SCIENCE, IDEOLOGY AND CLIMATE CHANGE

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ABSTRACT

The science of anthropogenic climate change (ACC) is not new, but has been built up like any science over the course of more than a century. Despite this, ACC has only been marked by controversy since the 1970s (Kellogg, 1987), when it became apparent that action must be taken to reduce emissions of greenhouse gasses. Subsequent debate has ensued not only around the type of action necessary to reduce humanity's impact on the climate, but around the accuracy of the theory itself. This thesis aims to explore this debate and the scientific, social and political nature of ACC using a mixed methods approach.

The first chapter of the thesis provides a review of the social science literature, to address the broad question: what contributes to the debate around the reality of ACC? I review literature examining the nature of ACC scepticism, contrarianism and denial, the range of positions exisiting with this alternative attitudinal and discursive space, the prevalence of such positions, and the connection such positions have with traditional conservative ideology. In addition, I review literature highlighting how collective views on ACC have changed over time, in line with the political and social events that naturally transpire, before reviewing literature focused on issues of morality and ethics around the ACC problem.

From here I highlight areas for further inquiry, and present five analytic chapters to address these areas. Chapter 3 uses a quantitative approach to explore an area of ACC research that has received little attention to date: differences in views about ACC between students enrolled in different academic disciplines, with a particular focus on the views of those enrolled in business

degrees. I conducted a comparative analysis on University students enrolled in business degrees, with those enrolled in the sciences, arts, humanities and social sciences, and environmental sciences, and find that those enrolled in business degrees, and particularly male students enrolled in business degrees, are significantly more likely to reject the human contribution to climate change and reject the science of climate change.

Chapter four furthers this analysis by using qualitative data collected simultaneously with the quantitative data, to examine the ideological influences on these students' views about ACC with a focus on the system-challenging rhetoric emerging from the student comments in response to the survey questions. This second phase of the study highlights the importance of utilizing both quantitative and qualitative data to capture the details of perceptions of ACC, providing a much richer view of the prevailing discourses people use to make sense of ACC.

Chapter five focuses on the theoretical and methodological bases of my rationale and aims for the following three analytic chapters. Social Representations Theory (SRT: Moscovici, 1984), the Information Deficit Model of science communication, and more recent psychological approaches such as Discursive Psychology (DP: Edwards & Potter, 1992; Potter & Edwards, 2001; Potter & Wetherell, 1987), and Rhetorical Psychology (Billig, 1987), are presented to explore the theoretical thinking on the ways in which science is constructed, contested, and mobilized to generate competing accounts of ACC. I highlight the importance of understanding ACC not just from a scientific

perspective, but also from a perspective that can help elucidate the complex ways in which meanings are constructed.

Chapter 6 explores the challenges posed when those within the scientific establishment itself publicly undermine scientific theories of political, social and environmental significance. Here, I analyse interviews with a well-known climate change sceptic and a leading Australian climate scientist, in addition to newspaper articles written by other prominent Australian scientists holding competing views about anthropogenic climate change (ACC). I demonstrate how the two competing sides of the debate draw from different constructions of science to argue their positions on ACC in the public sphere. This chapter demonstrates that competing constructions of science are not simply abstract ideas but are used as rhetorical resources deployed in concrete ways to construct problematic identities for scientists, the public, and science itself.

Chapter 7 presents extracts from the same data corpus presented in chapter 6. Here, the role played by distancing oneself from ideological bias is explored, in the discourse of two prominent Australian scientists – Ian Plimer and Barry Brook. Distancing oneself from ideological thinking, whilst simultaneously accusing one's opponent of ideological thinking, is a pervasive rhetorical technique used by these scientists. Drawing from the 'end of ideology' framework (see Weltman, 2004; Weltman & Billig, 2001), I argue that appeals to science to inform policy about ACC are undermined by the contentious nature of ACC science as it appears in popular culture. Such appeals to a non-ideological approach to ACC policy have stymied attempts to implement policy, and if we are

to generate effective policy to reduce GHG emissions, we must consider reframing ACC such that issues of morality and values are brought to the fore.

Chapter 8 extends the ideological conundrums inherent in the ACC debate by examining the political rhetoric used by Australia's political elites over the course of the development of market-based climate change policy. Here I explore the ways in which environmental imperatives are subordinate to economic ones, creating an ideological dilemma (Billig, Condor, Edwards, Gane, Middleton & Radley, 1988) that serves as a barrier to generating the support of a voting public whose immediate livelihoods may be threatened by economic action on ACC.

In conclusion, I argue that the ideological imperatives fuelling the ACC debate pit the environment against the economy, as if the two are incompatible. Paradoxically, however, such a move has resulted in a technocratic approach to climate change policy, whereby to deny one's position as ideological serves as a rhetorical mechanism for asserting the pragmatics of ACC action. Whilst this may work well as a rhetorical move for political purposes, it does little to generate a susbstantial ACC narrative that encompasses the moral reasons for action. As such, the conversations required to explain precisely why action is so important and in everyone's best interest, remain absent from public discourse. Given the power good rhetoric has over public opinion, and subsequent support for policy, the need for a strong and substantial narrative around the importance of ACC action is parament. I argue therefore, that without a redrawing of the moral landscape that underpins this dilemma, and without a fundamental re-working

of the discourses that shape ACC in the public sphere, the possibilities for advocating structural action to reduce GHG emissions will continue to be compromised.

DECLARATION

I certify that this thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other institution and, to the best of my knowledge and beliefs, contains no material previously published or written by another person, except where due reference is made in the text of the thesis. In addition, I certify that no part of this work will, in the future, be used in any university or other tertiary institution without the prior approval of the University of Adelaide.

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CONFERENCE PRESENTATIONS DURING CANDIDATURE

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I would also like to acknowledge my little girl, Audrey, for putting up with a stressed out and cranky mum for the majority of her life. Now we can look forward to easier times and getting to know each other post-PhD.

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For Audrey

"I am beginning to believe that nothing can ever be proved. These are reasonable hypotheses which take the facts into account: but I am only too well aware that they come from me, that they are simply a way of unifying my own knowledge."

– Jean-Paul Satre, *Nausea*

CHAPTER 1: INTRODUCTION

1.1. BACKGROUND

From Galileo's *Dialogue* to Darwin's *Origin of Species*, the western tradition of the dissemination of science to the general public has been marked by controversy, debate, and the battle for political power. Scientific discoveries that challenge long held socio-historical paradigms and their associated economic and political interests never enter into the social and political world seamlessly; they are fraught with conflicting political interests and the battle for power. No modern scientific development represents this phenomenon more so than anthropogenic climate change (ACC). ACC science challenges a modern worldview that is focused on industrialization, a worldview that downplays the human impact on the environment. Embodied within this perspective is an economic, industrial and political status quo that is threatened by ACC, as this system requires radical restructuring if action to mitigate dangerous climatic changes is to take place.

The theory of ACC is not new, but has been built up like any science over the course of more than a century. The concept known as 'the greenhouse effect' was first proposed in the 1800's by Jean-Baptiste-Joseph Fourier. Fourier proposed that infrared radiation could be inhibited from escaping into space by a build-up of certain gases in the atmosphere (Hulme, 2009; Kellogg, 1987). By 1863, John Tyndall was able to measure the absorption of infrared radiation by CO_2 and water vapour, demonstrating that these atmospheric gases were

capable of significantly raising the earth's temperature (Kellogg, 1987). In other words, Tyndall was able to provide quantitative evidence for the greenhouse theory proposed by Fourier. Tyndall was also the first scientist to relate atmospheric greenhouse gas (GHG) concentrations to previous glacial periods (Hulme, 2009; Kellogg, 1987). By the turn of the century, Swedish scientist Svante Arrhenius calculated the effect of a doubling of CO_2 on average surface temperature, finding that surface temperatures could be raised by 5-6K (Arrhenius, 1896). At around the same time, Thomas C. Chamberlin related CO_2 to glacial and sea level behaviour (Chamberlain, 1899). Moreover, there was general recognition that the burning of fossil fuels would increase levels of CO_2 and other GHGs (i.e. ozone, chlorofluorocarbons (CFCs), nitrous oxide, and methane), which could contribute to changes in global temperature (Kellogg, 1987).

As an idea, the 'greenhouse effect' took some time to gain traction in the scientific community as a theory of urgency or imminent threat, probably due to a failure to realize how significant our CO_2 emissions were, or were to become in a short space of time (Kellogg, 1987). However, by the 1950's recognition of the greenhouse effect and the potential problems arising from our increased burning of fossil fuels began to grow in the scientific community. By 1957 Roger Ravelle and Hans Suess wrote an article for *Tellus*, reporting that the human emissions of CO_2 would likely stay in the atmosphere for centuries due to the slow rate at which it could be absorbed by the oceans (Revelle & Suess, 1957). From 1958 onwards, levels of atmospheric CO_2 were monitored at the Mauna Loa observatory in Hawaii and at the South Pole, and now provide the best picture of

the rise in CO_2 over the last half-century (Kellogg, 1987). However the first official recognition that CO_2 could have a genuine impact on the global climate did not come until 1965, when the US President's Science Advisory Committee (PSAC) published a report of its Environmental Pollution Panel entitled, *Restoring the Quality of Our Environment* under the White House seal (Kellogg, 1987).

After the 1965 report, enough attention had been brought to the subject to elicit more systematic and quantitative analysis of the possibility of global climatic change through human activity (Kellogg, 1987). However at this time, the effects of GHG emissions were not considered an imminent threat, with the effects more likely to occur into the future. It was becoming increasingly clear, however, that regardless of when the changes became a threat, humanity would have to begin planning for the possible environmental and social impacts the changes would cause (Kellogg, 1987).

In 1970 an international meeting was held to discuss the human impact on global climate, and a report was compiled entitled, *Man's Impact on the Global Climate* (SCEP, 1970). Despite the advances in climate science to this date, there was still much disagreement within the scientific community about the likelihood of global warming due to GHGs, mostly around the role played by aerosols and their reflective qualities (Kellogg, 1987). Predictions around likely future changes were also difficult to make. Although there was general consensus that it was within humankind's power to change global climate, there was no agreement around what could happen or how serious it could be (Kellogg, 1987). In 1972 the United Nations Environment Program (UNEP) was

established, after which climate research around the world grew, especially with the aid of improved computer processing for analysing complex numerical models of the climate system (Kellogg, 1987).

Climatology as a discipline progressed steadily and in 1979 the World Climate Conference held in Geneva concluded that the effects of human GHG emissions could become noticeable by the end of the century, with the possibility of severe effects by the middle of the 21st century (Kellogg, 1987). Calls were therefore made to begin adjusting aspects of the world economy, particularly relating to agricultural practices and energy production. Similarly, global united action was called upon to plan for and perhaps mitigate the effects of global climate change (Kellogg, 1987).

At this point, when action on climate change became apparent and discussed, debate around the type of action necessary took hold. In particular, environmental scepticism emerged as a powerful political discourse aimed at discrediting the need for action on any number of environmental problems, including ACC.

Oreskes and Conway (2010) show how a handful of scientists working in right-wing think tanks in the United States mobilised during the 1970's, 80's and 90's over a number of environmental issues including acid rain, nuclear winter, ozone depletion, and ACC to challenge the science and undermine calls for regulatory action. The authors demonstrate that these scientists were also involved with challenging and undermining the scientific evidence that tobacco smoke leads to cancer. These men were not climate scientists as such, certainly not climate change experts, and yet their considerable political influence and

consistent private sources of funding meant that their anti-science rhetoric fell on the ears of those with the power to act. Moreover the conservative movement aligned with these contrarian scientists who had affiliations with the fossil fuel industry (McCright and Dunlap, 2003). One of the tactics these renegade scientists used was to publish their opposition to ACC science, including misrepresentation of the IPCC reports, particular scientists, and the science of ACC more generally, in the mainstream press, rather than peer reviewed scientific journals (McCright & Dunlap, 2003; Oreskes & Conway, 2010). ACC scepticism was therefore thrust into the public domain, creating doubt in the public mind as to the reality of ACC despite the overwhelming scientific evidence and consensus.

The conservative movement thus mobilized to successfully foster a counter-movement to the traditional environmental movement that had been finding greater political voice over the second half of the last century (Jacques, Dunlap & Freeman, 2008; McCright & Dunlap, 2000). Jacques et al. (2008) argue that environmental scepticism developed to challenge the need for environmental protection by questioning "the seriousness of environmental problems and the validity of environmental science" (Jacques et al., 2008, p. 352). Environmental scepticism is marked by its denial of the authenticity of environmental problems and its rigid anti-regulation policy stance – a core tenet of the conservative political movement. Opposition to environmental policy has had a long history; specifically in the US where environmental policy has come up against industry opposition that challenges government restrictions on natural resource use (McCright & Dunlap, 2000).

The frame of global environmental problems has been used to facilitate our understanding of the ways in which humans are disrupting the global ecosystem, with effects not only on the environment but also to the future wellbeing of our species (McCright & Dunlap, 2000). This frame is critical of an unregulated approach to environmental problems, with a focus on environmental management to ensure the protection of ecosystems and the sustainable use of earth's resources. The conservative movement thus turned its attention to ACC, where it saw threats to the core elements of conservatism: laissez-faire government, free enterprise, individual freedom and private property – the political commodities that are seen to be directly threatened by internationally binding agreements to curb GHG emissions (McCright & Dunlap, 2000).

1.2. The evidence for action on ACC

Despite the conservative movement's attempts to discredit climate science and obstruct the regulation of GHG emissions, a vast amount of scientific research has been conducted to provide the basis for policy creation and economic decision-making. The Intergovernmental Panel on Climate Change (IPCC) has released five assessment reports since 1990, plus a host of special reports that collate the data from thousands of scientific experts from around the world. The message is clear and consistent: if we do not radically reduce the amount of GHGs we emit into the atmosphere, our planet will undergo dangerous warming, the sea ice and glaciers will melt, bringing with it sea level rise that will cause the displacement of millions of people around the world, extreme weather

events will become more frequent impacting on both habitable and arable land, low lying island nations will be lost to the sea, species will be lost, and the list of disastrous consequences goes on (Spratt & Sutton, 2008). Moreover, the record 2012 Arctic sea ice melt, and the permafrost melt this has already begun to trigger, has forced scientists to reconsider their earlier projections; with many scientists now estimating temperature rises of up to 6 degrees Celsius by the end of this century (Spratt, 2012). A recent Price Waterhouse Coopers report states a 5.1% global reduction in emissions per year is needed to limit warming to the 2 degrees above pre-industrial times that scientists consider 'safe' (Spratt, 2012; PWC, 2012). This is a figure far exceeding anything currently achieved or even agreed upon by the international political and business communities. Moreover, the necessary reductions in emissions have been calculated to cost around 2% of global GDP (Randers, 2012; Speth, 2008). Should such reductions take place, the world economy is expected to be no worse off in June of 2020 than it would be in January 2020 without reductions (Randers, 2012). The need for sustained and radical action from the political and corporate world is therefore crucial at the present time as we face a very near future where environmental and climatic conditions will no longer support the life systems we currently enjoy.

1.3. ACC AND AUSTRALIAN POLITICS

Despite the strong scientific consensus on ACC (Anderegg, Prall, Harold & Schnieder, 2010; Oreskes, 2004), and the comprehensive and compelling scientific evidence supporting the reality of climate change and its anthropogenic

origins, much of the scientific information has been misrepresented in a systematic and deliberate attempt to misinform the public and political leaders on the reliability of climate science (Oreskes & Conway, 2010). A considerable debate surrounding ACC in all areas of social life has since ensued. The media, the general public, and the political and scientific communities have become divided on both the validity of the theory of ACC and the type of political action that it requires. The former point, commonly referred to as ACC scepticism, contrarianism or denial, has played a major role in undermining public confidence in ACC science and scientists, subsequently undermining political action on this issue.

The denialist movement is most prevalent in Western English speaking nations, where politically partisan climate change policies have had a major impact on perceptions of climate change within their general publics (e.g. McCright & Dunlap, 2011a; Tranter, 2011; Zia & Todd, 2010). The Australian context in particular has been marked by polarised climate change discourses and policies from alternate Liberal and Labor governments over the past decade, and therefore provides the backdrop upon which to explore the changing nature of climate change scepticism, contrarianism and denial, as it relates to political elites and the implementation of climate change policy.

Climate change in the Australian political landscape has had a turbulent trajectory since the 2007 election that saw the Left leaning Labor party led by Kevin Rudd take the leadership from 11 years of Conservative government under John Howard. Rudd's 'action on climate change' election platform is credited as being a significant factor in his win (Gascoigne, 2008; Kurz, Augoustinos & Crabb,

2010). Rudd proposed a Carbon Pollution Reduction Scheme (CPRS) early in his leadership, which failed to find support with the majority of the conservative members of parliament, in particular the outspoken Tony Abbott: the new leader of the opposition and a self-confessed climate change sceptic (Ferguson, 2009). After failing to gain support twice in the lower house, the CPRS lost public support and was soon abandoned. Rudd's popularity declined and internal conflicts within the Labor party saw Rudd dislodged as Prime Minister in favour of Julia Gillard. Gillard was successful in passing carbon pricing legislation during her term, despite considerable public disapproval. However the policy will not be in place for long. The Climate Change Authority was abolished within days of the Conservative government winning the Federal election in 2013, and at the time of writing the current Prime Minister, Tony Abbott, has already begun action to repeal the carbon pricing policy.

1.4. AIMS AND STRUCTURE OF THE THESIS

It is within this political context that the present thesis has developed. Using a mixed methods approach comprising of both a realist and social constructionist perspective, I aim to explore the scientific, social and political nature of ACC within Australia. A number of areas will be addressed, to cover the range of ideological, scientific, and structural areas that fall within the domain of the ACC controversy.

I begin in chapter two by presenting a literature review covering a disparate collection of the social scientific research on ACC. Due to the complex

nature of this topic, and the myriad of ways in which the social sciences have attempted to understand the ACC debate, this literature covers a variety of fields and is both quantitative and qualitative in nature. It is not my aim to exhaustively review the breadth of research in this area, but rather to illustrate some of the multifarious factors existing in the public space that relate to the development of the ACC debate.

From here I highlight areas for further inquiry, and present five analytic chapters to address these areas. The first analytic chapter uses a quantitative approach to explore an area of ACC research that has received little attention to date. The ideological divisions that define the ACC debate generate questions about how the relative positions find traction in the institutions and structures of the modern world, defined as it is by capitalist market systems. Business and industry are no doubt in a prime position to develop more sustainable business practices: it makes good business sense. However, business has been slow to act on ACC; an issue that may be influenced by the conservative heart of ACC scepticism that opposes regulation in all its many forms. In an attempt to uncover how those in the business world view ACC, I conducted a comparative analysis on University students enrolled in business degrees, with those enrolled in the sciences, arts, humanities and social sciences, and environmental sciences. Chapter four furthers this analysis by using qualitative data collected simultaneously with the quantitative data, to examine the ideological influences on these students' views about ACC with a focus on the system-challenging rhetoric emerging from the student comments in response to the survey questions. This second phase of the study highlights the importance of utilizing

both quantitative and qualitative data to capture the details of perceptions of ACC, providing a much richer view of the prevailing discourses people use to make sense of ACC.

The passage into qualitative analysis marks the trajectory for the remainder of my thesis. Chapter five focuses on the theoretical and methodological bases of my rationale and aims for the following three analytic chapters. Here I explore a number of theories relevant to the public understanding of science and science communication. In particular I examine Social Representations Theory (SRT: Moscovici, 1984), the Information Deficit Model of science communication, and more recent psychological approaches such as Discursive Psychology (DP: Edwards & Potter, 1992; Potter & Edwards, 2001; Potter & Wetherell, 1987), and Rhetorical Psychology (Billig, 1987), to understand the ways in which science is constructed, contested, and mobilized to generate competing accounts of ACC. I highlight the importance of understanding ACC not just from a scientific perspective, but also from a perspective that can help elucidate the complex ways in which meanings are constructed. I explore the variety of social values, norms, and expectations that constrain and fashion our views about this issue.

Chapter six explores the nature of the contrarian scientific discourse that has emerged in influential and popular opposition to the consensual scientific view. Here I explore the challenges posed when those within the scientific establishment itself publicly undermine scientific theories of political, social and environmental significance. I demonstrate how the two opposing sides of the

debate – the contrarian versus the consensus view scientists – draw from different constructions of science to argue their positions in the public sphere.

In chapter 7 I analyse extracts from the same data corpus presented in chapter 6. Here, I examine the role played by distancing oneself from ideological bias, in the discourse of two prominent Australian scientists – Ian Plimer and Barry Brook. In this chapter I demonstrate that distancing oneself from ideological thinking, whilst simultaneously accusing one's opponent of ideological thinking, is a pervasive rhetorical technique used by these scientists (and arguable many others in this debate). Drawing from the 'end of ideology' framework (see Weltman, 2004; Weltman & Billig, 2001), I argue that appeals to science to inform policy about ACC are undermined by the contentious nature of ACC science as it appears in popular culture. If both sides of the debate appeal to the scientific facts to inform a technocratic, non-ideological policy approach to this issue, the general public, and even politicians, are unable to determine what the appropriate course of action is, because the science upon which policy is based is presented as highly contestable. I argue that such appeals to a non-ideological approach to ACC policy has stymied attempts to implement policy, and that if we are to generate effective policy to reduce GHG emissions, we must consider reframing ACC such that issues of morality and values are brought to the fore.

