed, participants do not simply deny or resist individual responsibility, rather it is situated in relational terms. Thus for example participants advocate particular measures such as fines for failing to recycle, grants to install solar panels, and improved public transport, which are portrayed as setting appropriate systemic conditions such that individual action can occur. Relational responsibility in these terms is often portrayed as reciprocal; as a negotiated and reasonable societal arrangement.

This nuanced understanding by people of how society 'works' has, I suggest, been rather overlooked in a literature which has often been more concerned with attributing a motive of evasion to public(s). At the same time, participant perspectives in the present study are also revealing of a view of personal agency which is seen as severely limited in respect of environmental problems that exist at a highly distributed and collective level. Despite increasing emphasis by policy-makers upon individual action with respect to climate change (Shove, 2010) people themselves are, in turn, critical of this; as Malpass et al. (2007:249) argue, there is "justifiable scepticism towards the whole frame of 'responsibility' that is being addressed to them". Similarly, as Pidgeon and Fischoff (2011:37) point out, the ascription by individuals to national governments and other powerful actors of the responsibility to deal with climate change, relates to people's concluding "quite sensibly" that "climate change is too big a problem for them to tackle as individuals alone".

Notwithstanding the predominant understanding of relations of responsibility as discussed above, with respect to changes in public understanding there is evidence for a shift in emphasis over the time period of the present study. There was a significant decline between 2003 and 2011 in the proportion of survey respondents referring to government action, where asked what could be done 'to tackle climate change'. A separate decline between 2003 and 2011 was also observed in the proportion of respondents referring to characteristic features of the relational responsibility discourse concerning enforcement/encouragement measures (e.g. taxes or financial incentives);

whilst not statistically significant, reference to individual action as a way of tackling climate change also increased over this same period. Within the qualitative data, a change over time was identified entailing a move from assertions made in normative terms (what government 'should' do) to assertions made in descriptive terms (what is happening).

Whilst it is not straightforward to triangulate the survey and qualitative data here, it is likely that both are connected to an increasing normalisation of personal pro-environmental behaviour, and of personal responsibility – relative to responsibility conceptualised in terms of top-down governance. As an emergent trend, it would be valuable for future research to examine whether and how further changes occur in perceptions of the balance of responsibility between government and individuals for addressing climate change.

The trend identified in the present study towards an emphasis upon personal action, can be connected to the sense that in recent years a number of iconic pro-environmental behaviours such as recycling have also become a commonplace, 'normal' part of everyday life (Barr et al., 2003; Moore and Burgess, 2011). This is explored further with respect to public understanding of lifestyles and social practices in the following section.

Lifestyles and social practice in the context of climate change

Whereas the relational responsibility discourse is concerned with intermeshing responsibilities within society, the *lifestyles and social practice discourse* embeds climate change in contemporary ways of living, and relates it to cultural pressures and expectations. Climate change is understood in terms of people's situation within consumerist and capitalist society, and to a culture of materialism and excess (cf. Urry, 2010). Ways of living are connected to the demands of work and home life, and to contemporary dependence upon technology. Importantly, individual responsibility is not rejected, rather it is again seen within a wider context: for example, consumer demand is seen as driving unsustainable behaviour, through creating wants and expectations by members of society.

This manner of understanding climate change is found across the qualitative data from 1997-2010. The survey data, too, provide evidence that perspectives characteristic of the discourse are salient at the present time: a majority of respondents (55%) agreed that 'climate change has come about because we are part of a society that requires us to consume more than we need' (only 12% disagreed).

It has been noted previously in the literature that individuals themselves recognise the place of cultural expectations and values leading to a sense of being 'locked in' to unsustainable ways of living (Jackson, 2005). Lorenzoni et al. (2007a) also report research participants' explicit identification of cultural expectations which require carbon-dependent lifestyles. Humphrey (2010) notes that Western nations are frequently conceptualised by both academics and lay publics as being locked into the patterns and logic of consumerism.

The present study supports and extends these types of interpretation. From the discourse analysis carried out, I identify a particular metaphor of 'pressure' across the 1997-2010 time period – whereby the demands and the constraints of time, money, work, and family/social life are argued to preclude the ability to adopt more sustainable lifestyles. The self-referent and reflexive way in which participants understand the way in which lifestyles are situated within culture, is also emphasised in the analysis – that even whilst offering critiques of what are considered problematic features of consumer culture, participants at the same time acknowledge themselves subject to its appeal, influence and restrictions.

Two novel temporal perspectives are presented in the present study on the lifestyles and social practice discourse, though of rather different kinds. First, I suggest that research participants themselves (from all years) understand the ideas contained within the discourse in a historical context. Second, the qualitative longitudinal analysis identifies a change over the 1997-2010 time period, whereby pro-environmental living and behaviour are increasingly emphasised towards the more recent datasets.

In terms of the *historical context of climate change*, participant perspectives emphasise significant cultural shifts foreshadowing the problem of climate change – such as greater reliance on car travel, the need for additional housing, and increased energy consumption because of the proliferation of personal electronic devices; a general sense is also given of consumerism having become a more powerful force over time. These perspectives point to an understanding of the root causes of climate change as part of a historical and cultural process. This historical backdrop to public understanding of the place of culture in climate change has hitherto not been emphasised in the literature, and may be interpreted as underlining the understanding of personal responsibility existing to a far wider temporal context. It can also be aligned with an academic literature which sees contemporary consumer society as the culmination of long-term cultural shifts. As Burgess et al. (2003) note, a distinctive feature of the twentieth century was the rapid expansion of consumption from wealthy elites to the wider population. Hamilton (2010) argues that especially from the 1990's onwards, the influence of 'consumption society' and the penetration of free-

market values into social and cultural life has been a defining characteristic of developed economies.

In terms of a *change within the discourse* over the time period, there is some evidence for a trend which is somewhat contrary to these ideas. There is increasing reference made to the normalisation of climate change considerations: whilst there is some reference in earlier datasets to a perceived increase in general *awareness* about climate change, participants in the later groups also refer to a perceived increase in iconic *behaviours* (e.g. recycling, use of energy-saving lightbulbs) and, more generally, express the view that climate change-relevant considerations are coming to be seen as permeating everyday life – that is, are increasingly viewed as being normal and routine. Whilst there is no direct correspondence in the survey data to these features of the qualitative data, nevertheless it is of note that over the 2003-2011 time period there was a substantial and significant increase in reference – in the context of personal action taken on climate change – to more generic energy-saving actions (e.g. to "reduce energy consumption" or to "conserve energy, fuel"). This could be interpreted as pointing towards an increase in climate action seen as less specific to particular behaviours, and more broadly relevant to a range of activities.

The public perspective that pro-environmental behaviours and lifestyles are coming to be seen as more normal, is a significant and unexpected finding of the present study. Whilst much research attention has been directed towards understanding, measuring and promoting pro-environmental norms (Steg and Vlek, 2009; Bamberg and Moser, 2007; Cialdini, 2003) to date there has been little evidence of an articulation by people themselves that such 'normalisation' as an emerging process has begun to take hold. The language used by some research participants – for example that climate-relevant concerns are "getting more and more accepted", or with respect to recycling that "no one bats an eyelid… that's just what we do" – points also towards an interpretation of public understanding in social practice terms, whereby behaviours are viewed as being part of routine-driven, everyday activities (Verbeek and Mommaas, 2008) rather than being goal-driven and deliberate.