Chapter 8 extends the ideological conundrums inherent in the ACC debate by examining the political rhetoric used by Australia's political elites over the course of the development of market-based climate change policy. Here I explore the ways in which environmental imperatives are subordinate to economic ones,

creating an ideological dilemma (Billig, Condor, Edwards, Gane, Middleton & Radley, 1988) that serves as a barrier to generating the support of a voting public whose immediate livelihoods may be threatened by economic action on ACC.

In conclusion, I summarise my main findings and argue that competing constructions of ACC science and the ACC problem more generally, have been fuelled by competing moralities underpinning opposing ideological discourses. These ideological imperatives fuel the ACC debate by pitting the environment against the economy, as if the two are incompatible. Paradoxically, however, such a move has resulted in a technocratic approach to climate change policy, whereby to deny one's position as ideological serves as a rhetorical mechanism for asserting the pragmatics of ACC action. Whilst this may work well as a rhetorical move for political purposes, it does little to generate a susbstantial ACC narrative that encompasses the moral reasons for action. As such, the conversations required to explain precisely why action is so important and in everyone's best interest, remain absent from public discourse. Given the power good rhetoric has over public opinion, and subsequent support for policy, the need for a strong and substantial narrative around the importance of ACC action is paramount. I argue therefore, that action on ACC requires an accompanying discourse that redraws the moral landscape underpining competing ideologies. Without a fundamental re-working of the discourses that shape ACC in the public sphere, the possibilities for advocating structural action to reduce GHG emissions will continue to be compromised.

Throughout the writing of this thesis, I have grappled with the ACC debate myself. Taking a constructionist approach with the majority of the analytic and theoretical focus has required a sustained awareness of the constructed nature of my own views about ACC. This has been the cause of quite extreme shifts in my views over the 5 years it has taken me to complete this thesis, and an awareness that the perspective I have ultimately taken on this issue encompasses far more than simply being convinced by the science of ACC. My views on ACC have been formed by a basic undestanding of the science, but also by reflection on what I understand to be ethically and morally just. I have reflected upon my own ideological persuasions, calling them into question and attempting to deconstruct myself. The ideas that I present here are reflective of my research and analysis, but also of what I have seen going on in myself as I tried to make sense of the ACC debate more broadly. I have come to understand that the formation of my views on this issue is probably not too dissimilar to the formation of views in a majority of people – a combination of the things we read, the views we hold about science and government, and what we believe about our place as humans on this planet, amongst a myriad of other identity, cultural and socio-political factors. These perspectives hold real power, as they are not simply abstract notions, independent of the physical world exisiting 'out there'. As a political and social issue, ACC epitomises the connection our cultural and moral systems have with the natural world that sustains us. Ultimately, our collective response to ACC, formed as it is and will continue to be through the meanings we construct, will reflect the values of our times. What we consider to be the 'right' course of action on ACC will be evident in the climatic conditions of the future, demonstrating just how powerful our views about ACC really are.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

Anthropogenic climate change is one of the most compelling public scientific debates of our time. Alongside genomics, nuclear power, GM foods and stem cell research, ACC has emerged as a highly controversial issue, with social and political debate engulfing all areas of the ACC phenomenon, including its legitimacy as a scientific theory and its political, social and environmental implications. All areas of social life are divided on this issue, from political, economic, business and industry, through to NGO's and community sentiment; a division which has no doubt been heavily influenced by media reporting of ACC science. Particular editorial lines that prioritise ACC scepticism, contrarianism and denial, and the journalistic tradition of presenting both sides of socially controversial topics (Boykoff & Boykoff, 2007), fuel the mistaken belief that ACC science lacks broad scientific consensus. However the scientific consensus that climate change is happening and that humans are the main drivers of it is now well established. Ninety-seven percent of self-identified actively publishing climate scientists accept the tenets of ACC (Anderegg et al, 2010). Anderegg et al (2010) identify that top researchers in the climate researcher community, assessed for expert credibility by their expertise and prominence in the field, are in very high agreement about the reality of ACC, vastly overshadowing the number of contrarian scientists. Likewise Oreskes (2007) reports an analysis of abstracts from the ISI web of knowledge database revealing that of 928 abstracts found using key words 'global climate change', none openly refuted the scientific consensus. As Oreskes (2007) notes, science requires the broad and stable

consensus of the experts in the field. Whilst indirect evidence and inductive inference can form the basis of scientific development, this evidence and the inferences derived must be acceptable to the relevant experts. These experts draw upon the weight of available empirical evidence, which is evaluated according to the accepted methodological approaches of the field. As such, policy questions that require scientific evaluation must seek the scientific consensus (Oreskes, 2004).

Whilst such a process generally works well in most areas of science, the rejection of expert views in regards to ACC science has plagued attempts to generate political and community support for action. In an attempt to understand why ACC science has come under fire, and why and how denial of ACC has proliferated in the public sphere, this chapter will review the available literature exploring the nature of ACC scepticism, contrarianism and denial. The focus will be on literature generated within the Australian context; however I also draw from literature informing this aim that has been conducted around the world, particularly in other English speaking Western nations, such as the US and the UK. I draw attention to the fact that the issue of ACC has drawn considerable research interest over the past decade within the social sciences. It is not the scope of this thesis to review the breadth of this research. Rather, the focus will be on the nature and prevalence of ACC scepticism, contrarianism and denial, and the broad social factors that find influence over common understandings of ACC. The literature covers a variety of academic fields within the social sciences and is both quantitative and qualitative in nature. As will be shown there is scope for greater exploration of the structural, institutional and social factors that

influence constructions of ACC than the current literature provides. Moreover, the way in which various stakeholders, from scientists to politicians, rhetorically construct their positions on climate change to generate public and political support, is under-explored in the literature.

2.2. Literature review

The aim of the current review is to address the broad question: what contributes to the debate around the reality of ACC? The following review will address this question by focusing on issues related to ACC scepticism, contrarianism and denial. I will begin by clarifying the sceptical terminology, before discussing the prevalence of ACC scepticism, contrarianism and denial. I then go on to explore the relationship between scepticism and political ideology, and the factors that have contributed to changes in public sentiment toward ACC over time, before finally discussing the moral and ethical challenges inherent in the ACC problem. The challenge ACC poses to our modern industrial and capitalist society has seen the emergence of fierce opposition to action on ACC, and as will be shown, ideological differences underpin this opposition in all areas of the debate and are a common theme in the research under review. I acknowledge that the areas identified in this review are by no means exhaustive of the factors that contribute to debate, controversy and confusion around ACC[1];

[1] In particular I note the roles of experience with extreme weather (e.g. Whitmarsh, 2008; Donner & McDaniels, 2013), climate change knowledge (e.g. Ashworth, Jeanneret, Gardner & Shaw, 2011), affect (Myers, Nisbet, Maibach & Leiserowitz, 2012), media bias (Boykoff & Boykoff, 2007) issues of identity (e.g. Jaspal, Nerlich & Cinnirella) and demographic characteristics such as gender and race (e.g. McCright, 2010; McCright & Dunlap, 2011b). I have chosen to exclude these areas due to space constraints, and direct relevance to my thesis is not established. I also

however the areas covered by this review offer valuable insights into many of the social factors that configure and constrain our understandings of ACC. These social factors have attracted extensive attention by many researchers from a variety of fields within the social sciences, thereby offering an extensive corpus of literature for review.

2.3. SCEPTICISM, CONTRARIANISM AND DENIAL

ACC scepticism is one of the most common terms used to describe those who challenge the reality of ACC; however it has been noted that this is an imprecise term that has multiple meanings in the context of the ACC debate (Poortinga, Spence, Whitmarsh, Capstick & Pidgeon, 2011). Many key terms, such as scepticism, denial, cynicism, ambivalence and uncertainty are often used interchangeably (Poortinga et al, 2011), confusing the already complex nature and social scientific understanding of the debate. For the purpose of this thesis I draw upon the argument proposed by Robert Mann (2012), who makes the distinction between scepticism, contrarianism, and denial:

> "… 'Scepticism' suggests an open mind. The minds of those who dispute the consensual core of climate science are closed. 'Contrarianism' is a term commonly used, even by some of those who are best informed, like the climate scientist Michael Mann. 'Contrarian' might be the right term for the small minority among climate scientists who have not accepted the consensual conclusion of their fellow scientists. The contrarian is a loner, perhaps cranky, but also genuinely independent

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touch very little on experimental research, despite its value in demonstrating how various constructions of ACC impact on particular individual variables relating to behaviour change (e.g. Corner& Hahn, 2009).

> of mind. Most of those who dispute the consensual conclusions of the climate scientists are not mavericks or heretics but orthodox members of a tightly knit group whose natural disposition is not to think for themselves. To dispute the conclusion drawn by climate scientists involves for them neither the open mind of the sceptic nor the cranky independence of the contrarian but the determination – psychological or political or both – to deny what those who know what they are talking about have to say. They are denialists." (Mann, 2012)

Richard Muller supports this distinction by commenting that sceptics have raised legitimate concerns with ACC science and remain open-minded, whilst deniers pay attention only to data that support their pre-existing conclusions (in Corbyn, 2011). But whilst these terms are not to be used interchangeably, similar themes and discourses exist across all three categories. Much of the literature cited here uses different terms for what is, generally speaking, an oppositional stance toward the reality of ACC. Throughout the literature review, I will endeavour to maintain the language used by the original authors. However, for the purposes of this thesis, the term 'scepticism' will be used to refer to the general position that takes as it's starting point a questioning approach to the reality of ACC, 'contrarianism' will be used to refer to those (mostly) scientists who independently reject the scientific consensus on ACC, and 'denial' will be used to refer to the deliberate and systematic movement that discredits and misrepresents ACC science and scientists.

The general oppositional argument embodied by these terms clearly houses a complexity and logic that contains the seeds of a reasonable narrative. Hoffman (2011) investigated the 'sceptical' and the 'convinced' logics by conducting interviews with participants at the largest annual climate denier

conference in the world – the Fourth International Conference on Climate Change, hosted by the Heartland Institute in May 2010. The data corpus also includes extensive editorial analysis of US newspapers to capture the institutional logics and broader ACC discourses within the ACC debate. The study demonstrates differences between the two logics that may account for the lack of effective dialogue between the opposing camps in this debate. The 'sceptical logic' is described as relatively hierarchical and individualist in nature, capitalist, and sceptical of the environmental movement more generally. The 'convinced logic' was in direct opposition to this, being egalitarian, supportive of regulation, and accepting of the risks posed by ACC (Hoffman, 2011).

Hoffman's (2011) analysis included a thorough description of the elements that comprise the different logics, and identified 3 frames drawn upon to construct particular versions of ACC: 1) *diagnostic* (defining problems and focusing blame), 2) *prognostic* (suggesting what can be done about them), and 3) *motivational* (telling participants why they should act). The 'sceptical logic' employed a predominantly diagnostic frame focused on themes relating to the economic risks of action, undermining the science, and undermining the cause by dismissing it as ideologically driven. Alternatively, the 'convinced logic' drew more on prognostic frames – accepting the science and looking for solutions – around risk and ideology. Risk was constructed very differently by the two opposing logics, with those convinced about ACC describing the risks associated with inaction, whilst the sceptics described the risks associated with action (Hoffman, 2011). The two logics have different frames for understanding the issue and are therefore 'talking past each other', as Hoffman (2011) explains:

"…there appears to be a deepening schism between the sceptical and convinced logics, one that rests on foundational arguments that are based on different worldviews, different issues and different frames to communicate them" (p. 33).

Whilst the sceptical logic invokes ideology as the driving factor behind the ACC movement, it fails to recognize the ideological bases embedded within its own logic. And yet there is a significant amount of research demonstrating the relationship between ideological conservatism and ACC scepticism, contrarianism and denial (e.g. McCright & Dunlap, 2000; 2010; 2011b). ACC denial is not a movement that emerged in isolation from a political context. McCright and Dunlap (2000) analysed documents circulated by major conservative think tanks such as the Heartland institute and the National Centre for Policy Analysis between 1990 and 1997 for the nature of their counter-claims, and how they constructed ACC as non-problematic. They identify three primary claims that were used by ACC deniers to undermine the science: The first is that the evidentiary basis of global warming is weak or even wrong. This claim was connected to a number of arguments drawing on uncertainty, undermining and misrepresenting the consensus, and discrediting the science as junk science, which in turn allowed them to claim that they have aligned themselves with 'sound science'. This claim encompassed the idea that climate scientists had intentionally misrepresented and doctored reports for political reasons, that ACC is a myth perpetuated by environmentalists and bureaucrats to garner support for their cause and justify action, and that ACC was a political tool of the Clinton administration. The second claim used by ACC deniers is that global warming would be beneficial if it were to occur, to tourism, health and

agriculture, with an assertion that the benefits would outweigh the costs. The third and final claim stresses that global warming policies would do more harm than good; including the theme that action would be harmful to the economy, specifically to business and industry, workers and consumers. This claim also included the argument that action on ACC would be detrimental to national security, as treaties jeopardize military intelligence and readiness, and threaten national sovereignty by turning US power over to international bureaucrats. Moreover, this argument includes the paradoxical claim that the proposed treaties will actually result in environmental degradation. Such claims have real world-effects when disseminated throughout the media (e.g. Antilla, 2005; Boykoff & Boykoff, 2007), framing social discourses on ACC now present in the general public (e.g. Leviston, Leitch, Greenhill, Leonard & Walker, 2011) and political sphere (e.g. Fielding, Head, Laffan, Western & Hoegh-Gildberg, 2012; Jacques et al., 2008).

This 'misinformation' about ACC science manifests in a range of different sceptical positions. Hobson and Niemeyer (2012) report differentiation between five types of scepticism in a comprehensive mixed-methods Australian study. Participants responded to a range of questions measuring scepticism along three variables: *reality,* the denial of rising global temperatures; *causality,* the denial of human involvement in rising global temperatures; and *impact*, the denial that the effects of ACC will be substantially detrimental. Table 1.1 below outlines the 5 discourses identified by Hobson and Niemeyer, and the defining characteristics of each.

Table 2.1. Discourses of scepticism identified by Hobson and Niemeyer (2012) with associated characteristics

Discourse A: Emphatic Negation	• Climate change is not happening • Nobody is in a position to say whether ACC is happening • Observed changes are attributable to natural variation • Do not support action to reduce GHGs • A profound distrust of a range of authority figures and a somewhat hubristic conviction in their viewpoint
Discourse B: Unperturbed Pragmatism	• Milder form of climate change scepticism • Rejection of proffered policies, driven by a form of implicit cost–benefit analysis • Optimism that society will be able to adapt to any coming changes because there is still time to take action as any climate change is not yet upon us
Discourse C: Proactive Uncertainty	• A kind of centrist scepticism that shares specific elements with the other four • Doubt about whether the climate really is changing • General impact scepticism • Not emphatic, adopting hedging that action should be taken at individual and collective levels despite uncertainty • Relative indifference to policies and tendency towards inaction
Discourse D: Earnest Acclimatisation	• Most strongly associated with causal scepticism • Belief in climate change as a natural phenomenon, about which we should be concerned • A desire to adapt to climate change, but not to reduce greenhouse emissions
Discourse E: Noncommittal consent	• Not emphatic in their scepticism but rather are fundamentally uncertain about key aspects of climate change • Overall greater level of concern about climate change compared to the other discourses • Concession that it is probably a real, anthropogenic phenomenon • Uncertainty means greater emphasis is placed on doing something about potential impacts rather than causes

Hobson and Niemeyer (2012) aimed to determine how resistant such discourses are to change after intervention comprising a deliberative 4-day forum including in-depth interviews. The forum did see a migration of all views toward the noncommittal consent discourse (Discourse E), but this effect was short-lived for about half of participants, who returned back to their original position (Hobson & Niemeyer, 2012). The authors note that whilst this is

generally a positive outcome, given the time and resources put into the interviews and forum by the researchers, that more participants did not significantly move away from sceptical discourses raises questions about the types of intervention that would be necessary to challenge ACC scepticism. The authors argue: "… if 2 hours seeing (at times quite challenging) climate scenarios for your local region, and then 3 days spent deliberating cannot dispel the myriad of forms of climate scepticism, what will?" (Hobson & Niemeyer, 2012, p. 13). The authors posit that identification with the sceptical identity may be an important component of one's self-concept, and thus difficult to change.

2.4. The prevalence of ACC scepticism, contrarianism and denial

Gauging the prevalence of scepticism, contrarianism and denial is not a straightforward process. A number of studies have reported inconsistent findings, which are often attributed to measurement variability (see McCright, 2009). In particular, variation in question phrasing (Leviston, Leitch, Greenhill, Leonard & Walker, 2011), the effects of different conceptual framings, data collection and methodology will greatly influence the results of traditional survey techniques designed to measure the prevalence of particular attitudes in a community (Reser, Pidgeon, Spence, Bradley, Glendon, Ellul & Callaghan, 2012).

In a review of 22 studies of Australians' views of ACC, Leviston et al. (2011) explored the prevalence of ACC scepticism in Australia by reviewing a number of surveys and opinion polls conducted over the period 2008-2011. The authors

examined the extent to which Australians viewed ACC as happening and attributable to human activity, support for policy, differences between different community groups (such as rural and urban), and similarities with views from the US and UK. A complex understanding about what climate change is was reported, which the authors attribute to question phrasing. When questions referred to climate change as being partially caused by human activity, up to 90% of respondents agreed that climate change was happening. However when the question implied climate change was solely a man-made problem, this figure fell to 50% (Leviston et al., 2011). Variation in acceptance of climate change also resulted from questions distinguishing between current and future climate change. Leviston and Walker (2012) have also reported that a substantial 40% of respondents to an online questionnaire about climate change agreed with the statement *I think climate change is happening, but it's just a natural fluctuation in Earth's temperatures*. Views about ACC are clearly nuanced; therefore survey questions must include the varying 'types' of scepticism when attempting to gauge how prevalent sceptical views are in the community.

In the US, Lieserowitz, Maibach, Roser-Renouf and Smith (2011) identified 6 'interpretative communities' in a comprehensive survey-based study conducted in June 2010. These groups somewhat parallel the discourses identified by Hobson and Niemeyer (2012) above, and consisted of *alarmed* (13%), *concerned* (28%), *cautious* (24%), *disengaged* (10%), *doubtful* (12%) and *dismissive* (12%). This analysis highlights the breadth of views on ACC and (despite the relatively low prevalence of participants in the *doubtful* and

dismissive categories) the challenges to engaging a large portion of the public in greenhouse gas reduction strategies.

Similar results have been found in Australia where a CSIRO study by Ashworth, Jeanneret, Gardner and Shaw (2011) identified 'interpretative communities' in the Australian sample along two dimensions: knowledge of climate change (this construct was a combination of participants' actual knowledge and their self-reported knowledge) and concern about climate change (this construct included self-reported concern about ACC, belief in the information presented by climate scientists and the media, and support for government action). Ashworth et al. (2011) identified four different groups within their sample. *Engaged* (27%) participants reported moderate to high knowledge about ACC, high concern, and were supportive of government action. *Concerned and confused* (36%) reported less certainty than those engaged; however they reported moderate to high concern, moderate knowledge, and some support for government action. The *disengaged* (15%) reported the lowest levels of ACC knowledge, moderate to low concern, and were not supportive of government action. Responses for this group were commonly 'neither agree nor disagree' on the Likert scale; demonstrating members of this group were neither interested nor involved in the ACC problem. These first three groups share the common feature that their levels of knowledge and concern are correlated.

The *doubtful* group (23%) reported the lowest concern for ACC but with a moderate level of knowledge (Ashworth et al. 2011). However, much of the knowledge reported by this group consisted of arguments proposed by the denial movement (see McCright & Dunlap, 2000, above). The doubtful group

ranged from confirmed ACC deniers through to those with less extreme views; however they shared the common feature of not supporting government action. The moderate amount of knowledge possessed by this group poses a problem for policy aimed to mitigate ACC. Members of the doubtful group are prepared to educate themselves about ACC, and are not dismissive of it as a political issue; however the knowledge and arguments that uphold this position distort the truth about ACC science, thereby maintaining and reiterating 'misinformation' as opposed to accurate scientific information about ACC. Overall, Ashworth et al. (2011) report that 78% of Australians believed ACC is real, 63% agreed it is already happening, 15% believed it will happen in the next 30 years, 15% were unsure about climate change, and 7% did not believe it was happening.

Whilst such studies allow social scientists and other interested stakeholders to approximate the prevalence of views within society, such analyses are constrained not only by the limitations of traditional survey methods, but by the complex and nuanced nature of the issue, and the diversity of understandings. Billig (1987) argues that inconsistent research findings can arise when attempting to measure attitudes not simply because social scientific research techniques are imperfect, but also because "our attitudes are not neat bundles of responses awaiting the opinion-sampler's clipboard, but they represent the unfinished business in the continual controversies of social life" (p. 225). ACC represents one such controversy, and the complexity associated with investigating perceptions of this issue is undoubtedly related to the complexity of the issue as it presents in the political context. Billig (1989) argues it is unrealistic to assume that social actors inevitably divide into opposing sides in a

social controversy, but rather that the dilemmatic aspects of the controversy can exist within a single point of view, and may therefore be commonly shared by all engaged with the controversy. In this way, it is the controversial nature of the social issue that creates ambivalence within the social structures that define it (Billig, 1982).

The opportunity to analyse detailed and elaborated data is highly important for capturing this complexity of perceptions of ACC. By utilizing qualitative methods researchers are better able to explore the ways in which participants elaborate upon the issues in question (Billig, 1987). Billig argues that social researchers should not expect individuals to simply agree (or disagree) with a statement, because the process of controversy and rhetoric is situationally determined and reliant upon counter-argument and potential critical challenge. Moreover, this theoretical perspective accommodates the finding that perceptions of climate change have changed over time, in line with changing cultural and social factors (Brulle, Carmichael & Jenkins, 2012; Devinney, Auger & DeSailly, 2012). As Trumbo and Shanahan (2000) astutely note, "…the public has vacillated between hysteria and boredom." (p. 200)

One such study that demonstrates Billig's point explored increasing reports of scepticism towards ACC through the concept of sociological ambivalence (Carolan, 2010). Carolan's study involved interviewing participants using questions regarding perceptions of ACC from the US 2009 Gallop poll, and then prompting them to elaborate on their initial response. The contradictory nature of the views was justified in the interview process. For example, participants expressed serious concern over climate change but believed the

media exaggerates the severity of it; they reported concern about ACC but felt nothing they do could help mitigate the problem; participants also expressed concern for ACC but admitted they do not worry about it (that is, they feel helpless so avoid worrying about something they cannot control). Moreover, participants were able to self-reflect upon the different roles they must play in their lives, acknowledging the difficulties in acting consistently, and according to their beliefs (Carolan, 2010). This combined approach to data collection – both traditional survey questions augmented by further elaboration by participants – yielded much broader perspectives about ACC, and demonstrates that the levels of scepticism reported in quantitative analyses may be misleading. As Billig would predict, this demonstrates that perceptions can accommodate a complex and often contradictory array of elements and that people engage in critical and argumentative reasoning in a much more elaborate way than traditional survey response questions are able to capture.

2.5. Political ideology and views about climate change

Despite the limitations of traditional quantitative research techniques, political ideology has emerged as one of the most consistent and robust predictors of beliefs about ACC within the general public (e.g. Borick & Rabe, 2010; Hamilton, 2010, 2011, 2012; Kahan, Peters, Wittlin, Slovic, Larrimore Oullette, Braman & Mandel, 2012; Malka, Krosnick & Langer, 2009; McCright, 2009; McCright and Dunlap, 2011a, 2011b; Zia & Todd, 2010). In the US, McCright and Dunlap (2011a) report an unequivocal relationship between

political and ideological views and perceptions of climate change. The authors demonstrate that beliefs consistent with the scientific consensus and expressing concern about climate change are more likely from members of the public with Left leaning political views. The authors suggest that the public incorporates the views of political elites whose ideology aligns closely with their own. New information about ACC is unlikely to reduce this divide as those who believe in ACC filter the information to confirm their views, whilst those who do not believe negate such information (McCright & Dunlap, 2011a). That is, the public incorporate new information from trusted political elites into pre-existing paradigms reflective of their political leanings.

This finding is extended in an Australian study that reports on the influence political leaders have over environmental attitudes (Tranter, 2011). Labor and Green identifiers are three times more likely than their conservative Liberal/National counterparts to believe that ACC will pose a serious threat in their lifetime, and these partisan differences were even more pronounced for support for the Kyoto protocol (Tranter, 2011). Moreover, Tranter reports that party identification is not the sole factor people consider when forming their views; trusted political leaders in general, irrespective of party identification, exert an influence over people's views about ACC. For example, those who evaluated former Liberal leader John Howard (who was known for his conservative views on ACC) positively were more likely to be sceptical of ACC, whilst those who evaluated Labor and Greens leaders more positively were more likely to view ACC as a serious threat in their lifetime, despite their preferred

party affiliations. Tranter (2011) argues that in the context of political division people trust the views of other political leaders whom they evaluate positively.

A relationship has also been reported between political ideology and gender on views about ACC (McCright & Dunlap, 2011b). The "Conservative white male effect" explains the finding that Conservative white men, and particularly those who self-report high understanding of ACC, are significantly more likely to reject the consensus view of climate change (i.e. are more likely to be a climate change 'sceptic') than are females, non-whites and those with Left leaning political beliefs. The authors posit two explanations for this phenomenon, the 'system justification thesis' and 'identity-protection cognition thesis' to explain the effect, in what they describe as a "…socio-political explanation of climate change denial" (McCright & Dunlap, 2011b, p. 1164).

Given that conservative white men are more likely to hold positions of authority and power in the current industrial economic system, the 'system justification thesis' explains that denial of the reality of ACC allows this group to defend the system that maintains the status quo and hence, their power and authority within that system. The 'Identity-protection cognition thesis' similarly explains how the identity and roles of conservative white men are defended through their identification with the group that has a long tradition of holding positions of power and authority (Kahan, Braman, Gastil, Slovic & Mertz, 2007). In other words, conservative white men have a particular way of viewing ACC because of the social group they identify with and the norms, traditions and social roles that come along with such identification; as McCright and Dunlap

explain: “climate change denial seems to have become almost an essential component of conservative white male identity” (p. 1168).

Studies of policy and ideology offer an avenue for greater depth of analysis regarding the achievement of public support for various positions on climate change. Carvalho (2007) emphasises the co-constructed nature of scientific knowledge through its reproduction/reconstruction in both media and political discourses (see also Zehr, 2000). As scientific knowledge becomes embedded in public and political life, ideological agendas transform its character (Carvalho, 2007). The versions of knowledge conceived in this way employ scientific ‘facts’ to warrant, justify, and defend courses of action in line with political aims. This is evidenced by media corporations in Britain accommodating reports on the illegitimacy of climate change in line with their known political leanings (Carvalho, 2007).

When the media reports on the ‘need to act now on climate change’ or that ‘climate change is a lot of hot air’, they are doing more than simply reporting a story or providing a discourse; they are also attempting to convince their readers of the facticity of their accounts. Given that public support is essential for any policy implementation, this rhetorical work is considered an integral part of the social construction of climate change, and thus the ways in which it will be addressed. How these discourses achieve public support is therefore unclear without more detailed analysis than the current literature provides.

Within Australia, similar ideological divides are evident, particularly in the political rhetoric that has surrounded ACC discourse over the past decade (Kurz, Augoustinos & Crabb, 2010). Climate change was a key issue in the lead up

to the 2007 Australian federal election, with the Liberal and Labor parties both fashioning social identities around climate change policy issues to contend for office (Kurz et al., 2010). In appealing to the 'national interest' and 'economic growth', both parties were able to establish themselves as the appropriate choice for Australians, despite their radically different stances on climate change. Ultimately, the Labor party was able to position themselves as the rational 'middle ground' against the Liberal's sceptical stance and the Green's proposition to shut down the coal industry (Kurz et al, 2010). The Australian Labor party successfully won office in 2007 in what has been described as "the world's first climate-change election" (Glover, 2007). Kurz et al. (2010) used the principles of Discursive Psychology (Edwards & Potter, 1992) to examine political discourse in the climate change debate in Australia, focusing on the ways in which discourses actively construct particular versions of reality. The benefits of such an approach lie in the focus on how particular rhetorical and discursive devices achieve public support for ACC policy; that is, the power good rhetoric can have over public opinion.

2.6. CHANGE OVER TIME

Reynolds, Bostrom, Read and Morgan (2010) suggest that the relationship between public understanding of ACC and concern for its outcomes is influenced by the content, rather than just the amount of knowledge received. The authors found an increase in scepticism from 1992 to 2009, which they attribute not only to an increase in information but importantly, the presence of sceptical

discourses in the media. Moreover, they found that public understanding had not increased appreciably in the 17 years, despite the increasing presence of ACC as a major political, social and environmental issue. The authors suggest that the presence of competing accounts of climate science in the media and political arena serve to provide different types of information available to the general public. Thus, the politicisation of ACC, arguably, has had a significant effect on public perceptions. Individuals incorporate new information into their pre-existing beliefs, which are to a large extent augmented by the cues from trusted political figures and media outlets (McCright & Dunlap, 2011b), and relate to issues of identity (McCright and Dunlap, 2011b). As Reynolds et al. (2010) argue, aggregate level understandings of ACC are susceptible to change over time; and they suggest this is due to the changing nature of ACC in the social and political context. This notion has been explored in greater depth in two recent studies conducted in Australia and the US.

In Australia, Devinney et al. (2012) conducted a comprehensive analysis of the social, economic and political preferences of Australians, focusing on the trade-offs people use when making decisions about materially important issues. The authors use best-worse scaling scenarios, which they argue, "models the cognitive process individuals use as they select the largest perceptual difference seen in a set of options" (Devinney et al., 2012, p. 13). In other words, best-worst scales allow participants to choose between socially relevant issues, demonstrating how they give priority to certain issues over others. Sixteen categories were used in the study, and included issues such as minority rights, food and health, local crime and safety, economic matters, and environmental

sustainability, amongst others (Devinney et al., 2012). Best-worst scales are argued to be particularly relevant to the investigation of social, political and economic issues because individuals make distinct choices through discrimination, and such methods allow for direct comparison between people (Devinney et al., 2012). Unlike traditional surveys where a score of 3 for one person may not equate to a score of 3 for another person, in the best-worst approach participants are making the same choice out of the same set of options (Devinney et al., 2012).

Whilst the report assessed a large number of social, economic and political issues, perhaps the most startling and critical finding was the degree to which environmental sustainability dropped in the general preferences for Australians from 2007 to 2011. This finding was robust for both the general category of environmental sustainability and at the specific issue level, including the priority given to ACC (Devinney et al., 2012). ACC fell from a ranking of 12th most important issue in 2007 to a ranking of 51 in 2011 (Devinney et al., 2012). The significant decline in the importance of environmental sustainability was the largest decrease of all the categories examined by Devinney et al. (2012). In 2007, more than half of the specific environmental issues examined appeared in the top 25 concerns for Australians: industrial pollution (5th), alternative energy generation (8th), climate change (12th), deforestation and habitat destruction (13th), and depletion of energy resources (25th) (Devinney et al., 2012). Moreover, no environmental issue appeared in the bottom 25 concerns for Australians in 2007. By 2011, only deforestation and habitat destruction remained in the top 25 concerns, ranked at number 24 (Devinney et al., 2012).

Two environmental issues moved to the bottom 25, and all the environmental issues that mattered to Australians in 2007 fell dramatically by 2011.

Also of concern is the finding that similar decreases in the salience of environmental issues were reported in data collected from Germany, the UK, and the US. (Devinney et al, 2012). Poortinga et al., (2011) report that public belief in climate change in the UK dropped from 91% in 2005 to 78% in 2010, and that those denying any change in the world's climate grew from 4% in 2005 to 15% in 2010.

While it is tempting to attribute this to the changes in global economics, particularly the global financial crisis (GFC) of late 2007/2008, Devinney et al. (2012) demonstrate that the decrease in concern for environmental sustainability has not been replaced by economic concerns. Concern in cost of living did rise to 3rd on the list of most salient issues; however it was already a salient concern in 2007. Devinney et al. (2012) suggest that, rather than viewing the fall in salience of environmental issues for Australians, 2007 should be viewed as an anomaly. Environmental issues emerged in 2007 as part of a mainstream environmental push that changed from being simply ideological concerns to "having [the] potential for actual impact on power structures and economic forces" (Devinney et al., 2012; p. 38). The environmental movement thus enjoyed a period of unprecedented popularity and mainstream status that ultimately left it open to greater scrutiny and critical appraisal from a wide range of social, political and economic interests (Devinney et al., 2012). Devinney et al. (2012) suggest that the decreased salience of environmental issues in 2011 is likely to reflect "a long-term trend in the value of environmental matters to the

general population" (p. 38) in both Australia and other similar Western countries.

In a similar US study, Brulle et al. (2012) found that important social and political issues in recent years have had a noticeable impact on public opinion on ACC. Rather than focusing on individual attitude change, the wider social, cultural and ideological influences on aggregated patterns in public opinion were examined (Brulle et al., 2012). The authors drew from Zaller's (1992) Receive Accept Sample (RAS), which describes how people tend not to internalize certain issues they consider low salience (Brulle et al., 2012). Rather, people will use the most recent information they have received on an issue, which often comes through the media and/or political elites. The attitudes of an individual can therefore vary widely over time, and are influenced by media reporting and ideological cues (Zaller, 1992). Brulle et al. (2012) also draw from Stimson's (1999) "policy mood" analysis, which measures aggregated opinion towards particular government action. By analysing a cross-section of community opinion on policy matters, public mood on specific policy issues has been found to gradually change over time (Stimson, 1999; see also Brulle et al., 2012). Bringing these ideas together, Brulle et al. (2012) measure the important social and political factors that have run parallel to changes in public mood on ACC from 2002 - 2010.

Using a complex algorithmic measure derived from Stimson (1999), Brulle et al. (2012) develop a measure of central tendency across 74 surveys conducted in the US over the 8-year period. A Climate Change Threat Index (CCTI) was derived out of 14 questions from the 74 surveys that tapped into the

salience and perceived seriousness of ACC. The authors report a "steady and persistent increase" in the CCTI beginning in early 2006 and continuing through to mid/late 2007, peaking at 53.2 points; an increase of 10 points, or 3 standard deviations, from 2002-2005 levels (Brulle et al., 2012, p. 173). This was a peak period in the CCTI, which then rapidly decreased during the third quarter of 2007, falling by 9.2 points by late 2009 (Brulle et al, 2012). It remained at this level throughout 2010.

In order to account for these changes, Brulle et al. (2012) tested the influence of five factors plus control variables on the CCTI. The five factors consisted of 1) *extreme weather events*, including drought and extreme temperatures; 2) *scientific knowledge* as measured by the number of ACC related articles in scientific journals and popular science magazines, as well as major reports such as the IPCC reports; 3) *mass media coverage*, focusing specifically on reporting of ACC in the major broadcast TV networks (NBC, CBS, ABC), as well as print media (New York Times, Newsweek, Time, US News and World Report); 4) *media advocacy*, specifically the number of stories in major environment and conservative magazines, and the number of mentions of *An Inconvenient Truth* in the New York Times; and 5) *elite cues*, measured by Congressional press releases by both Democrats and Republicans, Senate and House roll call votes on ACC bills, and the number of Congressional hearings on ACC. The *control variables* consisted of 4 measures of economic and political factors: the unemployment rate, Gross Domestic Product (GDP), war deaths in Iraq, and the price of oil (Brulle et al., 2012).

A model explaining nearly 80% of the variance was derived to account for

the most significant variables to affect the CCTI. These variables include New York Times coverage of *An Inconvenient Truth*, pro-climate change action statements by Democrats, anti-environmental voting by Republicans, the unemployment rate, and GDP (Brulle et al, 2012). Brulle et al. (2012) report that: "New York Times mentions of *An Inconvenient Truth* significantly boosted the public's perception of the urgency of climate change" (p. 181). The authors suggest that the release of this film and the subsequent Academy Award generated significant media attention for ACC and subsequent public attention, which translated into an increase in the CCTI during this time (Brulle et al., 2012). Brulle et al. (2012) report that "[f]or every mention of this movie in the Times, the CCTI increased by .18 points" (p. 181). Moreover, elite cues were found to exert the strongest influence on public opinion. When bipartisan support for environmental bills was strong, public support for action to address ACC was similarly strong (Brulle et al., 2012). A lack of bipartisanship – that is, Republican rejection of environmental bills – related to a decrease in overall public concern for ACC. Increasing GDP and low unemployment also influenced the peak witnessed in 2006-2007 (Brulle et al., 2012). The decline in the CCTI from 2009-2010 corresponds to decreased cooperation between Republicans and Democrats on environmental legislation, fading media coverage of *An inconvenient Truth*, and increased unemployment and decreased GDP following the 2008 GFC (Brulle et al., 2012). Interestingly the model does not include extreme weather events or scientific information, with the authors noting that "[t]he implication [of these findings] would seem to be that science-based information is limited in shaping public concern about the climate change threat.

Other, more directly political communications appear to be more important" (Brulle et al, 2012, p. 184-5)

Overall the results reported by Brulle et al. (2012) point to the importance of political cues and advocacy groups in shaping public opinion on ACC. Importantly, the effect of political polarization on ACC will lead to a similarly polarized community. This polarization between the political Left and Right is longstanding, and is reflective of broader ideological and economic issues, issues of power and interests. Brulle et al. (2012) therefore suggest, "any communications strategy that holds out the promise of effectiveness must be linked to a broader political strategy" (p. 185-186).

The 2007 to 2012 period in Australia saw the political battle to implement a market-based mechanism to mitigate GHG emissions. This was a crucial time for Australia's climate policy as the reform was highly polarized and very difficult to implement. As Devinney et al. (2012) discuss, making the environment salient is crucial for government action on ACC. Relying on the environmental momentum built in 2007 will be ineffective for engaging community support, especially given the partisan nature of climate policy in this country. Research examining how the Australian government has constructed the need for environmental policy in recent years, especially in relation to the very unpopular carbon price, could provide important insight for understanding why this policy has so little community support, and provide the basis for developing stronger environmental narratives with which to approach Australia's climate policy.

2.7. MORALITY AND ETHICS

The moral and ethical implications associated with ACC have been noted by a number of authors as important factors that can both engage and alienate people from this issue (Devinney et al. 2012; Haidt, 2010; Hoffman, 2011; Jamieson, 2007; 2009; Gardiner, 2004; Grasso, 2012; Markowitz & Shariff, 2012). The moral issues associated with ACC are significant and are not limited to environmental impacts alone. The threat of ACC requires a moral response far greater than the altruistic environmental value of protecting and preserving the natural environment; moral and ethical thinking must be engaged with issues related to the practicalities of people's lives, including food security, public health, economic factors and job security. However engagement with issues such as these rarely find mention in the social discourses around ACC. Arguably, the moral narrative of ACC has not yet found its form in mainstream discourse, and a number of studies have attempted to understand the barriers faced by ACC in developing a strong moral narrative with which to cultivate public concern.

Markowitz and Shariff (2012) have suggested that part of the reason why climate change lacks broad acceptance and fails to ignite public concern is because, as a discourse, it fails to engage our instinctive moral processes. Markowitz and Shariff (2012) provide six reasons for this failure and offer six psychological strategies that communicators can use to frame ACC as a moral issue worthy of attention outlined in Table 1.2 below.

Table 2.2. Moral challenges posed by ACC and possible solutions, as identified by Markowitz and Sharriff (2012)

Reasons why ACC fails to engage our moral processes	**Psychological strategies to frame ACC as a moral issue**
1) Climate change is abstract and cognitively complex, making it a difficult issue to understand and therefore engage with	1) Using existing moral values to engage those sceptical of ACC, such as appealing to politically conservative values involving stewardship of nature
2) Climate change is a blameless and unintentional act. Jamieson (2009) argues that a moral problem typically involves the harm of one individual by another in a proximate time and place. Therefore the absence of an identifiable perpetrator of ACC leaves the moral nature of the situation ambiguous	2) Emphasising the benefits over the burdens of action to reduce GHG emissions
3) Guilty bias, whereby the potential guilt arising out of not changing one's environmental behaviours (e.g. recycling, conserving energy etc.) can foster the tendency to deny the seriousness of the problem	3) Using emotional carrots, not sticks, such as the roles that hope, pride and gratitude can play in driving support for action on ACC
4) The uncertainty around ACC breeds wishful thinking. People simply *want* ACC to not be happening	4) Avoiding extrinsic motivators such as economic incentives that can inhibit people from developing their own intrinsic motives for responding to the problem
5) Moral tribalism and ideological polarization, which, as discussed above, contributes to the mistaken belief that one can simply chose not to believe in ACC, justifying such as stance through identification with others who do not believe	5) Expanding group identity by reframing victims of ACC "in ways that underscore shared goals and identities" (p. 246)
6) ACC involves long horizons and faraway places, creating an in-group/out-group mentality between those of us here and now, and those far away and living in the future. The need to act for the benefit of an out-group is far less likely to occur than action that will benefit one's in-group.	6) Highlighting positive social norms around environmentally sustainable behaviour.