Other recent work by Barr and Gilg (2011) has pointed to research participants themselves conceptualising pro-environmental activities in this 'routine' manner; however, these authors also stress the limitations of a social practice interpretation of their findings. They argue that whilst this theoretical framework offers insights into how environmentally-significant behaviour emerges (is 'abstracted from') everyday acts of living, nevertheless there should be greater acknowledgement of how new types of practice may also be triggered by political discourses "intruding from above into the construction and discussion of daily routines and habits" (Barr and Gilg, 2011:1231).

With respect to the longitudinal trend identified in the present study, the corresponding timescale has indeed been associated with a political programme (both in the UK and internationally) which has seen sustained efforts to bring about changes in practice. For example, Clapp and Swanston (2009) argue that over the 1990's and 2000's a wave of international legislation restricting plastic shopping bags has both reflected and lead to the emergence of new environmental norms. In the UK, recent policies towards household waste collection and recycling are argued to constitute some of the most radical changes to policy for over a century (Bulkeley et al., 2007). It can equally be argued that media promotion of activities such as recycling (Inthorn and Reder, 2011) and the advocacy by social movements of private sphere environmental action (Hadler and Haller, 2011) have their place in this 'intrusion' into the lifestyles and social practice of individuals.

Public understanding of lifestyles and social practice in the context of climate change, I suggest, can thus be connected to wider socio-cultural trends which have taken place in recent years. Importantly for the present study, and not previously emphasised in the literature, is the finding that research participants themselves recognise the historical context of modern life as contributing to climate change – but also that public understanding is found increasingly to stress the incorporation into everyday life of pro-environmental, climate-relevant considerations.

Climate change as a folk-psychological phenomenon

The means by which people understand other people's responses to climate change, are argued by the present study to cohere within a *folk psychology* discourse. This discourse contains common sense ideas about the thinking and behaviour of ourselves and others: we respond to that which affects us (and given the climate change usually does not, we do not respond); we respond, more specifically, to rewards and punishments; we act according to that which we recognise and are conscious of; we act upon our values or fail to act because we lack appropriate values; we are resistant to change and are creatures of habit; we are susceptible to 'denial' and wilful ignorance.

Data from the 2011 survey suggests that these types of perspectives are commonplace. A novel survey item used to ascertain degree of accordance with the view that action on climate change is seen as restricted through being contingent upon self-interest, received widespread agreement: half (50%) of respondents (strongly) agreed that 'not much will be done about climate change, because it is not in human nature to respond to problems that won't happen for many years' (only 14% disagreed/ strongly disagreed). A further item replicated from Whitmarsh (2005) and selected for

correspondence with the folk psychology discourse – that people are 'too selfish' to act on climate change – received widespread agreement, though levels were unchanged between 2003 and 2011.

That research participants express perspectives about other people in the context of climate change has been affirmed by previous research, however few authors have interpreted people's understanding with respect to folk psychological understanding – instead, where research participants express such views they have tended to be interpreted as acting to undermine self-efficacy (Lorenzoni et al., 2007a) or as pointing to the individualism characteristic of capitalist societies (Räthzel and Uzzell, 2009).

From the analysis of the qualitative datasets for the present study, I argue that these types of portrayal also point towards an important set of coherent and underlying views about the motivations and characteristics of people-in-general. In this, the findings of the present study are aligned with recent research by Fischer et al. (2011) and Fischer (2010) who have argued that "generalised representations of human social life" and people's perceptions of 'humankind' are important for understanding how the public appraises ways of responding to climate change. Other work by Zeyer and Roth (2009) has also described how research participants used a folk psychology repertoire to draw inferences about people's attitudes towards the environment. These authors report that study participants made common sense assertions concerning, for example, the differences between men and women's attitudes towards the environment, or environmental inaction explained due to people having "their heads in the clouds".

The findings of the present study can also be related to the manner in which people typically use folk psychology to explain the motivations and actions of others. As Malle (2004:86) argues, such explanations typically distinguish between 'reason' accounts (based on agents' mental states) or 'mechanical' accounts (based on factors outside the person). Similarly, in the terms of attribution theory (Fiske and Taylor, 2008) a fundamental distinction between how people explain events, relates to whether these are perceived as deriving from external factors (e.g. lack of options to use public transport) or internal factors (e.g. level of personal concern about the environment). Within the folk psychology discourse identified in the present study, these distinctions are evident also: for example, other people's actions in the context of climate change are at times related to pejorative descriptions of largely internal factors, such as people being lazy or greedy; and at other times are related to structural factors, such as financial (dis)incentives.

Folk psychological accounts are also likely to be important for their relationship with social norms. For example, the commonplace portrayals of people-in-general as driven by self-interest or even wilfully disregarding of climate change may correspond to a descriptive norm, relating to how

others are seen to 'normally' act (Thogersen, 2006). Whilst descriptive norms have been substantially explored in terms of environmentally-signfiicant *behaviours* – for example littering (Cialdini et al., 1990) or energy conservation (Schulz et al., 2007) – there is less research concerning their influence in terms of the perceived *motivations* of others in the environmental domain[104].

The findings in the thesis concerning a 'folk psychology' of climate change are significant, I suggest, in part because a comprehensive folk psychological understanding of climate change has not been previously identified in the literature. This is surprising given that the idea of folk psychology has been much explored and discussed in general terms. Indeed, there is a substantial literature regarding the ideas held by people about how the mental states of others (and oneself) guide action (cf. Nichols, 2002; Davies and Stone, 1995). Whilst debates about the nature of folk psychology cross into some contested areas of philosophy, neuroscience and developmental psychology, in plain terms folk psychology can best be understood as the art of providing reasons for others' actions (Hutto, 2008) or as a form of 'domestic anthropology' (Stitch, 1983).

A novel finding in the present study, is that within the folk-psychological discourse participants themselves assert a place for 'denial' in people's responses to climate change. This may in part be due to such ideas gaining popular currency (e.g. as outlined by Washington and Cook, 2011) – indeed such portrayals appear to be particularly emphasised in the most recent data analysed for the thesis. The means by which participants portray the folk psychology of denial is of interest because this reflects a sophisticated view of how people are understood as responding to climate change. The suggestion in participant accounts, is that people do in fact know about climate change – including its serious implications and the imperative for action – but that despite, indeed *because* of this knowledge, they react in a manner that assuages or resists this awareness[105]. This explanation furthermore is found to be prevalent, as measured by a novel 2011 survey item: around two-thirds (66%) of respondents agree or strongly agree that 'a lot of people have a 'head-in-the-sand' attitude towards climate change'; only 8% disagree[106].

Participant portrayals of denial echo the idea as conceived of in psychology, such as have been related to Festinger's (1957) cognitive dissonance theory (e.g. in the context of climate change by

[104] For example, where a 2010 participant notes "I don't think that anyone's going to do anything unless they feel it affects them" this may be considered a descriptive norm concerning people's motivations to act.