Re-framing the ACC discourse to include the moral and ethical factors to initiate greater concern for ACC may not be as simple as Markowitz and Shariff's discussion might imply, which they duly note. The question of how we value future generations, for example, is fundamentally important to the development of policy and economic models aimed at addressing ACC. However no general consensus on how we define such value can be reached. Economic reports such as the Stern report, the Nordhaus report, and in Australia the Garnaut review, require a model that places economic values on future generations to determine the costs of action versus inaction, and there is significant disagreement as to what that value should be (Jamieson, 2009). Such disagreements are ideologically based, and contain competing ideas about what the morally appropriate course of action should be. What and how we value are not universal or static. ACC poses such a significant moral dilemma because it embodies a struggle between competing ideological positions, neither of which can claim a monopoly on what is morally appropriate, but both of which offer a convincing moral argument in their own right. Environmentalism offers a moral narrative that prioritises protection and preservation of the natural environment; capitalism offers a moral narrative that prioritises technological innovation, increasing wealth leading to improved standards of living. Threats to capitalism are also threats to the Western quality of life and standards of living that we value and consider our fundamental rights. And at the heart of the environment/economy battle are implicit moral imperatives that are competing with one another. This is an area that has received little attention in the literature to date and is considered an important element in understanding how

and why the debate is maintained, and why it is so difficult to find consensus either on the reality of ACC or the type of action that can reasonably be taken to mitigate it. The moral discourses that have dominated Australian political rhetoric around ACC, particularly from former Prime Minister Kevin Rudd during 2007-2008, suggest that this might be an important area to examine in detail. To date there has been little research exploring how moral issues underpin sceptical sentiment, either in public understanding or policy response.

2.8. Future research

The emergence of the conservative counter-movement in the US is clearly well documented and the literature in this field forms the bedrock of our understanding of how and why ACC denial developed and gained momentum over the past three decades. The ideological basis for denial is therefore apparent, as Robert Mann (2012) succinctly puts it, the handful of scientists discrediting ACC science during this time "were ideologically predisposed to disregard any problem that mainstream scientists attributed to market failure." However, too strong a focus on ideological differences within the debate overshadows the importance of the actual messages, the detail of the arguments, offered by contrarian scientists to the general public. Contrarian scientists offer the public, and indeed politicians, an alternative narrative with which to engage in the ACC controversy. In fact these discourses offer an opportunity to *not* engage with what is a very complex and challenging problem. 'Mixed messages' received about a scientific controversy have been found to reduce cognitive dissonance by providing a 'way out' of having to make drastic changes to our

lifestyles, with disagreement between experts appearing to dilute scientific messages (Corner & Hahn, 2012). The presence of contrarian scientists in the media, such as Ian Plimer or Bob Carter in Australia, or Fred Singer in the US, dilutes the scientific message about ACC. Their status as a scientist gives credibility to their claims, thus generating the appearance of greater validity than their claims actually warrant. To date little research has explored the role that scientists themselves play in constructing the science of ACC for mass consumption, particularly contrarian scientists who hold powerful positions within this debate and exert significant influence both over the public and political elites. Moreover, a constructionist perspective informs us that it is not solely the content of such discourses that holds sway over public perceptions, but also the rhetorical elements deployed by public figures to engage their audiences (e.g. Billig, 1987). Research exploring the different rhetorical styles of the opposing ACC narratives would help to determine whether something intrinsic to the presentation of the contrarian scientific argument, and not just the content, gives it rhetorical appeal.

In more recent years in Australia, the rhetoric around climate policy has clearly been failing to engage the electorate, as demonstrated by the highly unpopular 'carbon tax'. Research exploring the way in which ideological thinking is embedded in both the scientific and political rhetoric used to engage the general public to generate support for policy is sorely lacking. In the Australian context where the introduction of the carbon pricing system in June 2012 has been watched with interest by many in the international community, a thorough

understanding of the permeating and at times debilitating effects of ideological rhetoric on public acceptance of climate policy would prove fruitful.

Political/ideological influences therefore have a strong impact on what one believes about ACC, but there is more here to explore: different groups within society play different and varying roles in the ACC story. For example, the business community is in a prime position to implement the changes needed to reduce GHG emissions, with or without government regulation. Therefore the beliefs about ACC of people within the business community could greatly influence the type and speed of responses to this threat. Patenaude (2010) reports that business journals are lagging behind other social science disciplines in providing relevant and current ACC research to the business community. Moreover Patenaude (2010) argues that business school curricula in the UK are similarly failing to provide ACC relevant courses to business students. There are therefore still opportunities for exploring how the business community perceives ACC, whether or not their views differ from other groups in society, and how these views might manifest in such a way as to either facilitate or hinder action on ACC.

2.9. Conclusion

The literature here reviewed offers a diversity of perspectives and methodological approaches to understanding the denialist movement, and the subsequent questioning of ACC science by many within the community. Whilst I have highlighted the problems with using traditional techniques for measuring

attitudes, taken together, these studies suggest that ACC has become a highly politicised issue. The ideological basis of the ACC denialist movement has been well established (e.g. McCright & Dunlap, 2009; Oreskes & Conway, 2010); the changing nature of community sentiment over time highlights the influence of social factors on public views and attitudes towards ACC (Brulle, et al., 2012; Devinney et al., 2012); the robust findings of ideological influences on public perceptions of ACC (e.g. McCright & Dunlap, 2011a; 2011b; Tranter, 2011; Zia & Todd, 2010) suggest that the changing nature of society, the economy and politics are playing a significant role in social understandings and discourses of ACC; and the moral and ethical deficiencies in current ACC discourses (Markowitz & Sharriff, 2012) present obstacles to broader community engagement with this issue. The remainder of this thesis will examine the social, scientific, and political institutions that have thus far accommodated the debate on ACC, and I will attempt to highlight avenues for intervention, whereby policy can be developed to incorporate both structural and communicative changes that can do justice to the complexity of this problem, and which may help generate positive engagement with the ACC challenge.

CHAPTER 3: BUSINESS SCHOOL SCEPTICISM: PERCEPTIONS OF CLIMATE CHANGE IN A UNIVERSITY SAMPLE

3.1. INTRODUCTION

Business and industry have become increasingly important players in developing and implementing action to mitigate the effects of ACC. Some form of market-based mechanisms for reducing GHGs is now in operation in South Africa, India, New Zealand, Europe, parts of China, Canada and several US states. South Korea is in an advanced state of carbon market development, and many emerging economies, such as Costa Rica, Indonesia and Turkey, have received grants from the World Bank's Partnership for Market Readiness for the development of domestic trading schemes (Stephan & Paterson, 2012). The role of business and industry in supporting, implementing and operating these systems requires not only a commitment to the economic challenges such reform brings, but also an understanding and acceptance of the scientific and policy bases upon which such systems are formulated. Despite this, evidence suggests that business schools may not be developing the epistemological bases for supporting, implementing and operating business strategies to address ACC (Jabbour, Sarkis, Jabbour & Govidan, 2013; Goodall, 2008; Patenaude, 2010). Patenaude (2010) suggests that research is not engaging with the issue adequately, with a lack of cross-disciplinary dialogue posing a particular challenge (see also Linnenluecke, Griffiths & Winn, 2013). Similarly, educational domains prioritizing the role played by business in addressing ACC are not being developed in curricula (see also Jabbour et al., 2013). However it is precisely these students who will be expected to enact many of the changes society must

implement to combat and deal with ACC in the coming decades (Jabbour et al., 2013). Business will play a crucial role in investment in and development of clean technologies, implementing strategies to reduce GHG emissions within their own institutional parameters, operating within the structures of what are becoming increasingly global and mainstream emissions-trading networks, managing risks posed by extreme weather events etc. Without adequate education of the role played by business in reducing GHGs through economic structures, business students upon graduation may be both at a disadvantage in an increasingly 'green' business environment, but also lacking the relevant knowledge to facilitate the continued and urgent 'greening' of the business world (see Linnenlueck et al., 2013).

The lack of educational focus on ACC within the business sector is no doubt compounded by the overwhelmingly strong influence political ideology exerts over belief in the anthropogenic origins of climate change (e.g. McCright & Dunlap, 2011a; 2011b; Tranter, 2011; Zia & Todd, 2010). McCright and Dunlap (2011b) in particular have highlighted how those with Right leaning political views, in particular white men, are more likely to be sceptical of the human role in climate change than their more Left-leaning counterparts. Given that Right-leaning political views encompass such ideological positions as laissez faire economics and business-as-usual carbon scenarios, a relationship between the business world and ACC scepticism/denialism may exist. If so, the opportunity for engaging business students with ACC action messages during their university studies may prove an effective way of generating positive engagement with ACC with the very people who will be enacting the necessary changes.

The present study will therefore investigate university students' views about the anthropogenic origins of climate change. In particular, I will compare the views of students enrolled in business degrees with students enrolled in other educational domains, such as science, humanities, and social science, to determine whether business students are more sceptical of the role played by humans in climate change than other students.

3.1.1. ACC AND THE BUSINESS SCHOOL 'LAG'

In a 2011 study assessing the diffusion of ACC within academia, Patenaude investigated the Top-30 business and management journals listed in ISI web of knowledge for studies relating to climate change. Of the 20,405 articles published in these journals during the 1992–2008 period inclusive, only seven contained the phrases *climate change* or *global warming* in their title (Patenuade, 2010). Similarly few articles were returned when the search was broadened to include abstracts and keywords. Similar findings have been reported by Goodall (2008) who demonstrated that the Academy of Management (AOM) had not published a single article on ACC from 1970-2006, whilst only 9 articles on climate change were published out of 31,000 articles in the top 30 business and management journals over the 1970-2006 period. This number is lower than those published in the top 30 journals for economics, sociology and political science over the same time frame[2]. The lack of ACC related research in

[2] Although Goodall (2008) notes that the number of publications on ACC in the top journals of these fields is also surprisingly low. The author notes that whilst there is a paucity of ACC related research in

the business world inevitably leads to a lack of engagement with ACC related business strategies in business schools because, without the research, how can green business models be taught in schools? (Linnenluecke et al., 2013). According to Patenaude (2010), the teaching curricula of business schools reflect this research shortfall, with courses on climate change generally available only as electives, thus reaching only a fraction of the students. Patenaude (2011) argues that the need to address this shortfall is crucial given the influence business schools exert over corporate leaders. Moreover, Linnenluecke et al. (2013) argue that businesses that fail to address the ACC problem, either through mitigation or adaptation strategies, weaken their economic and competitive positions and thus their chances of survival.

The slow adoption rate of ACC into business schools is considered less about ideology, values or worldviews, but "linked to the nature of the idea itself – immediate relative advantages are not obvious; the idea is incompatible with many corporate belief systems, operations and experiences; the science is complex to comprehend; adoption is difficult to trial; causal relations difficult to observe…" (Patenaude, 2010, p. 268). In other words, part of the reason for the lag in business schools' uptake of ACC related research and education is because ACC is at odds with business norms; with the way business appraises innovation and the risks associated with trialling and implementing such innovation. Also highlighted are the constraints of academia that pose challenges for cross-disciplinary engagement (Patenuade, 2010).

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the top journals, ACC is occupying a substantial space in niche journals within the social sciences. The issue is thus seen as not occupying mainstream status rather than occupying no status at all.

Alternatively Goodall (2008) offers a number of explanations for the shortfall, including political bias. In particular Goodall points to the sceptical position adopted by the Bush administration, but couches this explanation by offering an analysis of the number of ACC articles published in Right-leaning newspapers, such as the *Financial Times* and *Forbes*. Goodall argues that the high number of articles on ACC published in these newspapers discounts political bias as a comprehensive explanation for the low uptake of ACC within business academe. If popular Right-leaning media outlets are reporting on ACC – so the argument goes – then political bias cannot be suppressing ACC information, particularly as it relates to the business world.

Goodall's (2008) analysis, however, provides no detail as to the content of the articles included in her analysis. As recurrent studies have shown (e.g. Antilla, 2005; Boykoff & Boykoff, 2007; Boykoff, 2007), media reporting of ACC in the US prestige press has been marked by the over-use of the journalistic norm of balance in reporting, resulting in an overrepresentation of sceptical views in many mainstream newspapers, including the Right-leaning *Wall Street Journal* (Boykoff & Boykoff, 2007). Goodall's (2008) claims that Right-leaning media outlets have not suppressed ACC information fails to consider this, therefore the effect of political bias may in fact be stronger than her conclusions warrant. Business norms and academic constraints, therefore, may not account for the entire phenomenon of the business school lag in ACC research and education. Rather, political and ideological views may contribute to why business research and education trails other academic fields in bringing ACC into their mainstream academic paradigms.

This explanation makes intuitive sense given the breadth of research highlighting differences between university students' political and ideological views based on their disciplinary affiliations. In particular, Hastie (2007a) has demonstrated significant differences between social science and commerce students on attributions of individual/systemic wealth and poverty, Left/liberal and Right/conservative economic and political views, and favourability of liberal and conservative social groups. In all cases, the social science students (including recent graduates) favoured Left/liberal views to a greater extent than their commerce counterparts. These findings support the self-selection hypothesis, whereby students choose disciplines that align with their pre-existing worldview. However, in a comprehensive review of research in this field Hastie (2007b) has also documented that socialization within the group during the period of study can also influence students' views. Moreover, such disciplinary differences have been found to persist over time (see Hastie, 2007b).

3.1.2. Politics, ideology and the gender divide

This is an important finding for the present study as political affiliation or ideological persuasion is one of the most common and consistent predictors of belief in ACC to emerge in the literature on perceptions of climate change (e.g. McCright & Dunlap, 2011a, 2011b; Tranter, 2011; Zia & Todd, 2010). A study conducted in Australia examining Australian politicians' views on climate change found significant differences between the conservative Liberal/National parties

on the Right and their Labor and Greens counterparts[3] on the left (Fielding et al., 2012). These differences were found on a number of questions relating to the causes of climate change, belief in the consensus view, potential outcomes of ACC and the seriousness of ACC as a threat to the environment. The conservative politicians were far more likely to reject the consensus view and downplay the potential negative outcomes of climate change than those on the Left.

The views of politicians reflect the views of the general public on this issue. Using logistical regression analysis and controlling for a number of social background variables, Tranter (2011) reports the powerful influence political leaders have over environmental attitudes, specifically reporting that Labor and Green identifiers in Australia were almost three times as likely as conservative Liberal and National supporters to believe that global warming will pose a serious threat in their own lifetime. Similar results have been identified in the US (e.g. McCright & Dunlap, 2011a) where beliefs consistent with the scientific consensus and expressing concern about climate change are more likely from members of the public with Left leaning political views. McCright and Dunlap (2011a) suggest that the public incorporates the views of political elites whose ideology aligns closely with their own.

As mentioned above, McCright and Dunlap (2011b) also report a relationship between political ideology and gender on views about ACC, in what they describe as the "conservative white male effect". Conservative white men,

[3] Non-aligned independents were also surveyed and significant differences were found with this group and the other groups also, however this group comprises members from both the Left and the Right sides of politics and will not be discussed here.

and particularly those who self-report high understanding of ACC, are significantly more likely to reject the consensus view of climate change (i.e. are more likely to be a climate change denier) than are females, non-whites and those with Left leaning political beliefs. The authors posit a "…socio-political explanation of climate change denial" (McCright & Dunlap, 2011b, p. 1164), arguing that identification with a 'conservative white male' identity influences the adoption of the sceptical position. Clearly, different social groups have different motives and assessments of what is at stake in the social and political controversies that inevitably arise as our awareness and understanding of ACC increases.

Gender differences are often noted in studies addressing perceptions of ACC but, according to McCright (2010), gender is often included only as a statistical control in multivariate models and subsequently only discussed in passing. However, gender has been found to impact on environmental concern, in particular women are more likely to show more concern for *local* environmental issues than are men, and to a lesser extent *general* environmental issues (see McCright, 2010). Interestingly, McCright's study reported that women express higher levels of ACC knowledge and concern than do men, yet despite this they are more likely to underestimate their knowledge than are men.

Four main points can be identified from the review of the above literature: 1) business schools are behind other academic disciplines in publishing ACC literature relevant to their field and may be failing to deliver ACC related material to their students; 2) students enrolled in business degrees, such as commerce, are more likely to hold Right/conservative political views than

their counterparts in other degrees such as the social sciences; 3) people who hold Right/conservative political views are more likely to be sceptical of ACC than those holding Left/liberal political views; and 4) women are more likely than men to report higher ACC concern.

The present study will therefore draw from a university sample (Southern Cross University and the University of Adelaide) to explore whether perceptions of anthropogenic climate change differ between students enrolled in different disciplines. In particular, it is hypothesised that: students enrolled in business degrees will be more sceptical of the theory of ACC than students enrolled in other disciplines (*H1*); men will be more sceptical of the theory of ACC than women (H2).

3.2. METHOD

3.2.1. PARTICIPANTS

Participants were 883 University students, aged 17 to 73 years (m= 28.74) from the University of Adelaide (UoA: n=585; 66.3%) and Southern Cross University (SCU: n=298; 33.7%). The two locations were chosen to ensure a range of varying social and demographic perspectives. SCU is a regional university with high levels of external (rural) students, whilst the University of Adelaide has a more urban student profile. In total there were 329 male (37.3%) and 554 female (62.7%) participants. Neither the UoA nor SCU offer any comprehensive environmental/sustainability courses as part of their core programs at undergraduate or postgraduate level[4].

3.2.2. MATERIALS

The survey was an online self-report questionnaire rating students' perceptions of climate change. The online format required that students must complete every question before the survey could be submitted. The questionnaire consisted of 49 7-point (1= strongly disagree, 7= strongly agree) Likert scale questions on perceptions of climate change. Thirty-three of the Likert questions were adapted from Whitmarsh (2008; 2009), 27 of those were

[4] This information was taken from the course information provided on each University's website:
http://www.business.adelaide.edu.au/study/
http://www.scu.edu.au/coursesin2014/#2525:7108

exactly as they appeared in Whitmarsh (2008), and 6 altered to apply to the Australian context (e.g. *recent floods in this country are due to climate change* was changed to *recent droughts and floods*…). The remaining 16 items were devised from extensive blog and media-based analysis of current debate around ACC, to ensure a broad range of views were included. The questionnaire can be viewed in appendix A[5]. A text box was included at the end of the questionnaire, with instructions for participants to include any further responses they wished to submit. This section did not require a response in order for the questionnaire to be submitted. The feedback left in the text box will be analysed and presented in the following chapter, where I will examine the more nuanced ways in which the students' construct their views about ACC, and the arguments used to bolster particular positions or versions of ACC, and the debate in which it is engulfed. Finally the questionnaire asked for demographic information including age, gender, university enrolled in, faculty and degree enrolled in.

3.2.3. PROCEDURE

The questionnaire was distributed in two ways. The first was via an email distributed through both universities' webmail systems. The students received an email inviting them to participate in an online questionnaire, measuring community perceptions of climate change. The second method was through the School of Psychology's research participation website at the University of

[5] The survey information email can also be found here

Adelaide. This recruitment method targeted first year psychology students, who were offered course credit for completing the questionnaire.

3.2.3.1. CONSTRUCTING SCALES

Questionnaire responses were initially examined using a principal components analysis (PCA) and reliability analysis to establish the psychometric properties of the survey. Whitmarsh (2008) constructed a scale of *uncertainty* from seven of the items in her survey (see appendix B for items). An alpha of .66 is reported however there is no information on how the scale was constructed. In the 2009 study, Whitmarsh compared differences between the terms 'global warming' and 'climate change', conducting descriptive statistics on the individual items, and also chi-square statistics to compare individual items for differences between the two terms. However no statistics were conducted to assess the overall scale structure. Therefore factor analysis and reliability analysis were used to assess the psychometric properties of the scale and determine the underlying structure.

The data was analysed using a split file method, whereby the file was randomly split into two and an exploratory Principle Components Analysis (PCA) was conducted on half (n=441) of the participants. A confirmatory factor analysis (CFA) was then conducted on the second half (n=442) of the data set. Inspection of the communalities table identified items with a score below .3, which were deleted. Items that were considered conceptually ambiguous were also deleted at this stage. The PCA was run iteratively until a final solution was derived, which

yielded a KMO of .96, Bartlett's test of sphericity was significant at $p < .01$, supporting the factorability of the correlation matrix. The PCA revealed the presence of 3 components with eigenvalues over 1, explaining 10.90 per cent, 1.78 percent, and 1.56 percent of the variance respectively. Inspection of the Scree plot and a Parallel Analysis supported the 3-component solution. All negatively loading items were reverse scored and a reliability analysis was run.

Table 3.1 shows the pattern matrix for the correlations between variables and components. Factor 1 describes the *human role* in climate change ($M = 5.4$, $SD = 1.27$, $\alpha = .95$). High scores on this factor indicate agreement that human activity is having an impact on climate change. Factor 2 describes the *scientific evidence* for climate change ($M = 4.54$, $SD = 1.91$, $\alpha = .73$). High scores on this factor indicate agreement that the scientific process and evidence for anthropogenic climate change is reliable. Factor 3 describes how ACC is related to *modern life* ($M = 3.96$, $SD = 1.04$, $\alpha = .46$). High scores on this factor indicate that climate change is inevitable due to our modern lifestyle and we are powerless to stop it. The third factor was not included in the following group differences analysis because of the low alpha score; however we acknowledge that this is an interesting finding worthy of further investigation.