[105] For example, participants in 2010 spoke of people as "backing away from knowledge" as a protection; and that "it's much easier to bury your head in the sand" where climate change is concerned.

[106] I acknowledge that it is possible that an affirmative response to this question could indicate a view that those who believe in climate change are mistaken.

Frantz and Mayer, 2009) and sociological interpretations (especially by Cohen, 2001). The portrayals of denial in the present study are similar to those obtained by Norgaard (2006a,b) who reported research participants in Norway arguing that "we don't really want to know" and interpreted such results in terms of what she called 'socially-organised denial'.

I do not wish to argue that the results of the thesis in themselves point to the presence of either cognitive dissonance or a more social form of denial, however; rather that the sorts of ideas implied by these frameworks are to be found in people's own explanations of human responses to climate change – that the notion of 'climate denial' has begun to enter public discourse.

Accounting for climate-relevant behaviour

When offering explanations for one's own behaviour, participants also draw on ideas about underlying motivations. In addition, in the personal domain, justifications and explanations are offered which are likely connected to impression management (a desire to be seen in a positive light; Buttny, 1993). The recognition of a normative obligation to act on climate change as an individual, as revealed elsewhere in the present study and prior research (e.g. Nilsson et al., 2004; Whitmarsh, 2009b) can be understood as the context for the offering of self-presentational accounts (Antaki, 1988; Semin and Manstead, 1983). As with the folk psychology discourse, it is notable however that whilst 'accounting' for one's actions has been considered across different literatures in the social sciences, nevertheless this has yet to be much explored with respect to climate change.

The idea of accounting for one's own actions can be understood as a rhetorical device, which has the function of convincing an audience that one's actions are justifiable: such accounts are a practical act used "to neutralise, or disclaim, or explain, or excuse, or justify social acts" (MacLennan, 2010:21). In this sense, the 'accounting for climate-relevant behaviour' discourse identified in the present study is closely aligned with the view of discourse delineated by Potter and Wetherell (1987) whereby language is considered to serve functions in interaction. As Semin and Manstead (1983:91-2) suggest, accounting for one's conduct can take many forms: these authors propose a detailed typology including such 'excuses' as 'denial of volition' (e.g. a 2010 participant's assertion that "I had to drive… there were no buses") and 'justifications' such as 'acting in accordance with conscience'.

A further category of justifications referred to by Semin and Manstead concerns 'appeal to values', which also appear across participants' accounts. Indeed, it is important to point out that

participants' explanations are far from concerned exclusively with justifying undesirable behaviour. Participants also make frequent reference to positive motivations, such as acting according to "an ethical mindset" and "consciously look[ing]" for locally-grown produce.

A change identified across the qualitative datasets, is an increasing emphasis over time in moralised and normative language applied to climate-relevant behaviour. This is a novel finding; whilst Butler (2010) has previously noted that climate change-relevant behaviour has become 'moralised' this is not with reference to a temporal change (i.e. a trend over recent years). Certainly in the 2011 survey data an individual-normative view appears prevalent: approximately 50% of respondents (strongly) agreed that 'it is morally wrong if you don't take regular action as an individual to help tackle climate change' (only 19% disagreed).

The analyses in the present thesis indicate also that another of Butler's observations – that people 'negotiate' their responses to the moral undertones of a governance discourse that emphasises individual responsibility – is present. This appeared particularly prevalent in the 2007 data and also the 2010 Bristol focus group transcripts. Such 'negotiation' can be described in terms of reconciling personal preferences with perceived normative obligations: a particularly revealing example is given by a 2010 participant who explains that whilst concerned about climate change, nevertheless they want their children to see the world on foreign holidays and so will continue to fly.

A final means by which participants account for their own response to climate change is in terms of climate change 'fatigue'. This is found only in the 2010 focus groups, and so is likely to be a more recent phenomenon. Nevertheless, it is striking the extent to which participants assert this perspective on the matter: terms used included 'bored', 'can't be bothered with', and 'disaster fatigue', as well as more sardonic perspectives. It is notable that, whilst a minority, still 29% of 2011 survey respondents agreed that 'whether it is important or not, on a day-to-day basis I am bored of hearing about climate change'. A comparison between image associations obtained from 2002 to 2011 surveys finds that whilst in 2002 no respondents at all asserted a fatigued reaction, in 2011 a small number did: several indeed used the term 'boring' or similar.

The notion that climate change is becoming tiresome is not entirely surprising given its extensive exposure over the past two decades, often in rather sensationalist terms (Risbey, 2008). Previously, Kerr (2009:926) has referred to 'climate fatigue' in suggesting that a "drumbeat of dire warnings" may be eroding public concerns. References to climate fatigue have also appeared in other recent research – from deliberative workshops a year prior to COP15, Platt and Retallack (2009) found high-consuming members of the public to have become 'tired', 'bored' and 'resentful', which they

too termed 'climate fatigue'.

Whilst it can be argued that research participants' expression of fatigue may be used discursively to justify lack of engagement with climate change, such portrayals likely also reflect a longer-term trend in how climate change is coming to be seen. As noted above, attention to climate change by the media and body politic has persisted over many years now, and been associated with a portrayal of climate science as contested and uncertain. Other researchers have suggested, too, that the sensationalism and fear associated with many portrayals of climate change can lead to desensitisation and disengagement (O'Neill and Nicholson-Cole, 2009; Moser and Dilling, 2004). 'Fatigue' may thus most appropriately be seen as an outcome of a cumulative process of exposure to many years – and an increasing volume – of often alarmist and disengaging depictions of climate change.

Understanding climate change as an 'environmental' issue

Climate change is often assumed in general terms to be an 'environmental issue' (Rogers-Hayden et al., 2011) and this conceptualisation is readily found in public understanding. The ways in which this occurs, however, show some pronounced changes over the time period of the datasets analysed.

It was expected that there would have been a decline in associations between climate change and stratospheric ozone depletion over the time period, as has been identified through survey-based research (Reynolds et al., 2010). The qualitative longitudinal research did indeed reveal this, though in a nuanced way. Participants in the 1997 focus groups talk in terms of the 'classic' mental model identified by Bostrom et al. (1994) whereby the ozone hole is understood to allow additional sunlight through, leading to increased temperatures. However, over time there is a gradual dislocation between the two phenomena with respect to the causes of both – entailing fewer references to bona fide ozone depleting actions (e.g. CFC-related) and more references to climate change-causing actions (e.g. fossil fuels). By 2010, a clear dissociation is found, between the issues in technical terms, and with respect to corresponding behaviours. Indeed, on the few occasions where the 'ozone hole' is referred to in 2010, this is generally as a now-forgotten concern. A significant and substantial decline in reference to ozone-associated terms was also obtained from the open-ended item asking people about their first thoughts on climate change between the 2002 and 2011 surveys; whilst 15% of respondents in 2002 referred to such terms, by 2011 this declined to less than 2%. This change over time is important, because there has been substantial comment in the literature over the past twenty years, directed towards people's confusing the two issues

(Kempton, 1991; Whitmarsh, 2009a). On the basis of these results, however, it would appear that the salience of the association has declined substantially.