Table 3.1. Pattern Matrix for climate change items (principal components extraction and oblimin rotation)

Scale Item	Factor 1	Factor 2	Factor 3
Climate change poses a serious threat to humanity	**.812**	.399	.217
Climate change is just a natural fluctuation in the earth's temperatures	**-.653**	-.365	-.181
We can all do our bit to reduce the effects of climate change	**.762**	.135	.167
There is nothing we can do about climate change	**-.767**	-.165	-.129
I worry about climate change	**.778**	.350	.054
Radical changes to society are needed to tackle climate change	**.737**	.325	.335
Claims that human activities are changing the climate are exaggerated	**-.809**	-.383	-.209
I feel a moral duty to do something about climate change	**.847**	.302	.053
Industry and business should be doing more to tackle climate change	**.866**	.318	.275
We don't have to worry about climate change	**-.793**	-.342	-.083
Nothing I do makes any difference to climate change one way or the other	**-.759**	-.085	.129
The government is not doing enough to tackle climate change	**.714**	.372	.191
Nothing I do on a daily basis contributes to the problem of climate change	**-.745**	-.156	-.010
Leaving the lights on in my home adds to climate change	**.748**	.129	.179
Human activities have no significant impact on global temperatures	**-.822**	-.329	-.266
The scientists working on climate change understand the issue very well	.493	**.673**	.189
The scientific method is rigorous and precise	.362	**.820**	.140
I understand the science of climate change well	.016	**.602**	-.248
The scientific method is to be trusted	.390	**.803**	.158
Climate change is a consequence of modern life	.520	.127	**.618**
Pollution from industry is the main cause of climate change	.487	.124	**.515**
Climate change is inevitable because of the way modern society works	.172	-.006	**.698**
I would only do my bit to reduce climate change if everyone else did as well	-.304	-.034	**.508**
Mean scale score	5.40	4.54	3.96
Standard deviation	1.27	1.91	1.04
Cronbach's alpha	.95	.73	.46

Using maximum likelihood estimation in the Lavaan package in *R* (Rosseel, 2012), a Confirmatory Factor Analysis (CFA) model was fitted to the second half

of the data (N = 442). In this model, the questions pertaining to Factors 1 and 2 in Table 3.1 were predicted to be indicators of different latent variables. Obtained fit indices suggested that this model had adequate fit ($\chi^2(151) = 625.16$, $p < .001$; RMSEA = .08, CI_{90} [.08, .09]; SRMR = .06; CFI = .92). Thus, the CFA confirmed the results of the exploratory factor analysis[6].

3.3. Results

3.3.1. Descriptive statistics

Table 3.2 shows the number, gender and mean age of respondents by university and total. Far more women (62.63%) than men (37.37%) completed the questionnaire and far more Adelaide University students (66.25%) than SCU students (33.75%). There was a significant difference on mean age between the Universities, with SCU students (M = 39.21, SD = 12.13; t (881) = 20.08, $p < .01$) significantly older than Adelaide University students (M = 23.46, SD = 8.05).

Table 3.2. Number, gender and mean age of respondents by University and total sample

	N	Male	Female	Age (M)
Adelaide University	585	220	635	23.46
Southern Cross University	298	110	188	39.21
Total	883	330	553	28.78

[6] See appendix C for correlation matrix

3.3.2. GROUP DIFFERENCES ON FACTORS 1 AND 2: HUMAN ROLE IN CLIMATE CHANGE AND SCIENTIFIC EVIDENCE FOR CLIMATE CHANGE

One hundred and three separate disciplines were recorded from the participants. This number was reduced to a more workable number for our group comparisons. Five discipline groups were chosen which cover a broad range of disciplines to adequately address our research goals: science, arts/humanities, social science, environmental science and business[7]. Table 3.3 below shows the number of participants comprising each discipline, gender, age, and the mean scale scores for each discipline on Factors 1 and 2: *human role* and *scientific evidence*.

Table 3.3. Number of participants, gender, mean scale scores for human role and scientific evidence and mean age by discipline

Discipline	N	Female	Male	Mean (Human role)	Mean (Sci evidence)	Mean age
Science	60	31	29	5.13	5.02	23.25
Arts	88	54	34	5.57	4.60	29.71
Social science	44	33	11	5.65	4.42	39.48
Enviro science	21	14	7	6.29	5.29	34.53
Business	50	21	29	4.85	4.04	34.04
Total	263	153	110	5.40	4.61	31.08

[7] Two of these disciplines are hybrids of 2 or more degrees to ensure adequate representation of a broad range of disciplines. These are *environmental science* which includes Bachelor of environmental science, Master of environmental science, and post-graduate diploma of environmental science; and *business* which includes business administration, business, Master of business administration, Diploma of business administration, and commerce.

In order to address our hypotheses a standard multiple regression analysis was conducted using gender and discipline, with three age groups included as a control (younger aged 17-28; medium aged 29-40; and older aged 40+), on the two components *human role* and *scientific evidence* separately. Table 3.4 shows the Pearson correlations for the multiple regression analysis on factor 1, *human role*.

Table 3.4. Correlation table for multiple regression analysis on factors 1 and 2 – human role and scientific evidence

	Human role	Sci evidence	Age (young)	Age (med)	Sex (female)	Science (degree)	Arts (degree)	Social-sci (degree)	Enviro sci (degree)
Human role	1.00								
Sci evidence		1.00							
Age (young)	-.14	.10	1.00						
Age (med)	.04	.10	-.39	1.00					
Sex (female)	.23	-.12	.01	.02	1.00				
Science (degree)	-.11	.18	.24	.17	-.07	1.00			
Arts (degree)	.08	-.01	.13	.02	.05	-.39	1.00		
Social-sci (degree)	.08	-.07	-.20	-.11	.15	-.24	-.32	1.00	
Enviro sci (degree)	.19	.16	-.17	-.01	.05	-.16	-.21	-.13	1.00

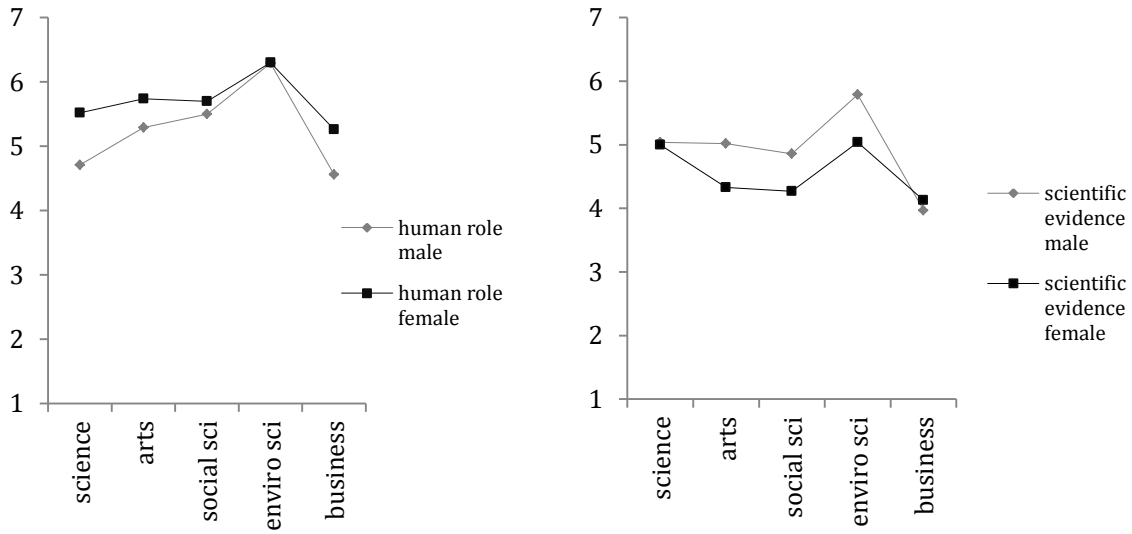
The overall model for *human role* was significant F (7,255) = 5.46, $p < .001$ and accounted for 13% of the variability in participants' acceptance of the human role in climate change. Discipline enrolment was the strongest predictor, with enrolment in business degrees being associated with significantly less acceptance of the human role in climate change than enrolment in arts $\beta = .24$, t (262) = 2.88, $p < .01$; social science $\beta = .16$, t (262) = 2.12, $p < .05$; and

environmental science β = .25, *t* (262) = 3.66, *p* < .01; but not for science β = .11, *t* (262) = 1.31, *p* > .05. Gender was also significant with females more likely than males to accept the human role in climate change, β = .19, *t* (262) = 3.24, p < .01. Age did not make an independent contribution to predicting acceptance of the human role in climate change, however younger people (aged 17-28) were marginally less likely to accept the human role in climate change than were those aged over 40, β = -.13, *t* (262) = -1.76, *p* = .08. Participants aged between 29 and 40 years did not accept the human role in climate change significantly differently to those over 40 β = -.01, *t* (262) = -.21, *p* = .84.

The overall model for Factor 2, *scientific evidence* was also significant *F* (7,255) = 5.42, *p* < .001 and again accounted for 13% of the variability in participants' acceptance of the scientific evidence for climate change. Discipline was again the strongest predictor, with enrolment in business degrees being associated with significantly less acceptance of the scientific evidence for climate change than enrolment in all other disciplines: arts β = .20, *t* (262) = 2.47, *p* < .05; social science β = .17, *t* (262) = 2.22, *p* < .05; environmental science β = .30, *t* (262) = 4.48, *p* < .01; science β = .28, *t* (262) = 3.45, *p* > .01. Gender was again significant with males more likely than females to accept the scientific evidence for climate change, β = -.15, *t* (262) = -2.47, p < .05. Age again did not make an independent contribution to predicting acceptance of the scientific evidence for climate change, however younger people (aged 17-28) were marginally more likely to accept the scientific evidence for climate change than were those aged over 40, β = 14, *t* (262) = 1.91, *p* = .06. Participants aged between 29 and 40

years were not more likely to accept the scientific evidence for climate change than those over 40, β = .13, *t* (262) = 1.86, *p* = .07.

Figure 3.1 below demonstrates the mean scores for disciplines by gender on the *(a)* human role in climate change and *(b)* scientific evidence for climate change. Note that for both genders, environmental science is the most likely discipline group to accept the human role and the scientific evidence for climate change, whilst both genders in the business degree are the least likely to accept the human role and scientific evidence for climate change.



(a) *(b)*

Figure 3.1. Mean scores for males and females on (a) human role and (b) scientific evidence

3.4. Discussion

The results support our first hypothesis that students enrolled in business degrees will be more sceptical of the theory of ACC than students enrolled in other disciplines. Those enrolled in business degrees were significantly less likely than students enrolled in arts, social science and environmental science to accept the role played by humans in causing and mitigating climate change. Despite this difference, business students still scored above the mid-way point on the 7-point scale (M = 4.85) indicating that business students still demonstrate a moderate acceptance of the theory of ACC. To explore this effect, I drew on qualitative data collected on the survey, which I present in the following chapter. Rather than treating this result on a continuum of acceptance of the human role in climate change, I explore the varied ways in which the students *construct* their understandings of ACC through qualitative analysis.

The finding that business students did not differ significantly from science students on their acceptance of the human role in climate change is unexpected. Given the nature of the debate around ACC is based within arguments that challenge the science, one would expect science students to be advocates for the theory of ACC. The lower scores (by comparison) on the acceptance of the human role in climate change from science students' challenges this view. This finding is also explored in greater depth in the following chapter that analyses the qualitative responses collected from the students. Briefly here, the science students provided open-ended responses emphasizing that climate change is both a natural and human induced phenomenon. Clearly, the questionnaire items

were too narrow in their scope to capture the nuanced understandings that science students hold about ACC, with natural climatic variation being considered a crucial element that the questionnaire items failed to encompass.

The study also found general support for the second hypothesis, that men will be more sceptical of the theory of ACC than women. Across all disciplines, women scored higher than men on the human role scale; that is, they were more likely to accept the human role in climate change than were men. Interestingly, women also scored lower than men on their acceptance of the scientific evidence across all disciplines *except* business. Despite the large body of literature demonstrating that women are less trusting of science than are men in general (see McCright, 2010 for a review of this literature) and in relation to climate change in particular (e.g. McCright & Dunlap, 2011b), these results indicate that female business students are more likely than their male counterparts to accept the science of climate change. Male business students are therefore the least likely group to accept the scientific evidence for climate change, confirming the gender trend reported by McCright and Dunlap (2011a). Again this result must be understood in terms of the actual mean scale score for this group, which was 3.96. This is still just above the mid-way point, and demonstrates only marginal acceptance of the scientific evidence for ACC.

This finding has real implications when considering our results alongside those reported by Patenaude (2010) and Goodall (2008), Hastie (2007a) and McCright and Dunlap (2011b). Comparisons with these studies provide a broad theoretical framework for interpreting this finding. Specifically, Patenaude's (2010) study suggests that business schools have not adequately engaged with

ACC, perhaps due to the challenge ACC poses to business norms. The lack of ACC related research and curricula within business schools may therefore allow these norms to go unchallenged, and they are thus perpetuated to new generations of business students. Hastie's (2007a) study highlights how the self-selection hypothesis relates to ideological and political issues, suggesting that those who identify more strongly with business-as-usual, capitalist imperatives may be more likely to pursue a career in an area that accommodates these views. Moreover, the conservative white male effect identified by McCright and Dunlap (2011b) mirrors the demographic characteristics of our findings, in that the most sceptical and least accepting of the scientific evidence for climate change in our sample were males enrolled in business degrees. This finding must be interpreted with caution, however, as extrapolating the views of business students to those of the business world more generally is beyond the scope of this analysis. Future research could explore this finding in greater depth.

Despite these findings, we identify practical avenues for addressing this phenomenon, specifically related to the delivery of ACC related material within the educational structures that have as yet failed to adequately address ACC from a business perspective. Goodall (2008) explains that the business world has always made changes to the way it does business even when environmental issues threaten business-as-usual scenarios. Examples of this can be seen in the swift response the global business community took to eliminate chlorofluorocarbons, sulphur dioxide and other air pollutants associated with the ozone hole and acid rain (Oreskes & Conway, 2010). Moreover, Hoffman (2005) suggests that the responses that many companies are already taking to

address ACC are strategically and not altruistically motivated. Companies that assess the risks posed by ACC and make wise investments are therefore not acting outside of traditional business norms. As such, strategic planning around ACC should, in theory, readily embed within traditional forms of business education delivery. Business schools are beginning to think more pragmatically about applying sustainable courses within business curricula, with encouraging results. For example, Issa, Issa and Chang (2011) report on the introduction of a sustainability course as part of the Information Systems (IS) and Information Technology (IT) postgraduate course at Curtin University, Australia. The students that completed the course reported 90% satisfaction with the course content and delivery, a rate well above the standard satisfaction rate at university level (Issa et al., 2011). The authors report a 'shift in mindset' of the students, and an enhanced understanding of the concepts of 'sustainability' and 'Green IT' (Issa et al. 2011). Furthermore, the students had changed their minds about the necessity of sustainability in the IS and IT fields.

3.5. Conclusion

This survey study found that men enrolled in business degrees at the two Universities sampled are significantly more likely to reject the human role in ACC than their counterparts in arts, social science and environmental science, and to reject the scientific evidence for ACC than their counterparts in science, arts, social science, and environmental science. Although these effects were small and indicate still a moderate acceptance of the human role in and scientific evidence for ACC, these findings are significant and therefore worthy of note.

The increasing international efforts to use a market based mechanism to reduce the amount of greenhouse gas (GHG) emissions and mitigate the effects of anthropogenic climate change, will no doubt now give the business community more certainty when it comes to reducing GHG emissions within their current business practices. As such, it is possible that strategic planning for ACC be a priority both within the corporate world and within business schools. The global business community is charged with the responsibility for changing the fossil fuel driven industry that is responsible for ACC, and curbing emissions enough to contain warming to something approximating a reasonable level by the end of the century. How this is achieved will require ingenuity and innovation, but also a solid commitment to making the necessary changes and within a business model that prioritises strategic planning around ACC.

The modest scale of the present study presents a number of directions for future research. Replication of the study in other parts of the world would help ascertain the prevalence of business school scepticism in other regions. If in fact business school students are reporting decreased acceptance of ACC than other students in other countries around the world then a concerted effort could be made to address this by developing and delivering ACC related research for curricula. Elaborating the questionnaire to include a measure of political/ideological affiliation could also increase our understanding of this phenomenon and the impact it has on views about ACC, specifically as it relates to the very social group that dominates leadership within both the political and corporate worlds.

The following chapter elaborates this aspect of the study and provides greater insight into the nature of the students' views by analysing the qualitative data associated with this questionnaire within a social theory framework. The more nuanced ways in which the students construct their understandings of ACC provides a more detailed perspective for understanding how ideology manifests in perceptions of ACC. Overall, the present study connects with the existing literature in the field and offers a new and valuable avenue for exploring the nature of perceptions of ACC in a practical way, by devising interventions to encourage greater ACC engagement at a tertiary educational level; interventions aimed specifically at generating greater understanding of the problems and challenges posed by ACC for the business community, as well as greater commitment to addressing ACC within current business practices.

CHAPTER 4: SYSTEM-CHALLENGING RHETORIC AND THE IDEOLOGICAL DISCOURSES OF CLIMATE CHANGE

4.1. INTRODUCTION

Traditional survey techniques like the one presented in chapter three, have been used extensively to gauge public sentiment on ACC (e.g. Leviston & Walker, 2011; Leviston et al., 2011; Poortinga et al., 2011; Reser et al., 2012; Reynolds et al., 2010). Whilst such techniques are effective at determining aggregated community views, they are burdened by a number of issues that can constrain the research findings. As Reser et al. (2012) explain the task of assessing public perceptions of ACC is made difficult by the multi-disciplinary nature of research in this field and subsequent diversity in conceptual framings and methods. Moreover, quantitative methods cannot provide the detail on *how* participants understand an issue, and the arguments used to generate particular versions of a social controversy that can be used in concrete ways to garner support for political action.

The constraints of traditional quantitative methods can however, be overcome by incorporating qualitative data collection methods simultaneously with the collection of quantitative data. A mixed method approach such as this are neither a new idea nor technique (see Wolf & Moser, 2011), and such methods are recognized as providing a broader and richer set of data with which to understand complex social issues (Carolan, 2010). In the case of ACC, there is greater scope to explore the important role played by political/ideological views in shaping perceptions of ACC. An analysis of how ideological factors find expression in public perceptions can provide insight into the ways in which

competing positions in the ACC debate battle for dominance. The benefits of a qualitative approach, therefore, include an understanding of *how* such positions work rhetorically to generate support; an insight that quantitative research alone cannot provide.

The highly politicised nature of ACC has been demonstrated by a number of authors explaining how the denialist movement emerged out of conservative Right wing think tanks in the US over the past several decades (e.g. Jacques, et al., 2008; McCright and Dunlap, 2000; Oreskes and Conway, 2010). The sceptical position is considered individualistic in nature and consistent with the capitalist market logic; a logic that views environmental risk as contrary to commercial and individual freedom (Hoffman, 2001). Alternatively, belief in ACC is characterised by a more egalitarian discourse that is accepting of environmental risk and opposed to unrestrained commercial activity (Hoffman, 2001). In this way, the two positions exist in ideological opposition to one another.

Studies demonstrating the ideological bases of views about ACC have greatly increased our understanding of some of the driving forces behind the climate change debate. However I wish to extend this understanding by exploring in greater detail how those positions are constructed in rhetorical opposition to one another, to serve as the discursive resources for debating and advocating particular policy responses. Using a comprehensive qualitative analysis of data collected with the online questionnaire presented in chapter 4, and drawing from social theory, I analyse perceptions of ACC using the Left-Centre-Right political paradigms (Sunderlin, 2003). The complexity of views these data embody highlights the nuanced and detailed ways in which the

students' perceptions find expression in discourse, demonstrating the limits of quantitative data and the important and unique role of qualitative methods for understanding the ACC debate.

4.1.1. IDEOLOGY

Ideologies are generally considered to be a worldview or system of evaluations that help shape our ideas about how society should function, as well as explaining our experiences in logical and comprehensible terms (Sunderlin, 2003; Mohan & Kinloch, 2000). Ideologies allow people to organise a variety of social beliefs about what is right and wrong, good and bad, and true or false, both for the individual and the social group to which one belongs (Van Dijk, 1998). They provide us with the values and beliefs with which to make our lives meaningful and hence engage with social reality (Mohan and Kinoch, 2000). Billig (1991) stresses that ideological thinking is in fact 'common-sense' thinking, where the familiar maxims, values and beliefs (the 'ideas') held by particular social groups are cultural products that allow the assumptions of a given time and place to repeat throughout history, confirming existing power arrangements.