In light of these findings, it is nevertheless surprising that nearly half (45%) of the 2011 respondents agreed that 'one of the main causes of climate change has been the reduction (hole) in the ozone layer'. This may point to continued conflation: though is still a lower than a figure obtained by DEFRA (2002) who found that 69% of UK respondents identified the ozone 'hole' as a contributor to climate change[107]. Also as Upham et al. (2009) have noted, people tend to identify a wider variety of causes of climate change when *prompted* (as by this survey item) than when asked *unprompted*. Research by Giorgi et al. (2009) has indeed found that conflation with ozone depletion only emerged where participants were asked for a detailed explanation for the causes of climate change, suggesting again dissociation over time between the two issues.

Associations between pollution (especially air pollution) and climate change are found across the qualitative datasets (though less so in 2010 than other years). This reflects the finding of others that the 'morally-loaded' idea of pollution (Upham et al., 2009) is often associated with climate change (Lorenzoni et al., 2006). Air pollution, in particular (described by participants in the present study in terms such as 'smog', 'smoke', or 'fumes') is more immediately visible and has been associated with powerful cultural imagery (Bickerstaff, 2004); it is thus salient as a shorthand for the causes and characteristics of climate change.

As Smith (2009) notes, the idea of 'dirty' emissions is redolent of defilement and impurity; in social representations terms, climate change is thus 'anchored' to other phenomena which cause harm to the natural world. From a discursive perspective, it may equally be argued that similar language and concepts are used interchangeably to explain both climate change and pollution. As Bulkeley (2000:318) describes it, such associations occur where "discursive elements from various issues are combined to explain the climate change problem".

A further environmental issue to which climate change is related is deforestation – this arises frequently across the qualitative datasets. Again, deforestation is seen in terms of harm to the natural world; however, whereas (air) pollution tends to be associated with local causes and impacts, deforestation is conceived of on far larger scales. In this sense, the relationship between climate change and deforestation is more closely related to the idea of climate/nature as vulnerable

[107] DEFRA's question wording was: "Which, if any, of the things listed on this card do you think are major contributors to climate change?" with "the hole in the ozone layer" given as a possible response.

to disturbance from human actions – in cultural theoretical terms as ephemeral, 'fragile' and 'intricately connected' (Thompson, 2003)[108].

The significance of these results, is that climate change continues over time to be seen as an environmental issue, and to be associated with other environmental issues – whether through interrelation of technical concepts or more culturally-situated ideas. Although the particular conflation with stratospheric ozone depletion has faded over time, other connections persist.

Ethics and climate change

Ethical considerations with respect to climate change are familiar in the academic, activist and policy literature (e.g. Agyeman et al., 2003; Posner and Weisbach, 2010; Ikeme, 2003; Hulme, 2009)[109]. However, notwithstanding the body of research which has shown that values are important for predicting environmental concern and action (e.g. Schulz and Zelezny, 1999), little empirical research exists as to whether and how the public incorporates ethics arguments as a part of their understanding of climate change. In the terms of Markowitz (2012), it is presently unclear the extent to which the public accords with the view of moral philosophers that climate change poses an 'ethical problem' for humanity and that as such humans have a duty to address it.

The present research goes some way towards addressing this limitation in the literature, through identifying a number of means by which climate change is understood as an ethical matter. Likely reflecting the universal nature of ethical principles – at least over long time periods and cultures – the present study finds no evidence that these have changed over the time period for which data are analysed.

One ethical principle frequently asserted by research participants in the present study, is that of justice (and relatedly, fairness). This concept has been emphasised to a large extent in research into moral psychology (Haidt, 2007) although for the most part such research applies at the individual and inter-individual level (i.e. the morality of acting in certain ways towards others). The findings

[108] An example is where a research participant refers to the effects of deforestation upon climate in terms of its "mucking around with the balance constantly".

[109] The Stern Review on the Economics of Climate Change (2007) also states: "The breadth, magnitude and nature of impacts imply that several ethical perspectives, such as those focusing on welfare, equity and justice, freedoms and rights, are relevant" and "Questions of intra- and inter-generational equity are central".

of the present study are in line with such notions of personal morality, however as specifically applied to climate change. Across the qualitative datasets, it is asserted that ethical principles should manifest in everyday life (e.g. through being 'sustainable'); as noted above, half of all 2011 survey respondents (50%) indicate that it is 'morally wrong' if one does not take action as an individual to help tackle climate change.

In addition, ideas of justice are also applied to national, international and intergenerational considerations – public understanding of which have been less explored in the literature. Importantly, the conclusions drawn from an ethical framework may be that acting on climate change does *not* meet the criterion of justice: participants frequently invoked justice concerns in advocacy of the (presumed) positions of developing nations, arguing it was unreasonable for poorer countries to be expected to forgo development to forestall climate change. That emissions historically have been from the West, was also used to support a justice argument such that developing nations should not have their activities curtailed. This finding mirrors some earlier work by Darier and Schule (1999:322) who argued that participant perspectives on climate change were concerned with global equity, noting there was "a strong sense that those who benefit from economic prosperity have no right to tell others that they should not aspire to the same". Such a view also accords with more formal considerations of climate justice (e.g. Agyeman et al., 2003).

The view that climate change constitutes an ethical problem in terms of intergenerational ethics (Davidson, 2008; Page, 2006) is also commonplace across the qualitative data. This may be contextualised to one's own family lineage, but also in general terms towards 'future generations'. Albeit that the argument that climate change is important for one's 'children's children' is not unfamiliar, this has not been much articulated in the literature in terms of a salient intergenerational ethic present in public understanding. There has been a tendency instead to emphasise the relative *absence* of immediate personal concern about climate change for its impacts being situated far in the future (Bord et al., 2000; Gattig and Hendrickx, 2007) but also that the impacts of climate change are seen as more serious the further in the future they are positioned (Gifford et al., 2009). The presence of an intergenerational ethic perhaps goes some way to reconciling these two positions: that whilst climate change is often not seen as directly relevant in the here and now, a sense of obligation is nevertheless present with respect to future lives. In discursive terms, the emphasis upon intergenerational ethics asserts a duty to act in spite of – or even *because* of – the limited immediacy of climate change; in this, public understanding of climate change mirrors broader sustainable development discourses which emphasise stewardship of the future (Haque, 2000); as Solow (1993:180) puts this, "the notion of sustainability is about... a moral obligation that we are supposed to have for future generations".

Climate change concern: change over time and with respect to other concerns

The discussion thus far has drawn attention to the general finding that public understanding of climate change shows remarkable consistency over time in many ways, together with some subtle shifts in emphasis within some discourses. Given the continuity in public understanding identified, it is thus perhaps to be expected that whilst the 2011 survey did, as predicted, find a significant decline in climate change concern from levels ten years previously, this was not pronounced. A regression using a composite measure combining concern, issue importance and level of interest in climate change, found that the time period was as important as voting preference for determining level of 'engagement' – though only a small amount of variance was accounted for by the model. No evidence was found to support the hypothesis that increased importance ascribed to the economy (as would be expected following the 2008 financial crash), could account for changes in climate change concern (e.g. as proposed in the context of 'finite pool of worry' by Weber, 2006, and with respect to polling data by Scruggs and Benegal, 2012).

I conclude from these results that caution should be exercised in interpreting shifts in public perceptions of climate change over time, as measured by the widespread measure of 'concern'. On the one hand, it is correct to say that there is evidence – here, and from other recent research (particular in the USA: Brulle et al., 2012; Scruggs and Benegal, 2012) – that levels of public concern have declined over recent years. On the other hand, an emphasis on what has *changed* risks concealing that which has remained *consistent*: indeed, despite a drop in the mean concern score, overall similar proportions in 2002 and 2011 remained (very) concerned about climate change.

It is important to exercise caution concerning the treatment of evidence for change in climate change concern: Krosnick (2010) has been sharply critical of conclusions drawn from (longitudinal) survey measures of concern, arguing that question wording and underlying assumptions have masked the fact that, even in the USA, large majorities accept the reality and importance of climate change. This author has argued that small, recent declines in acceptance of the problem of climate change are likely to be temporary – and urged acknowledgement that the 'climate majority' remain convinced and concerned.

Interpretation of changes in concern also remain contentious: whilst Krosnick (2010) attributes a decline in concern in the USA to weather events, recent research by Scruggs and Benegal (2012) attributes similar evidence to the effect of the post-2008 economic downturn and Brulle et al. (2012) to 'elite' cues (from influential politicians and others) transmitted through the media.

I would argue that it is as sensible to suggest that the aggregate measure of climate change concern (or similar indicators) is likely to be a product of a number of factors, each acting through subtle effects upon prevailing public discourses. Trends identified in the present study – such as the heightened sense of climate 'fatigue' and the politicisation of climate change – are likely to have prompted an attenuation of concern in some quarters. However, that concern remains relatively high, is likely sustained by such factors as the continued recognition of an ethical dimension to climate change, and the persistence of the view that both individuals and society bear responsibility for mitigation. That the present study also finds that cultural theory preferences (particularly egalitarianism and individualism) predict climate change concern is in line with other recent research (Kahan et al., 2011; Bellamy and Hulme, 2011).

11.3 Implications of the study for theory and future research

The discussion above has considered public understanding of climate change with respect to several disciplinary and theoretical frameworks. In this section, I will consider implications of the research for cultural theoretical and discursive interpretations of climate change, as these have been particularly important in the interpretation of findings of the present study. I also consider implications of the research for policy and communication.

Implications for Cultural Theory interpretations of climate change

Ways of understanding climate change identified in the present study, only partially align with that proposed by a cultural theoretical framework. In particular, an orderly distinction in the physical domain corresponding to prototypical 'myths of nature' is not found: rather, there is a dominant view of climate as mutable, cyclical, and evolving. This does not, however, neatly map onto any of the four 'myths' as has been theoretically proposed by a number of authors. The implication of the present research is therefore that future studies applying cultural theory to climate change understanding should seek to reconsider and redefine how climate as a natural, physical system is understood.

In other domains, too, particular emphases dominate public understanding, rather than manifesting in heterogeneous ways that correspond to cultural theory's grid/group typology. Public understanding of (climate) science emphasises a largely hierarchist viewpoint, entailing deference – albeit conditional – to expertise. The dominant view of societal relations is also

hierarchist, whereby a powerful state is portrayed as responsible for enforcing change upon a passive and reactive citizenry. Social dilemma perspectives acknowledge the interdependencies in society (are high 'group'); where stressing means of responding to this dilemma, this is commonly in egalitarian terms, whereby mutual cooperation is seen as desirable and efficacious. Folk psychological perspectives with respect to climate change, by contrast, for the most part emphasise an individualist/ fatalist perspective, whereby each person is seen as responding in isolation to their own self-interest and preferences.

The implication of these findings is that it is climate change *discourses* which are characterised by cultural preferences, rather than *individual* viewpoints. Despite the presence of over 200 different research participants (for the qualitative data) of different backgrounds and at different time periods, the 'shared understanding' of climate change in the respective physical, social and personal domains follows a consistent pattern. This is further affirmed by high levels of accordance with survey items which portray climate change in terms highly specific to particular cultural types. The study thus in the main supports a 'mobility' interpretation of cultural theory (Marris et al., 1998) whereby cultural biases may vary independently of an individual's typical preferences, but dependent upon the particular context considered. This said, that individual differences (as measured by the 2011 survey) still are predictive of cultural theory-derived climate 'myths' (as well as level of concern) does also lend some limited support to a 'stability' interpretation of the theory.

I suggest from the present study, that future research concerning climate change perceptions should seek to conceptualise cultural theory in terms which recognise *uniformity* within shared understandings, and a relative *flexibility* of individual preferences. Future work should also recognise the inherent features of climate change as a risk issue – for example that it is, by any reading, a highly complex social dilemma – which may give rise to shared perspectives, rather than assuming that people's understanding of climate change will be driven exclusively by distinct and discrete, individualised cultural preferences.

Implications for discursive interpretations of climate change

There has been only a limited amount of prior research adopting an explicitly discursive approach towards understanding public perspectives on climate change (Kurz et al., 2005; Swim et al., 2010). The present study has shown that there are a series of coherent and consistent discourses in use by members of the public, and that these are broader in scope than previously acknowledged. Whilst

the construction of climate change as an 'environmental' issue is well-known, for example, the use of folk psychological ideas to appraise people's responses to climate change, and the means by which people account for their own climate-relevant behaviour, have been less explored.

Given that discursive psychology has a long tradition of attending to the ways in which language is used by people to explain their own and others' behaviour, it is surprising that these insights in particular have not been much applied with respect to climate change. Future research should thus seek to understand in more detail the ways in which people reconcile the contradictions and tensions they experience in everyday life, using the various 'rhetorical devices' at their disposal.

As well as conceptualising discourse as serving functions in interaction, the present study has drawn attention to discourse in terms of a shared 'sense-making device', or 'interpretative repertoire' (Potter and Wetherell, 1987). The present study has illustrated the rich array of ideas that people are able to draw on to draw conclusions about matters as diverse as the physical realities of climate change, and how societal structures influence ways of responding to it. In many ways, these discourses mirror more general ways of understanding people, society and the natural world: climate change is in these terms not a unique phenomenon, rather a catalyst for the application of pre-existing discursive ideas.

Future research should, therefore, take greater account of the ways in which common-sense ideas about the world manifest in the particular context of climate change. There is substantial scope also for empirical examination of the consequences of the discourses of the sort identified in the present study – such as how they may be applied to appraise particular policies or ways of communicating, and as drivers or barriers to pro-environmental behaviour. This might be achieved through research strategies such as experimentally framing climate change in discourse-specific ways, or through focussed discussion with research participants.

Implications of the study for policy and communication

Whilst it is important not to overstate absolute levels of public uncertainty concerning the scientific and physical basis of climate change, the present research has argued that there are several reasons why this has nevertheless persisted over recent years, including the view that controversy persists about the basic tenets of climate science. In communicating about climate science, it is therefore essential that more fine-grained distinctions be made between what is known with something approaching certainty, and what is more contested (Moser, 2010): in the simplest terms, that consensus about the reality and anthropogenic component of climate change

is high, whereas views about the exact nature of long-term consequences are more contested. A move towards a more realistic and nuanced portrayal of the science (Naustdalslid, 2011) might serve also to remove climate science from the pedestal on which some have sought to place it and from which it is vulnerable to being dislodged – as demonstrated by the UEA controversy during 2009-10.