Ideologies are influenced both by ideas and material conditions, and go largely unnoticed by their proponents (Sunderlin, 2003). The ideas that give rise to ideological positions in the West are generated by centuries of thought in economics, philosophy, psychology, political science, sociology and anthropology, amongst others (Sunderlin, 2003). The material conditions of our circumstances, such as democracy and economic prosperity, similarly influence

an individual's beliefs about how the socio-political world should be organised, and are closely related to, but not reducible to, the ideas of the time and place in which such conditions arise (Sunderlin, 2003). These ideologies are "universalized" and "externalized" by their proponents, which generates their legitimacy (Eagleton, 1991). These processes extend outward the values and interests of specific ideological positions of a particular time and place, to serve as the values and interests of all humanity. Ideologies in this way protect themselves against claims that would undermine any one position as relative – they are considered by their proponents as non-specific, generalizable 'truths', an assumption that Eagleton (1991) describes as necessary for their continued acceptance. Dominant ideologies gain so much traction that their ideological nature goes unnoticed by their proponents, who view only opposing paradigms as 'ideological' (Sunderlin, 2003; Van Dijk, 1991). In this way the polarisation of 'truth' versus 'ideology' generates social conflict, with ideologies defining themselves in opposition to other ideologies (Van Dijk, 1998) in a way that is inherently rhetorical (Billig, 1991). Ideology therefore underpins a multitude of conflict and debate in the 21st century, including conflict around religion, race, ethnicity, national identity, human rights, abortion, and environmental protection (Sunderlin, 2003).

Political ideology is only one form of ideology that has a long history as a topic of inquiry in social theory and analysis, influenced heavily by the writings of Karl Marx. Studies of political ideology are primarily concerned with the relationships of the individual and the state to capitalist society (Sunderlin, 2003). In this sense, ideology is viewed as the way relations of power and

dominance are upheld and preserved in a society through the operation of the market and the production of commodities (Augoustinos, 1999). For Marx, only ideas and forms of knowledge that concealed contradictions or rationalised inequitable social relations were considered ideological (Augoustinos, 1999), however as Abercrombie, Hill and Turner (1990) argue, there is little evidence to suggest that the 'masses' uncritically accept the ideas of those in power. Social cohesion is not a product of the general acceptance of the social values and beliefs inherent in the dominant ideology, but of a practical need for subordinate groups to participate in the capitalist system of wage labour (Abercrombie et al, 1990). The system is maintained and reproduced through "behavioural compliance to the reality of capitalism" (Augoustinos, 1999, p. 299). However within the confines of this system, individuals have considerable room to think and act both critically and reflexively (Billig, 1987). As Billig (1991) suggests, thinking is highly rhetorical; so whilst the social, historical and cultural conditions of a given time and place have a powerful influence over ones' thinking, individuals are simultaneously capable of complex rhetorical engagement with their social worlds (Billig, 1991). In this way, transformation and change becomes possible. Ideology is therefore far more than beliefs, values or representations; it also encompasses behavioural and discursive practices and rituals (see Augoustinos, 1999).

4.1.2. IDEOLOGY ON THE LEFT-CENTRE-RIGHT POLITICAL SPECTRUM

Sunderlin (2003) has drawn upon the framework of social theory to identify three key paradigms on the Left-Centre-Right spectrum as a generalized way to unite classical social theory with modern political ideologies. Social theory is a very broad field of thought formed during the massive social and industrial changes that took place in Europe between 1750 and 1920 (Sunderlin, 2003). Drawing from a range of social science disciplines, social theory encompasses knowledge about human action, social institutions and their mutual connections (Giddins, 1987).

The three key paradigms identified by Sunderlin (2003) are the *class paradigm*, the *managerial paradigm*, and the *individualist paradigm*, which relate to the Left, Centre, and Right political ideologies respectively. The *class paradigm* found its roots in the philosophical work of Karl Marx and sees social reality arising out of the antagonistic relationship between two opposing social groups – the impoverished majority and the elite minority (Sunderlin, 2003). Many modern class theorists have departed from the original tenets of Marxist philosophy, but maintain a critical focus on the economic relationship between opposing groups within society, and a cynical stance towards capitalism (Sunderlin, 2003). According to proponents of the class paradigm, the primary issue underpinning global environmental problems is economic exploitation of countries in the global South by countries in the global North (Sunderlin, 2003). Over-consumptive lifestyles of the North are treated as a central problem to overcome in order to bring about positive environmental change (Sunderlin, 2003). Within the class paradigm, the solutions to environmental problems

require confronting "class exploitation, inequality, and injustice through activism and mass mobilisation against those who cause and perpetuate exploitation" (Sunderlin, 2003, p. 79).

Proponents of the *managerial paradigm* view society as dominated by governments and large corporations that they attempt to rationalize through either conditional support for or neutrality towards capitalism (Sunderlin, 2003). This paradigm is based upon the philosophical ideas of Max Weber who believed that the management and legal developments around wage disputes decreased antagonism between the classes (Sunderlin, 2003). Bureaucratisation, large-scale planning, centralised management and technological advancement are viewed as the necessary responses to an increasingly industrialised and business oriented world (Sunderlin, 2003). Within this paradigm, the government is seen as the key agent for controlling and managing the activity of all social players within the capitalist system. Improved management is seen as providing the basis for mitigating and constraining the negative aspects of capitalism (Sunderlin, 2003). Within this paradigm, environmental problems are viewed as arising out of inadequate government policy and regulation (Sunderlin, 2003). Solutions to environmental problems therefore include international diplomacy and regime building such as the Kyoto protocol; improved regulation, management and laws at the international, national, or local level; manipulation of economic parameters, and improved application of technology. Government representatives and experts such as scientists are seen as the key agents of change (Sunderlin, 2003).

The *individualist paradigm* takes the individual as the key point of reference, with aggregated individual preferences and values constituting the primary force for shaping human history (Sunderlin, 2003). Issues of class struggle and economic power are therefore downplayed in constructions of social problems in favour of cultural factors. The writings of Durkheim have strongly influenced the individualist tradition, whose theories were shaped largely in opposition to Marx (Sunderlin, 2003). Durkheim argued that the division of labour leads to functional interdependence and to an increase in the autonomy of the individual (Sunderlin, 2003). Class distinctions, according to Durkheim, were largely peaceful and stable, and solidarity within the classes had a unifying rather than conflictive function (Sunderlin, 2003). Unlike Marx, Durkheim saw no need for a restructuring of society, but that the exchange of services within the industrial system would lead to positive moral forces and solidarity through interdependence and mutual obligation (Sunderlin, 2003). Within the individualist paradigm, global environmental problems are presumed to arise out of a collective of individual decision makers, who are not stratified in terms of class or power (Sundering, 2003).

The individualist paradigm diverges into two distinct groups, often oppositional, referred to by Sunderlin (2003) as the "cultural" and the "free market" traditions. The cultural tradition considers the cultural breakdown of norms and values as the primary cause of environmental problems. This tradition is aligned with the deep ecology movement, proponents of which promote resource custodianship and solutions involving mass education of the public (Sunderlin, 2003). Wholesale cultural transformation is seen as key for

reversing destructive patterns and protecting the environment (Sunderlin, 2003). Alternatively, the free market proponents believe environmental problems are caused by government interference in the market and constraints on economic activity (Sunderlin, 2003). Wealth accumulation is not viewed as the cause of environmental problems but the solution to such problems (Sunderlin, 2003).

These four ideological approaches to understanding environmental problems stand in opposition to one another. Yet it is this opposition that provides each position with much of its meaning (Billig, 1991). Disputation and negation generate counter-positions that derive their meaning from each other and are rhetorically inter-dependent (Billig, 1987; 1991). The four paradigms described above therefore do not exist in isolation from one another; rather the critique of one paradigm can serve as a defining feature in the expression of another.

4.1.3. THE PRESENT STUDY

To explore the expression of opposing ideological positions in the ACC debate I draw from the university sample, details of which are presented in chapter 3. The exploratory analysis presented here is designed to complement the analysis conducted in chapter 3, with a focus on comparing perceptions of ACC between academic groups. However, unlike chapter 3, here I compare students based upon Faculty affiliation (see appendices D and E), rather than

discipline[8]. It is therefore important to note that making direct comparisons with the findings from chapter 3 is impracticable. What I aim to demonstrate, however, is the importance of qualitative research methods and the essential role they can play alongside traditional quantitative techniques for better understanding the complexity of perceptions of ACC (Wolf & Moser, 2011).

In this chapter, I explore the thematic differences between the Faculty of Sciences, the Humanities and Social Sciences (HUMSS), and the Professions, with the aim of examining how the ideological paradigms described by Sunderlin (2003) find expression as qualitative differences between students enrolled in different faculties. In addition, I will explore the ways in which the ideological positions find rhetorical expression in opposition to each other, as the contrary themes that form the basis of the debate that surrounds ACC.

4.2. METHOD

4.2.1. PARTICIPANTS

Participants were drawn from a sample of 883 University students, aged 17 to 73, (m= 28.74) from the University of Adelaide (n=585; 66.3%) and Southern Cross University (n=298; 33.7%) who completed an online survey about their perceptions of ACC. A total of 257 of these 883 participants provided qualitative responses in the online survey, 29.1% of total participants. As

[8] I chose to conflate the disciplines into their Faculty groupings as the smaller number of participants who left comments meant there were many disciplines represented in our corpus with very low numbers. I consider that collapsing the disciplines into Faculty groups is appropriate for the kind of comparative analysis I will be conducting.

mentioned, the primary focus of our analysis is on the students from the Faculties of Sciences, HUMSS and Professions. The small number of qualitative responses from the Health Sciences and EMCS students (see Figure 4.1) made it difficult to assess pattern responses for these groups of the kind found in the Faculties of Sciences, HUMSS and Professions.

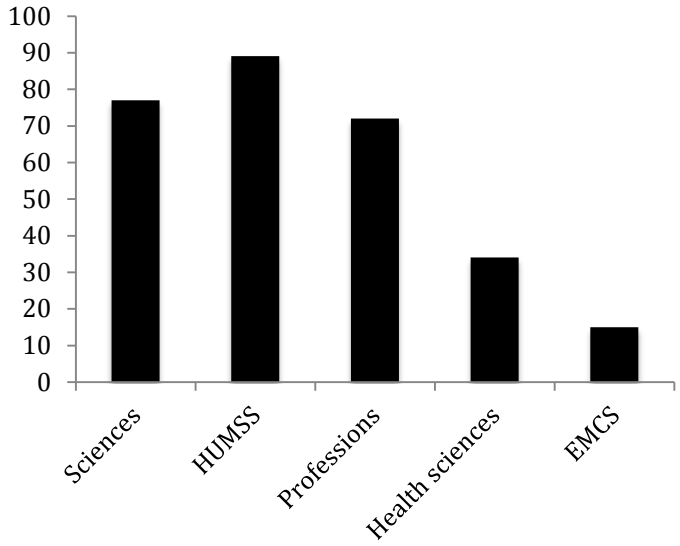


Figure 4.1. Number of Reponses by faculty

Note: 15.2% percent of participants who left comments are enrolled in double degrees. Where one participant is enrolled in two Faculties, both Faculties are included; hence the combined percentage of all Faculty responses is 109.7% (see appendix).

4.2.2. MATERIALS

The qualitative data is drawn from a text box provided for participants immediately following completion of the questionnaire. The questionnaire items referred only to 'climate change' without any reference to manmade/anthropogenic origins, and without a definition of climate change.

This tactic was employed to ensure that particular definitions, clarifications or comments that the questionnaire prompted would be elicited in the open-ended responses. Unlike the rest of the questionnaire, this text box was optional and simply instructed participants to leave any additional comments. Demographic information including age, gender, university, faculty and degree enrolled in, was also collected.

4.2.3. Procedure

The two universities were combined and the faculty groupings homogenized (see appendix E). All comments were imported into Microsoft office excel, and categorized according to faculty enrolment. Those enrolled in double degrees that straddled more than one Faculty were kept in the analysis and their comments were included in the results for both Faculties.

Analysis occurred in two phases. The first phase consisted of basic thematic analysis, adhering to the processes outlined by Braun and Clarke (2006). This phase involved exploring the data and developing consistent themes across the entire data corpus, using an iterative approach to coding until major themes had been generated. Many comments were coded more than once, and 84 comments did not correspond with the themes and were therefore discarded. Once all themes were established, the prevalence of individual themes for each faculty group was determined. The second phase involved a more in-depth analysis of the themes, in the social constructionist tradition of rhetorical analysis outlined by Billig (1987; 1991) and Potter (1996). This phase consisted

of exploring how political ideology underpins the individual comments, and finds rhetorical expression through opposing alternative ideological positions. In this way, the analysis focused on how climate change is debated as an ideological issue.

4.3. Analysis

4.3.1. Identification of themes – All three Faculties combined

Figure 4.2 shows the total number of themes to emerge for all three Faculty groups combined. A total of 33 themes were initially identified in the data, however a cut-off point was chosen where only those themes with 10 or more responses in the category were included for analysis[9]. As can be seen in Figure 2, *consumer capitalism* was the most commonly occurring theme (42 responses in total), with responses in this category describing consumer capitalism as both the cause of ACC and the main obstacle to ameliorating the problem. *Anthropogenic & natural* (38 responses) refers to descriptions of climate change as a natural phenomenon that is contributed to by anthropogenic activities. The high number of these responses partly reflected the lack of a definition of climate change in the questionnaire, an issue raised by several participants. *Industry* (31) was another strong theme to emerge and was used by respondents as a source of blame for the changing climate as well as a potential

[9] Although the figure 10 is arbitrary we feel that anything less in a corpus of 257 participants is too idiosyncratic to justify inclusion.

agent for the mitigation of climate change. *Criticism* of the questionnaire was another common theme (28), with participants in this category commonly explaining that the survey questions failed to provide scope for them to express their understanding of climate change. Participants described *individual actions* (26) in a number of different ways; mainly as ineffective where real reductions in greenhouse gases were concerned; however a number of respondents also described the actions they took to reduce their 'carbon footprint'. *Government action* was a common theme in 24 responses. References to *geo-political* issues, especially in relation to the actions of the United States, India and China, occurred 23 times. The *media* was referred to as providing misinformation a total of 20 times. Responses expressing *general environmental values* (19), regardless of whether ACC was real or not were also relatively common, as were references to *alternative energy* (18) as a solution. Climate change was often described as a *natural* process (18), and many respondents described *politics/ideology* (13) as a reason for why both scepticism and 'hysteria' have gained such prominence. A number of respondents also expressed their belief that the *science is flawed* (18), particularly in relation to uncertainty, but there were many comments that also accused the availability of government grants for ACC research for supporting a particular version of the theory and hence, tarnishing the credibility of the scientific process. The impact of ACC on *other species* appeared a total of 18 times, whilst *scepticism* occurred in 17 of the comments. References to previous climate change as an *historical occurrence* occurred 15 times, and to *adaptation* 14 times – specifically in relation to our ability to adapt to current climate change. Finally the *precautionary principle* and descriptions of ACC as a *crisis/catastrophe* each occurred a total of 10 times.

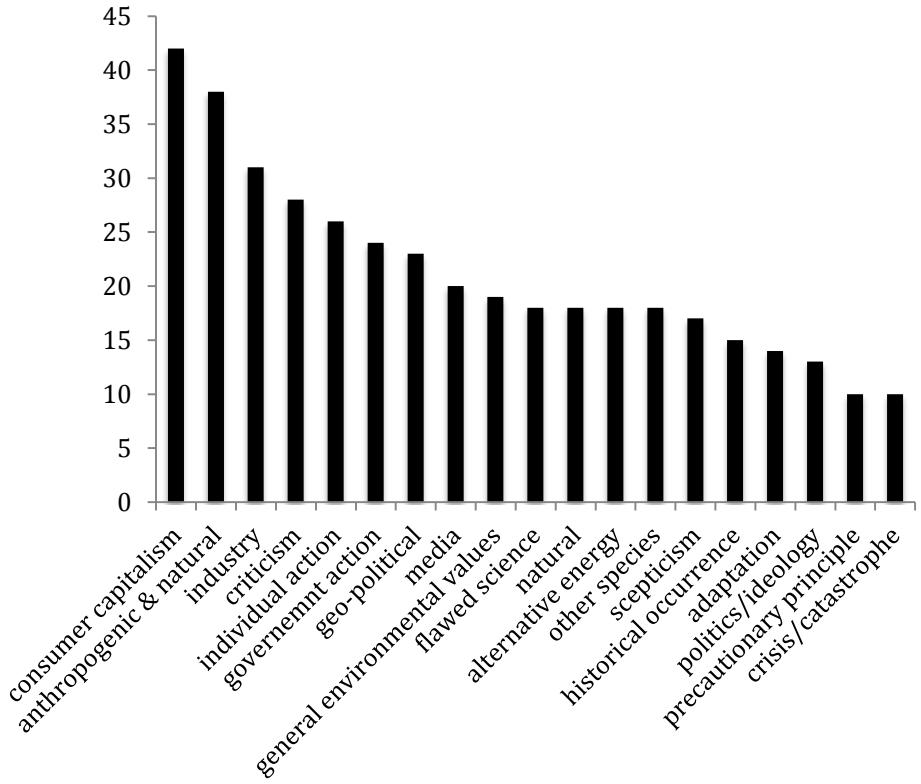


Figure 4.2. Total number of responses for each theme - all three faculties combined

4.3.2. FACULTY OF SCIENCES

Figure 4.3 shows the number of responses for each theme for the students enrolled in the Faculty of Sciences[10]. We will present the top five occurring themes for analysis – *anthropogenic & natural* (19), *other species* (13), *criticism* (11), *consumer capitalism* (11), and *adaptation* (9)[11]. As will be shown, the

[10] 25 responses were categorised as 'other' for this group.

science students were far less likely than the other two faculty groups to draw on ideological interpretations of ACC. Instead, the primary focus is a scientific one, whilst ideological factors find expression in only a secondary role.

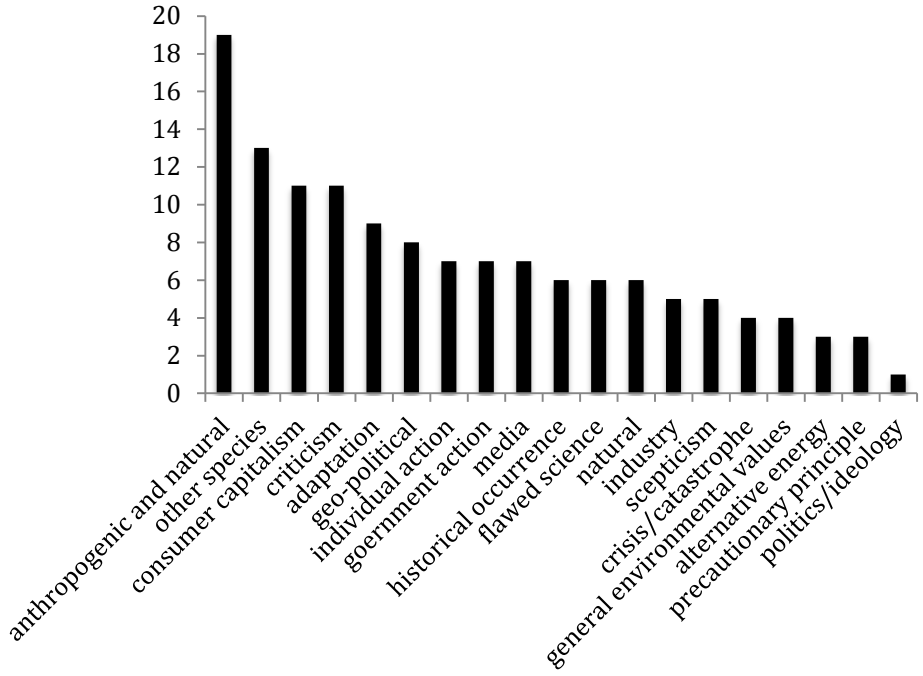


Figure 4.3. Number of responses for each theme - sciences

The sciences were dominated by responses describing how climate change is a natural process that humans are contributing to due to the burning of fossil fuels, for example:

[11] The extracts as they are presented here have had minor spelling and grammatical corrections to improve legibility.