It is important nevertheless to recognise that whatever is said about climate science, there is a salient discourse in circulation which constructs climate as part of nature, and this most often as a facet of a mutable, ever-changing system. That this is equated in the present thesis to a 'myth' is not to suggest this view is a falsehood, but rather that – as with cultural theory's myths of nature – it is part of cultural understanding and thus to an extent outside of the parameters of 'logical' argumentation. Any communication should thus further seek to explain what is scientifically known about climate change, in terms which also acknowledge and do not work against this widely-held perspective.

No amount of communication will (or should try to) stop people drawing their own conclusions about climate change using the variety of evidence to hand: through the everyday medium of the weather and other proxy and informal evidence. However, communication which is aligned with the widely-held (and broadly correct) view that climate change entails disruption to natural systems would seem pragmatically desirable: especially given that the present study finds evidence against the idea that the public holds a simplistic view in line with a view of climate change as universal 'warming'.

Whilst the public's understanding of the physical basis of climate change is at times limited, their understanding of social systems is highly nuanced and complex. Responses from communicators and policy-makers are urgently required which address the very real and difficult societal questions relating to climate change, such as are expressed by research participants.

To date, government has tended to encourage public responses via either economic or informational means[110]. These of course have their place, but are driven primarily by an 'ecological modernisation' agenda (Hajer and Versteeg, 2005; Dryzek, 1997), which arguably serves to reinforce dominant structures as well as top-down presumptions of governance. In addition, such

[110] Examples of economic measures include subsidies for home insulation through the Energy Efficiency Commitment programme; variable vehicle excise duty to encourage purchase of smaller cars; and feed-in tariffs to encourage microgeneration. Examples of informational approaches include television advertising and the 'Act on CO2' campaign.

approaches may be ultimately disempowering, leading to people being treated instrumentally and experiencing a lack of choice (Chapman, 2004).

There are no simple and straightforward ways of changing the relations of responsibility in society, nor people's perceptions of them. On the one hand, the views expressed by participants in the present study for the most part portray the public as passive recipients of exactly such a top-down 'command and control' governance structure. This is understandable given the large-scale collective nature of climate change. On the other hand, powerful arguments have been made that given the failure of top-down and particularly global approaches to addressing climate change, action should now occur at the "lowest possible level of decision-making" (Rayner, 2010:618); Ostrom (2009) too argues for a 'polycentric' approach, entailing efforts to reduce emissions at multiple scales and levels. Peters et al. (2010) discuss ways in which this has actually occurred in the UK context, with local authorities facilitating the involvement of communities (see also CSE, 2007). Inevitably, such approaches will have their own challenges, but will likely be an essential part of 'clumsy' solutions to the 'wicked' problem of climate change (Verweij et al., 2006; Thompson, 2003). From the point of view of public engagement, they also make more sense than placing responsibility upon individuals in isolation – who, as the literature and the present study shows, more often than not return this back in the direction of government.

The findings of the thesis point to a willingness to respond to climate change in a personal but cooperative manner. As such, both policy and communication approaches should encourage this. One alternative is to develop more participatory forms of climate governance, as indeed some authors have advocated (e.g. van den Hove, 2000; Backstrand et al., 2010). However, given current levels of disenfranchisement with politics, even where the public are actively involved they may express scepticism as to the value of their contribution (Maciejewski and Hoppner, 2010).

Public participants themselves recognise that climate-relevant behaviour is situated within contemporary ways of living – and furthermore that it is implausible to expect that people will be convinced they should act on climate change when myriad physical and social structures, cultural expectations and economic systems are in direct contradiction to such action. If changing single behaviours is difficult – and it is (Abrahamse et al., 2005) – then changing the societal systems and social practices that are the context for these behaviours will be harder still. Nevertheless, it may be of value for policy and communication to more openly acknowledge and seek to engage with the public's own understanding of these matters, rather than seek only to pursue individualised solutions in the behavioural domain. Strategies exploring societal transformations (or 'transitions')

may go some way towards bringing together the roles of individuals, government and technology in progressing to sustainable futures (Spaargaren, 2011; Moloney et al., 2010).

There is a related challenge in developing policy and communication which attends to the very real collective problem of climate change, whilst not alienating those parts of society which place high value on individual freedom, liberal economics and material wealth – and which typically place lesser importance upon climate change. The experience of the USA has shown that climate change has the potential to be a highly polarising issue (Dunlap and McCright, 2008). As Kahan (2010) argues (partly with respect to climate change), communicators may therefore need to better develop means of presenting information in forms that "are agreeable to culturally diverse groups" and to structure debate so as to avoid cultural polarisation.

11.4 Methodological reflections

The research methods in the thesis have been applied with the intention of discerning both change and continuity in modes of understanding climate change across several research projects. These methods have incorporated novel approaches which have been little used in the field of climate change research, and in the case of the secondary longitudinal qualitative analysis, never applied previously. I reflect here upon some of the characteristics, advantages and difficulties of the approaches used, with a particular focus upon the use of discourse analysis and qualitative longitudinal analysis.

Discourse analysis

The discourse analysis has entailed a hybrid approach combining elements of Potter and Wetherell's (1987) influential discursive psychology (recognising the functional component of language to explain, interpret, justify etc.) and a view of discourse as constituting a socially-shared way of apprehending the world (Dryzek, 1997; Hajer and Versteeg, 2005).

As Kurz et al. (2005) have noted, there are important differences between these discourse traditions, though there is nevertheless an overriding concern in both with a socially constructed view of the world and an appreciation of how this is applied within particular contexts – as such, they may be seen as complementary. The analysis used in the thesis has therefore sought to identify discourses wherein particular themes and ideas cohere in meaningful ways, and to draw

out the ways in which these discourses can be used to make sense of a range of matters pertinent to climate change.

As I noted in the Methodology chapter, Taylor (2001) has argued that an explication of the *process* of analysis is an important criterion for rigour in discourse analysis; this may also be conceived in more general terms as a need for *transparency* in methods and data presentation (Yardley, 2000). In the present thesis, a systematic approach has been applied to construct the series of discourses as given in chapters 5 to 8. The 'ontology' of each discourse (Dryzek, 1997) is made explicit: this means the basic terms by which climate change is recognised – for example as a 'social dilemma' or as a 'scientific problem'. I suggest that the division of discourses in this way has enabled the presentation of a series of ways of understanding climate change which are *internally consistent* (within a discourse) but also *conceptually distinct* from each other (between discourses) – whilst retaining overlaps according to the broad categories of 'physical', 'social' and 'personal' discourses. Each discourse has been further characterised according to the language and ideas through which it is constructed; this has enabled the component parts (or 'building blocks') of each discourse to be outlined in some detail. The functions of a discourse, for example in self-presentation or appraising truth claims, have also been outlined.

The analysis in the thesis applies the criterion that discourses are able to be detected in multiple qualitative datasets; in many cases, they are found in all six datasets, and as such can be considered 'commonplace'. High levels of agreement with summary versions of discourses are also found in the 2011 survey, suggesting that these ways of understanding climate change are meaningful to many people (often a majority of respondents). That discursive interpretations of climate change are obtained through triangulation of separate methods and datasets, permits confidence in the interpretations presented (Taylor, 2001). Indeed, the ability to triangulate data has been an advantage afforded by the secondary analysis of qualitative transcripts from unrelated projects.

Whilst I have worked to ensure a systematic and transparent approach to discourse analysis, at the same time it should be acknowledged that an interpretative flexibility has been essential: in parallel to the application of a guiding framework for constructing the discourses, I as a researcher have made judgements regarding the ways in which I have understood concepts as cohering within participant talk. These judgements have been guided in part by the prior literature – for example, the 'relational responsibility' discourse relates to work concerning relations of responsibility outlined in the risk literature (cf. Bickerstaff et al., 2008).

As a reflexive researcher, I recognise that the characteristics of the discourses are also guided by my own disciplinary standpoints and concerns. The idea that climate change constitutes a 'social

dilemma' manifests in participant talk, and previous research has also argued that, in an objective sense, climate change 'is' a social dilemma. I also recognise, however, that this way of conceptualising climate change is influenced by my own background in Psychology, a discipline in which the idea of social dilemmas has often been a guiding paradigm. As an interdisciplinary researcher, I also see the way in which I have constructed discourses as being influenced by other theoretical paradigms. A case in point is the 'climate as nature' discourse which is aligned with work deriving from anthropology that argues that the ways in which the natural world (and consequently climate) is understood relates to long-standing and culturally-situated ideas.

In places, the characteristics of discourses are less familiar to the current literature, and are influenced by my own reading of participant talk. For example, the 'folk psychology' discourse was identified as a consequence of my sense that threading through much of what participants said about responding to climate change, related to a series of underlying assumptions about human nature. The work of Fischer et al. (2011) who (to my knowledge) are the only other authors to have explicitly discussed a place for folk psychology in climate change perceptions, was encountered *after* I had named and described this discourse.

Yardley (2000) proposes 'sensitivity to context' as a criterion for qualitative research: this author suggests that this can relate to sensitivity to prior literature, and the examples given above point to the ways in which I have attempted to achieve this. Equally, I was in the Methodology chapter careful to define the 'context' relevant to the present analyses in terms of *external* context rather than *proximate* context (Schegloff, 1992): it is the 'sociocultural setting' (in Yardley's terms) which is of particular interest to the present research.

Yardley (2000:220) suggests that attending to sociocultural context entails awareness of "normative, ideological, historical, linguistic and socioeconomic influences" upon participant talk. Throughout the discourse analysis I have, I argue, maintained such a sensitivity to the ways in which society and culture are understood by participants: for example, how participants have expressed views on the role of science in discerning truths; the relationship between individuals and the state in contemporary society; and the ways in which our own and others' actions are viewed. Normative and ideological components of context emerge, for example, in views expressed concerning the morality of acting (or not acting) on climate change; historical context is important in the ways in which participants contextualise climate change as a consequence of burgeoning consumerism over recent decades.

Based on the reflections above, I argue that the discourse analytic approach has been systematic and coherent, and enabled the research to draw on approaches from more than one discourse

analytic tradition so as to interpret participant perspectives in a meaningful way. At the same time, I acknowledge that the interpretations presented are but one possible way of portraying the diversity of participant perspectives as revealed through the research transcripts. In this, the present research is faced with the problem of 'legitimation' familiar to much (or all) qualitative inquiry (Seale, 1999; Cho and Trent, 2006). Nevertheless, more sensible than asking whether the qualitative interpretation is 'correct', is to ask whether it is meaningful – that is to say, likely to have impact or importance, and to present a novel and challenging perspective (Yardley, 2000). Clearly, much of the impact of research can only be appraised retrospectively – however, in drawing attention to little-considered yet demonstrably salient characteristics of public understanding of climate change, I would argue that substantial potential exists for the present discourse analytic research to make a valuable contribution to current thinking in this area.

Qualitative longitudinal analysis

Given the different participants, different research methods and objectives, different discussion moderators, and different research locations and time periods, it is indeed remarkable that there is such a degree of consistency and continuity able to be detected in the discourses identified. A benefit of performing the time-sensitive and secondary analysis for the thesis, has been to identify the extensive *similarities* in ways of speaking about and interpreting climate change across different research settings. Methodologically, this points towards the value of applying the discourse analytic approach used here – as an analytic stance which accepts that there are commonplace understandings in circulation within society, and which are able to be accessed and drawn upon by members of that society (whether in 2000 in Norwich, or in 2010 in Bristol). I would go so far as to reflect that it has indeed been substantially more difficult to detect *differences* in perspectives over time than to identify commonalities: at times, it has seemed during the analytic process as though participants from different years were recounting perspectives almost by rote.

On reflection, for many of the discourses identified it is perhaps not surprising that substantial continuity has been observed. Given that I have argued people interpret climate change in terms of, for example, their understanding of how society works, it would be rather strange to find that these were manifestly different over a period of a mere decade and a half. At the same time, however, climate change is in other ways still a relatively recent phenomenon which has undergone shifts in interpretation. For example, the relevance to an individual's everyday choices of a climate 'morality' has developed over recent years.

The use of qualitative longitudinal methodology in itself is uncommon – although there is a fast-growing literature in this area (Neale et al., 2012). As noted in the Methodology chapter, however, much of what has been written about this research approach has emphasised the issues and concerns around its application, rather than proposing specific guidelines for carrying it out. In addition, the nature of the analysis carried out here – the use of multiple and unrelated secondary datasets – is different to that of the majority of extant research, which tends to follow individuals (or family units, etc.) through life transitions. I have therefore attempted to construct a practical approach able to detect differences within discourses over time, which attends to context in a selective manner.

Having carried out the large-scale qualitative longitudinal analysis for the thesis, I suggest that an important challenge has been an inherent tension between the competing demands of two (often opposing) research paradigms. Typically in qualitative research, measurement of phenomena is avoided: as Kitzinger and Davidson (2001:5) argue, focus group data "does not lend itself to numerical analysis". This is not problematic for the construction of discourses *per se*, for these are defined by and composed of essentially qualitative concepts. Where comparing qualitative data between years in the present research, this too has often been treated in a commensurate manner – this is to say, change is identified within discourses as moving from one *type* of interpretation to another. In this sense, the comparison of data/discourses between years mirrors a 'constant comparative method' employed in a range of other research (cf. Boeije, 2002). This type of approach has been used for example to compare gender differences in risk perception (Gustafson, 1998).