Climate change is definitely part of the earth's natural processes (the occurrence of glaciation and warming periods throughout geological history proves that). Human influence appears to be causing changes in climate to be rapid, therein lays the problem. (Bachelor Science, Marine Biology)

Anthropogenic activity is contributing to the speed at which climate change (a natural fluctuation in the Earth's temperatures) is occurring. Currently, it is far exceeding any rate of change ever seen before, and this is the concern. (Environmental Science)

References to *other species* were the second most commonly occurring theme (13). These comments use identifiable scientific terms, such as 'natural selection' and 'ecosystem collapse' as seen in the comment below from an ecology student:

I believe that climate change is mostly a natural cycle, but that our human impacts have increased its severity to an extent, which may or may not be beyond the scope of natural resilience. Humans have enough technology to adapt to different weather patterns, but I am concerned that ecosystems will collapse under the strain as changes will happen too fast for natural selection to keep up. (Bachelor Science – Ecology)

Alternatively *other species* were often categorized as being of prime importance in the issue of adaptation and the follow-on effects such destruction could bring:

I believe in climate change but I believe that it has been blown out of proportion. Although changing our habits is important I believe that assessing sustainability of flora and fauna is more important. (Bachelor of Science)

I feel that the impacts of climate change are not often well understood or are played down, especially in relation to how ecosystems and individual species will be affected. The flow on effects this may have on humans should be highlighted more - instead of just how it's going to get hotter or wetter etc. (Bachelor of Science – Chemistry and Earth and Environmental Science)

What is interesting to note about these comments is their reference to ACC communication – climate change has been "blown out of proportion", "not often well understood", or "played down". The impacts on other species are therefore not being communicated properly; an issue that clearly has significance for these students. In this way the references to other species reiterate the preference for scientific explanations of ACC over ideological ones. However, all three themes presented above contain implicit constructions of science. Whilst not overtly ideological in a political sense (as described by Sunderlin, 2003), the prioritising of scientific explanations by these students nonetheless works as a rhetorical resource for elevating the status of science in this debate, particularly in relation to 'other' types of science that may have been sidelined in the debate around ACC.

Similar scientific constructions were evident in the theme *criticism*. The science students criticised the survey questions much more than any other group – a total of 11 of the 28 critical responses came from the sciences. It is clear from

the responses below that one of the main causes for the criticism was that the questionnaire did not differentiate between natural climate change and human induced climate change:

Find it difficult to answer every question without a specific explanation about what's meant by 'climate change', climate change is a natural process, it's been happening since the beginning of time.... has been catastrophic, etc... planet evolves... humans do have an impact on the climate but will not be able to 'stop' natural climate change…(Environmental Science – Environmental Resource Management)

the specificity in these questions is lacking context, but climate change is a natural process that human activity is influencing… (Environmental Science – Marine Science)

References to *consumer capitalism* were found in the science students' responses (11), but played a less salient role compared with scientific explanations. They were often embedded with implicit value judgments about humanity and are representative of the cultural/individualist paradigm. Changes to cultural practices are offered in a rhetorical critique of consumer capitalism with references to making money, lifestyles and the economy. The science students' references to consumer capitalism claim that nothing can be done about ACC without a cultural transformation in the way we see ourselves and our place in the ecosystem, which is a perspective typical of the deep ecology

movement (Sunderlin, 2033). However this critique is also expressed with little hope of change:

> Mitigating climate change is firstly about human values and ecology--if we are somehow able to see ourselves other than the dominating species that is on this earth to make money then we may see some progress--otherwise actions to do anything about climate will be a sham as are a lot of human endeavours these days (Bachelor Ecological Agricultural Systems)

> The developed world lacks the political will to do anything serious about climate change. The economy has become more important than the environment and there is little anyone can do to change that fact. (Bachelor Science)

Without hope of change these comments show an awareness of the ideological battle between economic imperatives and the environment, but this is expressed with a sense of inevitability. Economic development is clearly constructed as the problem, but there is little expression of a feasible solution.

Finally, *adaptation* was referred to 9 times by this group, with references to both human civilizations' adaptation and other species' adaptation to climate change. These comments stress that adaptation is an issue regardless of whether humans are causing climate change or not, but also implicit is the managerial paradigm, however not in opposition to capitalism:

climate change is happening, but it is not caused by anthropogenic activities…climate change is inevitable, we need to invest in programs and plans to deal with climate change, to be resilient. (Bachelor Science)

We best learn how to preserve ecosystems and biodiversity, which are at real risk of damage if anthropogenic climate change really rears its ugly head in the following decades. If climate change is caused by man [sic] we have a responsibility to protect the other species which inhabit the Earth, and which will not have time to naturally evolve and adapt. (Bachelor Environmental Science)

The adaptation theme is most notable for the lack of concern for ACC as a legitimate threat. Climate change in this way is constructed as a natural occurrence; adaptation is therefore the only possible option. Political issues are not explicit in these constructions of climate change; however the focus on climate change being a natural process implicitly suggests that the burning of fossil fuels and the economic system that drives it is non-problematic.

Overall, the dominant themes from the science group were accounts of the complexity of the issue from a scientific perspective; criticism of what was perceived by some to be an overly simplistic view of climate change presented in the survey questions; and an awareness of the impacts on other inhabitants of the planet. The ideological positions that did emerge were representative of the deep ecology movement of cultural individualism, and the managerial paradigm – positions that were constructed rhetorically against economic development. However the construction of economic growth as non-problematic was also

notable and suggests that engagement with ACC for this group was not ideologically homogenous. Rather, the uniting discourse for this group was a scientific one.

4.3.3. FACULTY OF HUMSS

Figure 4.4 shows the number of responses for each theme for the respondents enrolled in the faculty of HUMSS[12]. As can be seen, the theme *consumer capitalism* dominated the HUMSS students' responses (see figure 4). *Consumer capitalism* occurred 23 times, much more than the next most commonly occurring themes: *industry* and *anthropogenic & natural*, both with 13 responses each. Following these were, *individual action*, *geo-political*, and *general environmental*, at 8 responses each.

[12] 25 responses were categorised as 'other' for this group.

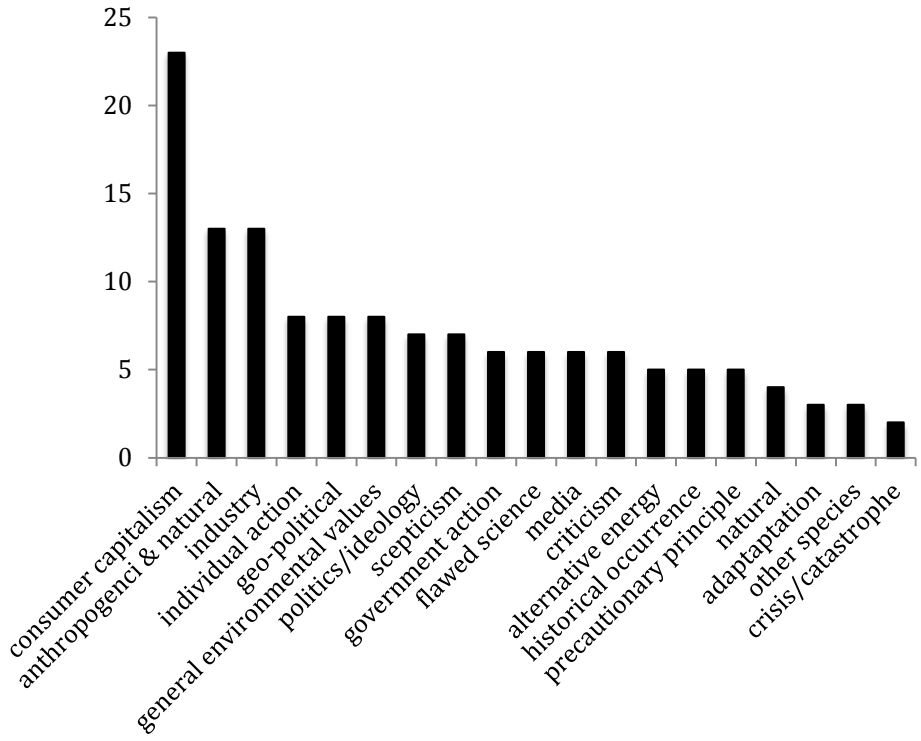


Figure 4.4. Number of responses for each theme – humanities and social sciences (HUMSS)

It was common for this student group to construct *consumer capitalism* as the main cause of ACC, as well as the main obstacle to generating solutions to the problem. The respondents bind the consumer capitalist system to undesirable human traits, thereby constructing the capitalist system as something that facilitates objectionable human tendencies:

People are too selfish and ignorant to see what damage they do daily - littering of parks, streets and waterways. Large homes with excessive footprints that need excessive amounts of electricity to heat etc. (Bachelor Social Science)

The real problem is people cannot stop doing what they do… Greed and self-centred interest have eroded civil life. The market place is dominating everything… (Bachelor Visual Arts)

…We cannot expect to abuse the planet and not have it react to protect itself... If we value life on earth and love our children the mindless consumption must end now… (Bachelor Media Studies)

Human traits are given as explanations alongside the capitalist system as the primary cause of ACC. Such explanations are indicative of the deep ecology movement of the cultural/individualist paradigm: it is a breakdown of values and morality that has led to the environmental problems we now face. Habit, self-interest, ignorance, denial, excess, greed and mindless consumption are to blame for ACC. Evident in this theme is a counter-argument to the free market ideology, and whilst both arguments occupy the politically Right framework of individualism, their rhetorical opposition to one another is clear. Interestingly, much of the political action that is occurring to deal with ACC is operating within the capitalist framework – carbon taxes and emissions trading schemes, investment in renewable energy etc. The new 'green economies' represent the (attempted) integration of environmentalism with the current market system. However these anti-consumerist comments construct consumer-capitalism solely as the problem – a system that must be overhauled to bring about a new way of life.

The references to excessive lifestyles and greed were common in the data corpus for this group. What is interesting here is the dominance of social and political critique from these students, as opposed to the science students who

showed more concern for what factors constitute climate change and how it is defined. However, the HUMSS students also demonstrated awareness that the definition of climate change must incorporate both natural and anthropogenic factors (13):

I believe that climate change is due to natural fluctuations in the earth's temperature but I'm sure all that pollution going up into the atmosphere can't be good either. I know very little about the subject. (Bachelor Arts/Bachelor Science)[13]

I think that there may be natural fluctuations in temperature over many centuries and that global warming may be a naturally occurring phenomenon… (Bachelor Social Science)

What distinguishes these comments from the science students' *anthropogenic & natural* comments are the prefixes – the common use of 'I believe' and 'I think'. This demonstrates less confidence in their knowledge of ACC science whilst simultaneously demonstrating the *complexity-of-ACC-science* rhetoric.

The category of *industry* (13) is differentiated from the *consumer capitalism* theme by the explicit references to 'industry'. Often these comments expressed that industry must be forced to change, because it is seen as the main cause of ACC:

[13] This student is enrolled in both the Faculties of Sciences and HUMSS.

Industries must be held accountable for their pollution, energy and water use, and made to implement more environmentally friendly practices… (Bachelor Arts/Law)[14]

Pollution from cars is another main cause of climate change… Industry needs to be forced to change… (Bachelor Arts)

Whilst these comments locate the source of ACC with industry and an implicit connection to our modern way of life, these comments were expressed through a different ideological discourse than the consumer capitalist comments. References are made to industry being 'held accountable', 'made to implement', and 'forced to change', far more expressive of the managerial paradigm than the cultural/individualist paradigm represented in the *consumer capitalism* theme. References to the government are absent in these comments however the implication is that government must regulate and impose mandatory compliance to reducing greenhouse gas emissions. Unlike the consumer capitalist comments presented above, these comments do not construct the need to change on a social, cultural and individual level. Rather it is industry alone that is required to change. Whilst less oppositional to capitalism than the deep ecology perspective, these comments nonetheless construct current free market practices as the problem. Capitalism is therefore somewhat accepted, however not unregulated.

[14] This student is enrolled in both the Faculties of HUMSS and Professions.

The geo-political statements (8) were predominantly references to the expected actions of other nations. Again, this demonstrates how the HUMSS students drew upon the managerial paradigm to construct the problem of ACC:

I disagree with the Australian Govt leading the way on climate change. It's just a way to increase taxes and charges for energy usage. China, India, and USA should be made to clean up their act first! (Bachelor Languages – English)

Pretty sure climate change has been proven, although governments are reluctant to help stop it because it means reducing the growth of their economy. That's why India and China didn't sign the Kyoto protocol, because they would have to make up for the damage caused by already developed nations like the US, which would mean less growth. (Engineering, Finance, Diploma Languages)[15]

The actions of Australia are downplayed in these comments – a rhetorical resource that has been used extensively in Australia's climate policy debate in recent years. Whilst still reflective of a regulatory approach to dealing with ACC, in line with the managerial paradigm, these comments locate the responsibility to act with those countries with the highest greenhouse gas emissions, somewhat diminishing the importance of global united action.

[15] This student is enrolled in the Faculties of EMCS, Professions, and HUMSS

Although the *individual action* theme (8) for the entire corpus also included statements about the futility of individual action in the face of minimal action from government and industry, the HUMSS students were more likely to construct the importance of individual action, and the type of action that can be taken. As with *consumer capitalism*, these responses are implicitly critical of social and political authorities through the demonstration of a strong commitment to the power of grass roots action, much in line with cultural individualism:

I live rurally, with off grid solar power; I drive an LPG powered car, use a composting toilet and reuse all grey water. So questions like 41, leaving a light on for me would have little effect on global warming. I grow what food I can and I am a vegetarian, I think all meat eaters should take a good look at the effects that the meat industry has on global warming and water use. (Bachelor Music/Teaching)[16]

More bikes! (Bachelor Social Science)

I am pleased you are doing this survey & research - keeping the issue alive. I believe increased population and resultant time, famine & monetary greed are contributors to climate change - human behaviours need to change on the individual level. (Bachelor Visual Arts)

[16] This student is enrolled in the Faculties of HUMSS and Professions.

These comments, whilst not explicitly critical of capitalism, contain within them an inherent opposition to consumer capitalism. It is through change on an individual level that consumerism can be rejected; individuals can choose to protest against the system through their everyday lifestyle choices. Again, embedded in these comments is the ideological rhetoric of cultural individualism.

General environmental values (8) often downplayed the importance of ACC in regard to modern ways of life:

I believe that humans are destroying the earth, but climate change is separate and should not be considered the same. We have no respect for our planet, and that is one issue on its own. Climate change is a natural occurrence but our destruction of the planet is not respecting Mother Nature. Man [sic] cannot control the climate, so we need to learn how to live with climate change as our Indigenous Ancestors have. (Bachelor Social Science)

It doesn't matter if global warming and climate change is happening or not, we should still be looking after our planet. We have to live on it and we should be doing our best to preserve it and the plants, animals and people on it. (Bachelor Arts)

ACC is not considered important in these comments, perhaps not even 'real', and yet there are strong environmentalist themes running through them. Whilst capitalism is not directly referenced, the assumptions within these comments are very similar to those presented in the *consumer capitalism* theme.

What appears to define the HUMSS responses is a broad ideological critique of the current social and political status quo. There is a strong emphasis on individual action and 'bucking' the trends associated with capitalism and consumerist lifestyles; however there are also constructions of the managerial approach as the solution to the problems. Both ideological positions are constructed to critique capitalism and contemporary patterns of consumption and lifestyles.

4.3.4. FACULTY OF PROFESSIONS

Figure 4.5 shows the number of responses for each theme in the faculty of professions[17]. As can be seen, *government action* was the most frequently occurring response, with 13; *industry* followed on 10, whilst *capitalism/consumerism*, *anthropogenic & natural*, *criticism*, and *alternative energy* all appeared a total of 8 times each.

[17] 18 responses were categorised as 'other' category for this group.

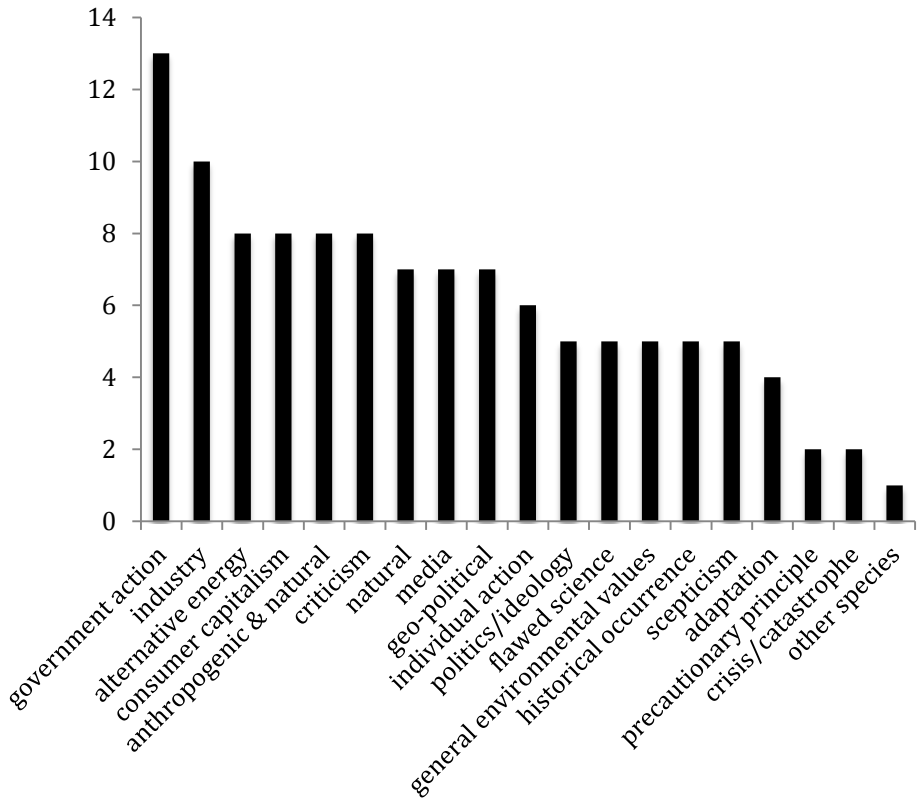


Figure 4.5. Number of responses for each theme - professions

As with the *industry* theme presented for the HUMSS group, the *government action* responses from the professions group suggest the government should force or entice industry to change:

Strong positive government policies that provide incentives for industry to develop sustainable processes are one of the key requirements. (Masters Business Administration)

…If any government is serious about this, they will introduce policies to lessen the number of cars, planes and trucks on the roads and stop the excessive use of plastics etc… (Associate Degree Law)

These comments suggest a genuine concern about the threat of ACC, and construct solutions to the problem entirely within managerial rhetoric. The government is constructed as the sole agent for action, forcing industry to change current practice. Again, capitalism as a system is not critiqued; however regulation of the system is explicitly called for.

As the comment below demonstrates, governments are expected to force *industry* (10) to act because industry is blamed for the environmental degradation we are facing. However unlike the comments above, governments are not taken for granted as being effective agents of change.

The government's "tactics" to reduce climate change are purely a smoke screen for additional revenue, we have not seen how the carbon offset taxation plan will use the revenue to effectively combat global warming, and it will only hurt the small consumers as opposed to big businesses who are the main culprit for environmental abuse. I do not think that this means we all shouldn't do our part, but the efforts of the average person are negated by the actions of big business, and super economies that are unable to control their emissions. (Bachelor Justice)

Here the student constructs 'big business' and 'super economies' as being 'unable to control their emissions', with the government's carbon offset taxation plan failing to target the 'main culprit'. A number of ideological battles are taking

place within this extract. The managerial paradigm is invoked as flawed; however there is the suggestion that government *should* be targeting big business with adequate policy. The individualist perspective is pushed against in two main ways: unregulated capitalism is clearly critiqued, but so is individual action, which is constructed as ineffective in the face of monolithic capitalist structures ('super economies' and 'big businesses') that are 'unable to control their emissions'. Both individual action and current regulatory policy are therefore constructed as entirely ineffective. Rhetorically, all paradigms are constructed as flawed in the face of the ACC challenge.

Unlike the science students' responses, the *criticism* (8) from the professions was most commonly associated with scepticism, rather than an inaccurate definition of climate change. This is in keeping with the higher levels of scepticism found in this group in the results presented in chapter 3, and demonstrates that these students are less likely than the other student groups to challenge the definition of climate change than they are to challenge the theory of ACC:

I'm old enough to remember the Y2K bug, the one that was going to send us back to the Stone Age. Climate change is a scientific led "beat up" to support them receiving more Government grants. The UN, seeking yet another mandate to justify their existence, is doing all it can to perpetuate this nonsense.... it would seem you've been brainwashed as well. (Masters Business Administration)

This comment is indicative of the free market individualist paradigm. This was a rare find in our data corpus, with the majority of comments demonstrating rhetoric opposed to this position, but very few drawing on it rhetorically as a legitimate position. However this makes sense as an example of ACC scepticism. Opposition to the UN is a common theme to emerge within the sceptical counter-movement, and represents opposition to any kind of organised regulation, especially global (McCright, 2009).

As with the responses from the other faculties, references to both the *anthropogenic & natural* causes of climate change (8) demonstrate an understanding of ACC that is a natural cycle being affected by human activity:

The cycle continues with or without human intervention (Masters Business Administration)

I always thought that the Earth goes through natural cycles and that climate change is inevitable, like the Ice Age we had ages ago, but our activity on the planet now, is speeding up the process, A LOT. (Bachelor Commerce)

Whilst comments such as these do not fall neatly into the ideological paradigms defined by Sunderlin (2003), there is something implicitly ideological about the way climate change is constructed that aligns with particular readings of science. The role of science in society today is rapidly changing (Funtowicz & Ravetz, 1993; Hulme, 2009), and science knowledge is able to be used as a way of engaging politically with important socio-scientific phenomena: policy responses

to constructions of ACC as entirely human-induced may be very different in kind to policy designed for only partially human-induced change (Hanson-Easey, Bi, Hansen, Williams, Nitschke, Saniotis, ... & Hodgetts, 2013). Moreover, such comments are reflective of worldviews that position a particular role for humans in the natural environment: not as complete and absolute masters of their domain, but neither as merely at its mercy. Rhetorically these comments may be less obviously challenging capitalism; however they can provide important rhetorical fodder for engaging with policy.