The longitudinal interpretation has, however, also drawn upon conceptions more typically associated with quantitative research: if there is 'more' or 'less' occurrence of a way of talking about climate change occurring over time then this implies such is essentially measurable. Despite recognising this, I have nevertheless deliberately constrained my identification of change within discourses to one based on qualitative interpretation. This is in part because it is not *practically* possible to detect or confirm change through quantitative measurement and analysis. To put this in the terms of quantitative research: statistical analysis is precluded because too many assumptions would be violated – not least the experimental control of all influential factors aside from the time period. As important, quantitative analysis of change would have entailed data reduction (e.g. to number of coded instances) and associated loss of meaning: it would be hard to see how, for example, it would be possible to have *measured* the politicisation at a national level of a social dilemma interpretation of climate change. Instead, through maintaining a qualitative approach also in the longitudinal analysis, the richer set of meanings and ways in which language and ideas are

used, have been retained as part of the interpretation of change. (Indeed, it may be argued that the interpretation used is more powerful *because* the richer set of meanings in participant talk are retained in analysis.) Researcher interpretation has thus been required not just to identify discourses themselves, but also as to how these have shown consistency and change over time.

Whilst the qualitative longitudinal findings cannot easily be consolidated through quantitative measurement, where possible I have attempted to triangulate these with longitudinal survey data. For example, the dissociation between climate change and ozone depletion observed in the qualitative data can also be found in comparisons between 2002 and 2011 survey data. However, for some qualitative changes observed, such triangulation is not possible because of a lack of correspondence with survey items. Nevertheless, it is important that qualitative changes are evidenced. The means by which I have supported the conclusions drawn from the qualitative longitudinal analysis, has been through the use of extensive participant excerpts and commentary given in the relevant chapters and associated Appendices.

In terms of the transparency and explication of the longitudinal method itself, a systematic framework has been used to identify differences between datasets (this is outlined in detail in the Methodology). This framework was intended to provide a practical means of identifying change: discourses were inspected for variation within and between datasets; the characteristics of a discourse in proximate time periods were compared (e.g. 2007/2010 data compared to 1997/2000 data); references made by participants to contemporary events were noted; working hypotheses were formulated as to changes over time through repeated reading of relevant coded excerpts, and retained or rejected through further inspection of the data.

In terms of the applicability of the framework, on reflection it has been more feasible to distinguish contrasts between years where these are aggregated: to compare 'recent' to 'early' datasets, for example. More gradual trends emerging across the fifteen year time period have been harder to pinpoint. The aggregation of data does, I suggest, in fact have the advantage of promoting confidence in differences identified. Where a discourse feature appears to be more commonplace in combined 'recent' data, for example, it can be stated with more certainty that this is not an artefact of a particular research project. In this way, the lack of control over the circumstances of the original data generation can be overcome to some extent. Conversely, should a feature only arise in one dataset, it may be necessary to interpret this with more caution.

A further challenge in appraising change over time in the transcripts, is that there are few time-sensitive references made, by which to 'anchor' the analyses. Whilst events such as the publication of the Stern review may be considered significant to those working in the field of climate change

research, these are rarely mentioned by participants; even the much-publicised UEA controversy was something many participants did not recall or have an opinion about. As such, the influence of the wider and changing sociocultural context is required in many instances to be inferred, rather than being directly grounded in the data.

The present research explicitly privileges 'distal' over 'proximate' context (cf. Schegloff, 1992) – that is, the wider cultural context rather than the context of a particular group discussion. Nevertheless, the possibility exists that idiosyncrasies of particular group discussions or research protocols (or researcher behaviour) may have influenced the study findings. I have attempted to address this concern firstly through consideration of multiple datasets when formulating interpretations of change: I have been careful to ensure that claims made are based not on a single individual's remarks or even a single group discussion, but upon a consideration of multiple years and transcripts (although some findings do relate to differences between 2010 data and previous research). In addition, working hypotheses and negative case analysis have been applied. In many places during the process of analysis, I formed a provisional view that a particular difference over time was present, but upon more extensive re-examination of transcripts rejected this. Even so, given that focus group discussions are not by their nature 'controlled' environments, should by chance (or some unknown factor) particular viewpoints have emerged in particular years this could have influenced findings. This is acknowledged as a limitation of the present study.

A further limitation of the longitudinal approach used, is that the research projects revisited for analysis in the thesis have been considered sequentially, although the time intervals between them in fact varied. Relatedly, it may be argued that as climate change increases in intensity or recedes into the background as an issue, public perspectives may in parallel change more or less rapidly – including with respect to prevailing social amplification and attenuating factors (Renn, 2010). As part of this, as yet unanticipated events may give rise to possibly sudden shifts in public understanding in future years.

A final comment upon the confidence in the qualitative longitudinal methods, is to suggest that certain trends identified may be predicted to develop in future research. An example of a continued decline in salience anticipated, is that of the association made between climate change and ozone depletion; by contrast, an increasingly salient view anticipated in future years, is that lifestyles and social practice will be seen by people as becoming ever more pro-environmental.

In general, it should be acknowledged that 'researching the temporal' using qualitative data is methodologically innovative in the social sciences (Henwood and Shirani, in press) and thus presents a range of opportunities as well as challenges in explaining social phenomena. A key

advantage of using these techniques, is that novel insights can be provided into change and continuity of public understanding, that cannot be revealed through survey methods. The challenges lie in constructing a method which addresses the difficult tensions between research paradigms. The approaches used in the present thesis, I suggest, go some way towards addressing such challenges, in an as-yet developing field. If the momentum for qualitative longitudinal work is sustained in the coming years, alternative approaches may yet be developed that could be combined with those used here.

Mixed methods and survey approaches

The combined use of survey-based methods together with a discourse analytic approach has enabled insights into which types of understanding are prevalent, and how they have changed over time.

The replication of survey items from previous years has pointed towards a change in some modes of understanding climate change, with consistency observed in others. Whilst ideally the methodology used to measure public perceptions at each time point would have been identical, this was impractical. Nevertheless, that key measures that were expected to have remained consistent, were unchanged between 2010 and 2011 (including a measure of environmental identity) indicate that the 2011 sample surveyed were broadly representative. It may be of use in future research nevertheless to investigate further whether different responses are obtained according to survey mode used. The 'gold standard' of survey research has tended to be the face-to-face approach; however, I would also argue that online methods, as used in the present study, have unique advantages. For example, it may be that social desirability effects in climate change research (such as a perceived need to report being 'concerned') are less of an issue where online surveys are completed without others being present.

11.5 Conclusion

From investigating the perspectives of participants from half a dozen different research projects, it is argued that there are prominent, persistent and durable ways of understanding climate change, which are not specific to particular research projects (at least in the UK context). The thesis adds to the research literature by articulating public understanding in terms of a series of coherent discourses used to interpret climate change, as well as by developing and applying a novel methodology. The research also adds to the literature by presenting findings with respect to changes in public understanding over the past fifteen years.

The thesis has found that public understanding of climate change incorporates many disparate, often contradictory ideas about science, society and people themselves. Climate science is seen both as consensual and chaotic; action on climate change is viewed both as pointless and morally imperative; and responsibility is argued to belong to everyone and no-one. Climate change may be argued to be irrelevant to us in our daily lives, and yet to be important to people not yet born. We cannot apprehend it, as it is too abstract and technical a phenomenon; and yet, we draw conclusions about it from the weather outside our windows.

As society continues in the direction of bringing about large-scale changes in climate systems, it will be important in the future to continue to attend to the public's viewpoints, and where possible to find means of responding to and accommodating them.

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