The comments referring to *alternative energy* sources (8) tended to question why more sustainable sources were not implemented despite the possibilities:

…this "clean coal" initiative is a farce. How could coal be clean? What's wrong with nuclear energy? Or does some pop star on the front bench yield so much say? People in Europe don't complain. We have 38% of the world's uranium. (Diploma Business Administration)

…Enough energy hits the earth from the sun every day to power the entire earth for 180,000 years, but we can only harness enough to power New York for a day. So if we finally ditched tidal energy, wind energy, thermal energy and focused on finding some decent semiconductors to use in solar panels we might have a chance.... (Bachelor Information Technology)

Government action to implement alternative energy solutions is constructed in both comments here as ineffective and in this way, the managerial

paradigm is being critiqued via references to its failings. But this critique is not happening through the rhetoric of an alternative ideological paradigm. Quite the contrary, these comments construct government action as necessary, which is indicative of the managerial paradigm, whilst simultaneously arguing that the government has been ineffective. These comments reflect the battle between capitalism and management in constructions of the ACC problem: the government is constrained by big business; it is rendered ineffective and impotent in the face of oil, coal and mining companies. However politicians (the 'pop star on the front bench'[18]) and even the well-intentioned but misguided alternatives (thermal, wind and tidal energy) are singled out as impediments to effective action to deliver alternative sources of energy.

Finally, *consumer capitalism* (8) was drawn upon as a reason why appropriate action is not being taken to mitigate the problem, however references to big business and government are far more explicit for the Faculty of Professions than with the two other faculty groups:

… Greed is at the back of man's activity and unless you get big business to back off and be honest, the concerns of a few individuals mean nothing. The recent financial crisis has proved how greedy some people are. This very subject, climate change/global warming is a source of extensive profit by those willing to exploit it…. (Associate Degree Law)

[18] This reference is to Peter Garret, a minister in the Labour government who previously fronted the Australian rock group 'Midnight oil'.

I feel disgusted that the political agenda of people in power today appeals to climate sceptics/the maintenance of the economy because it probably suits their immediate and short-term political position. It is time to look past individual loss/gain that is fuelled by a capitalist societal structure. (Bachelor Law)

As with the *alternative energy* theme, these comments referring to *consumer capitalism* employ a strong critique of both the managerial and free market capitalist paradigms. Big business is again constructed as the culprit that 'fuels' undesirable human qualities such as greed. Moreover, the political world is drawn into this critique, with short-term political gains coupled with big business greed. The references to individuals in the above comments vary. In the first extract, the individual's power and social position is downplayed against the power of the larger social structures of capitalist society. In the second extract the individual embodies the characteristics that drive capitalism. Greed and short-term gains are the assets of the individuals in positions of power, whether that is political power or the power amassed from wealth derived from the capitalist system. The expression of power inequality here is reflective of the class paradigm – a rhetoric that was not common in our data corpus. What we see in these comments is a critique of the managerial paradigm, the free market individualist (capitalist) paradigm, and the cultural individualist paradigm – it is the stratification of society, the power imbalance that is hindering action on ACC.

The professions' responses were more diverse than the other two groups, with fewer responses recorded in the most frequently occurring themes. However these responses did demonstrate thematic patterns which could be

described as predominantly solution-focused – from who should be managing and enforcing the changes to what should be done in the way of regulation or alternative energy. For the most part, this is very much in line with the managerial paradigm. Interestingly, industry is singled out as the villain in a capitalist society that demands large profit margins; however government is also included in this critique. In this way, the class paradigm found expression in the profession students' rhetoric.

4.3.5. Comparisons across Faculties of Science, HUMSS and Professions

As can be seen in Figure 4.6, although there were common themes across all three faculties (i.e. *anthropogenic & natural*, *consumer capitalism*, *industry* and *criticism*), overall, faculty specific thematic tendencies were observed. The faculty of sciences expressed predominantly scientific explanations of what climate change is, particularly that it is both a natural and human induced phenomenon; the HUMSS students expressed opposition to the current consumer capitalist paradigm; and the professions students expressed a need for action and solutions through strong government action, placing regulation on industry in order to mitigate GHG emissions.

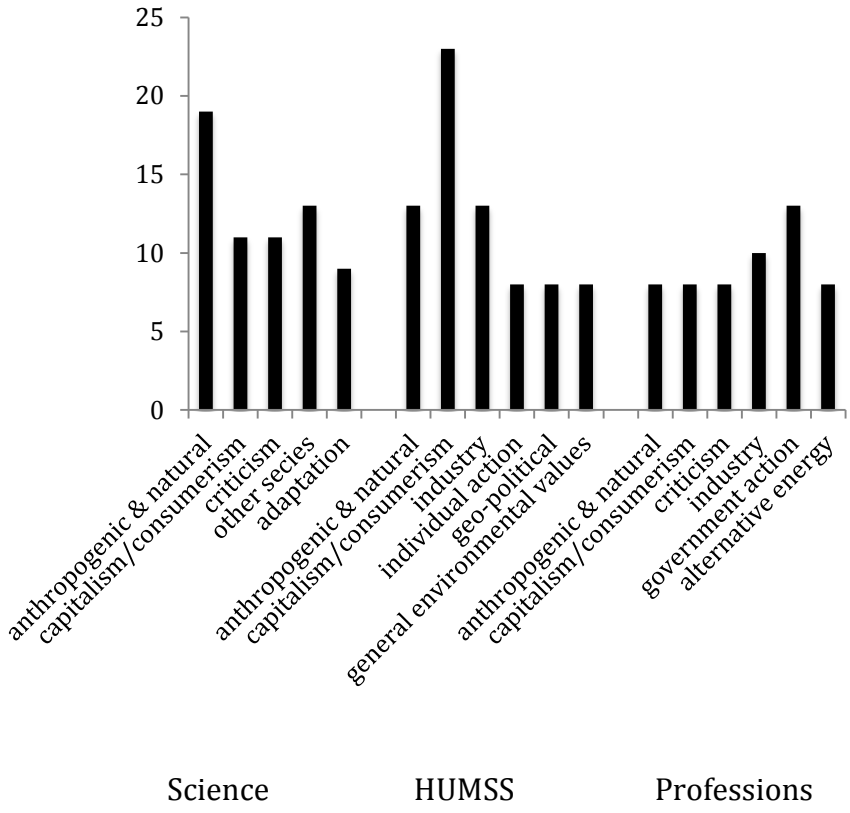


Figure 4.6. Comparison of most frequently occurring themes across faculty groups

4.4. DISCUSSION

The science students' drew predominantly from constructions of science, which is itself a rhetorical resource for engaging with the debate. ACC science has come under attack over the last several decades and whilst these comments are not overtly defending climate science, they are implicitly drawing on the rhetoric of science to prioritise versions of ACC that exist outside of politics. This is seen in the way the 'missing' science is offered so frequently by this group, and is evident in the themes *anthropogenic & natural*, *other species*, *adaptation*, and even the *criticism*. In this way the science students construct ACC as

predominantly an issue about science, and rejecting the politicisation of the issue. Whilst it is difficult to explain this finding within the confines of the data generated here, I suggest that this may be related to their status as science students and both the knowledge and culture of science they are exposed to during the course of their study.

Ideologically, the Faculty of Sciences theme *adaptation* showed some reference to the managerial paradigm, however not in direct opposition to capitalism. This theme was most notable for the construction of climate change as entirely natural, with capitalism therefore not responsible for climate change. In contrast, the *consumer capitalism* theme was also strong amongst these students, and found expression through the ideological paradigm of cultural individualism. These comments bear a striking critique of consumer capitalism by drawing on notions of human values and lifestyle change; however ACC is expressed through a sense of inevitability with little hope of change. However, ideological positions in general were far less common with the science students than the other two faculty groups.

The HUMSS students' comments were dominated by a critique of consumer capitalism, in not only the *consumer capitalism* theme but also with the themes *industry*, *individual action*, *geo-political*, and *general environmental values*. Two ideological positions were drawn upon rhetorically for this: the cultural individual and the managerial paradigms. The focus on individual action was very high amongst this group, and even those claiming not to believe in ACC commonly expressed the need for lifestyle change. This is typical of the cultural individualist position, or the deep ecology movement of the political Right.

However the use of the managerial paradigm in the HUMSS students' anti-consumerist rhetoric demonstrates how the overarching theme of social change found rhetorical expression through more than one ideological position.

The Faculty of Professions was distinct for its focus on action and solutions to the ACC problem through a broad critique of authority and power. The managerial paradigm is implicitly constructed as necessary for action on climate change; however it is also presented as an impotent force against the power of free market capitalism. Those in government as well as business leaders are constructed as corrupt and driven by money and power, thereby attenuating possibilities for change. Interestingly it is the students enrolled in professional degrees that draw upon the class paradigm to critique the system that has given rise to ACC. Unlike the findings by Hastie (2007a) and others (e.g. Pascarella & Terenzini, 1991) the social science students from the HUMSS faculty were more likely to draw from an ideologically Right position (cultural individualism), whilst commerce and business students from the professions drew from the ideologically Left class paradigm. I explain this finding by suggesting that the debate around ACC has become so embroiled in politics, with vested interest groups vying for authority in all matters relating to policy and the economic outcomes entailed, that opposition to the current capitalist and political system is requiring increasingly creative rhetorical expression through whatever ideological positions are available. Argument and debate give rise to contradiction and ambivalence (Billig, 1987), and such contradictions form the basis for ideological dilemmas (Billig et al, 1988). However, these dilemmas can be seamlessly woven into the discursive fabric to appear consistent and

reasonable (Billig et al, 1988). Rhetorical discourse is never straightforward but will utilise arguments in creative and spontaneous ways. The professions students' comments should not be considered genuine adherence to a Left political agenda, but rather the deployment of Leftist rhetoric for the purpose of critiquing the current political and economic system.

The overwhelming majority of ideological constructions from all three faculty groups are system-challenging in nature. Whilst the free market individualist paradigm associated with capitalism is not drawn upon consistently by any Faculty group as a way of understanding the world it is nonetheless constituted in the majority of comments as the force against which the rhetoric of the students is aimed. The managerial paradigm, the cultural individualist paradigm, and the class paradigm are therefore all deployed as rhetorical devices for countering what is seen to be the cause of ACC and the primary obstacle for mitigation.

Such findings compliment much of the research on ACC that has demonstrated the ideological bases of ACC scepticism from the politically conservative Right (e.g. Jacques et al, 2008; McCright & Dunlap, 2000; Oreskes & Conway, 2010). We found very few comments arguing from this position, no doubt due to the relatively small number of sceptical comments in our data corpus[19]. However the way in which ideological forces buttress scepticism mirrors the ways in which ideology also buttresses belief in, concern for and

[19] A finding that reflects the high acceptance of the human causes of ACC reported in chapter 3; most likely due to the University sample.

action on ACC. Apart from the science students who maintained a predominantly scientific rhetoric, the politicisation of ACC is highly evident in our findings.

Finally, the present analysis demonstrates the important role played by qualitative research as a compliment to traditional quantitative work in this field. As these findings suggest, views on ACC are complex and nuanced, and can vary qualitatively in ways that traditional questionnaire techniques fail to detect. Moreover, many of the ideological underpinnings of these views did not find expression in the Likert question format. The qualitative responses differ from the quantitative data in one important way: the quantitative data showed that students enrolled in business degrees were significantly more sceptical of ACC than other student groups; however the qualitative data does not reflect this trend. The business students enrolled in the faculty of professions provided comments that support the need for action and, specifically, government regulation. I offer two explanations for this finding. The first relates to the mean scores for the business students on the human role scale (M = 4.85) and the scientific evidence scale (M = 4.04: see chapter 3.3.1, p. 70). Both of these scores are above the midway point on the 7-point Likert scale, demonstrating moderate acceptance of the human role in ACC and the scientific evidence for ACC. This suggests that whilst these differences were significant compared to the other student groups, they do not reflect absolute scepticism. What they reflect is less acceptance of ACC than the other student groups. So whilst only moderate acceptance of ACC and the science that underpins it was found for the business students, the strong theme of action on ACC from this group suggests that

avenues for tailoring business school programs with the design of solution-focused strategies may find a receptive audience.

The second explanation for the inconsistent findings between the qualitative and quantitative data, relates to the *anthropogenic & natural*, and *criticism* themes, evident across all three faculty groups. Clearly, the survey questions failed to capture the subtle ways in which the students understand ACC. By allowing respondents the opportunity to reflect upon the issues raised by the questionnaire, a richer source of data was elicited, providing a more thorough understanding of the ways in which ACC is politicised.

This politicisation is central to the character of ACC as it emerges and becomes negotiated within the social and political spheres. Whilst I recognise the university sample is not representative of the broader community, I also highlight that these findings are consistent with other research in the field demonstrating the political/ideological nature of this issue within the broader public sphere (e.g. McCright & Dunlap, 2011b; Tranter, 2011). These findings compliment and contribute to this research by demonstrating how capitalism is used as the primary force against which views about ACC consistently find rhetorical expression. The capitalist system in this way is constituted as incompatible with environmental protection.

4.5. Conclusion

This study has demonstrated the highly politicized and contestable nature of ACC. More than just a scientific controversy, ACC is controversial for reasons

that cut to the heart of how we live. In order to understand this highly complex, contestable, and controversial issue, we must move away from individual understandings or perceptions of this issue, and examine the social, scientific, and political context through which this controversy is unfolding. The constructed nature of the ACC debate lends itself to a broader critical analysis of the social factors that constrain and shape this controversy, and the remainder of this thesis will present theoretical and methodological approaches toward this aim.

CHAPTER 5: PUBLIC UNDERSTANDING OF SCIENCE: THEORETICAL AND METHODOLOGICAL CONSIDERATIONS

5.1. INTRODUCTION

The past five years have seen a number of scientific and political controversies erupt in the public sphere, that have provided reasons for the general public to question the urgency for action on ACC, the accuracy and legitimacy of climate change science and the necessary steps that should be taken to tackle the problem. For example, after leaked emails emerged in late 2009, the University of East Anglia's Climate Change Institute was accused of manipulating and suppressing data in order to empirically support global warming trends. This scandal, known as 'climate-gate', was taken in some instances as proof that climate change science is corrupt, and the theory of ACC, questionable (Gray, 2011). Two inquiries set up by the University into the allegations of scientific fraud absolved the scientists from any wrongdoing, however the media attention given to the incident has arguably tarnished the credibility of climate change science for the general public (Lieserowitz, Maibach, Roser-Renouf, Smith & Dawson, 2013). Moreover the international environmental negotiations of the past two decades, including the Kyoto, Copenhagen, and most recently the Doha conferences, have been unsuccessful in gaining unanimous support for GHG emissions reductions. The generation of weak, non-binding treaties provides no incentive for governments to make the required cuts to their GHG emissions, and as Speth (2008) points out, "…governments have been far more effective representatives of their countries' business interests than of their citizens' environmental interests" (p. 72). Although the goal to reach unanimous and binding GHG reductions is complex

and perhaps ambitious in its aims, the lack of leadership to mitigate ACC in international negotiations has arguably tarnished the climate change cause for the general public.

Within the Australian context the political urgency of climate change action has had an inconsistent trajectory over the past 10 years. Little was achieved under the Howard government, with the Prime Minister not only failing to ratify the Kyoto protocol but also successfully negotiating the 'Australia clause'. This clause allowed countries with net emissions from land clearing to include these emissions in their 1990 baseline. The late 1980's and 90's saw good agricultural conditions and an unusually high level of land clearing in Australia, such that it raised the nation's baseline emissions by around 30% in 1990 (McIntosh, 2007). Subsequently, the 1990 baseline target was much higher than usual, making the emissions reductions from that baseline easier and cheaper to achieve, as well as allowing reductions in land clearing to then offset increases in the burning of fossil fuels (McIntosh, 2007).

With the election of Kevin Rudd in 2007, changes to Australia's stance on climate change action began to take effect. Rudd constructed ACC as an inherently moral issue, and ratifying the Kyoto protocol was his first official act as Prime Minister. The Rudd government also proposed a Carbon Pollution Reduction Scheme (CPRS) that failed to pass into legislation, and instigated internal squabbling in the Liberal (conservative) opposition, resulting in a leadership spill, which saw the then opposition leader ousted in favour of a self-confessed climate change sceptic, Tony Abbott (Rintoul, 2009). The issue of climate change retreated as an election issue in 2010 after Julia Gillard took

control of the Labor party, and famously stated during the election campaign that there will be no carbon tax under a government she leads. Gillard was seen to take a dramatic back flip on this stance only months after her election win when she announced plans to put a price on carbon. Although not technically a tax, the policy was dubbed the 'carbon tax' by the opposition and reiterated as such in the media, and Gillard and her government failed to explain and defend the policy appropriately (Walsh, 2013). Subsequently, considerable public anger and opposition to the carbon 'tax' erupted spurred on by the relentlessly negative opposition from members of the Liberal/National coalition.

Opposition leader Tony Abbott led the campaign to discredit the carbon pricing system, describing it as economically reckless; a 'tax' that would "swing like a wrecking ball through our economy" and cause "wholesale wealth destruction"[20]. However 300 business leaders had signed a letter of support for the carbon price, detailing their agreement with the governments' economic rationale (Iggulden, 2011). Despite the public and political opposition, the carbon pricing system passed through both houses, and during its operation starting in July 2012 Australia's economy continued to grow, inflation remained steady, and unemployment continued to be amongst the lowest of the major advanced economies (Combet, 2012).

However, the carbon pricing policy will not be given the opportunity to develop into a fully-fledged GHG reducing strategy. The 2013 federal election win by the Abbott government saw a substantial shift in climate change action.

[20] These quotes come from a doorstop interview Abbott made in Victoria in April 2012. The full interview can be found at: http://www.tonyabbott.com.au/News/tabid/94/articleType/ArticleView/articleId/8676/Joint-Doorstop-Interview-Broadmeadows-Victoria.aspx

Actions have already be taken to repeal the carbon pricing system, and the renewable energy target, the Climate Change Commission, the Clean Energy Finance Corp and the Department of Climate Change and Energy Efficiency have already been dismantled. The opposition's alternative Direct Action Plan comprises cutting carbon dioxide emissions through sequestration and carbon capture and storage (CCS), and the establishment of a $3 billion Emissions Reduction Fund that will allocate money to private projects designed to reduce carbon emissions (Parkinson & Vorrath, 2013). Moreover Abbott has proposed a 'green army' of 15,000 workers whose job will primarily consist of clearing litter and planting trees. This plan has been widely criticised for being expensive and ineffectual against GHG emissions, as well as neglectful of the science (Parkinson, 2013).

As this brief political history demonstrates, ACC as a political issue has and will continue to be treated as controversial and contestable by political leaders, which will have repercussions for the public understanding of ACC science. Engagement with and understanding of ACC is encompassed within the broader social controversy that has engulfed ACC science and policy, so much so that it is not possible to study the public understanding of ACC science without also studying the social and political controversy that surrounds it. This controversy is unique in that narratives that call climate science into question therefore call climate policy into question, and the tangible act of dealing with GHG emissions becomes tainted by alternative and competing meanings about ACC, our relationship with the natural environment and the moral and ethical implications of changing the way we produce energy. ACC therefore is a scientific

issue posing unique challenges for public engagement and subsequent political action. To attempt to understand the dissemination of climate science throughout the political and social worlds therefore requires a theoretical framework of public understanding of science sufficient to encompass the complexity of the social, political and scientific phenomena bound to anthropogenic climate change.

In this chapter I will attempt to articulate such a framework by evaluating the relevant and important theoretical frameworks available under the broad topic of *public understanding of science*. I will begin by looking at Moscovici's Social Representations Theory (SRT: Moscovici, 1984), before going on to highlight the critiques of SRT made by Potter and Edwards via their explication of Discursive Psychology. I will also introduce Rhetorical Psychology (Billig, 1987; 1989; 1991) as a theory of human thinking that accommodates argumentation and ideology as cornerstones of social psychological analysis. I go on to describe insights from the Sociology of Scientific Knowledge including the ground-breaking work of Gilbert and Mulkay (1984) and the information-deficit model. I will argue that the socially contestable nature of ACC lends itself to Billig's rhetorical approach. Finally I will develop these social constructionist interpretations as they directly relate to the unique problems posed by ACC.

5.2. Social Representations Theory

Social Representations Theory (SRT) is a theory of social knowledge (Markova, 2000) primarily concerned with how science is understood by

individuals and society. It articulates the purpose that shared knowledge systems serve for groups of people. Namely, to make sense of unfamiliar phenomena, position oneself in relation to the world, and facilitate communication and social cohesion (Moscovici, 1984; Purkhardt, 1993). SRT has a particular focus on how the reified knowledge domain of science is transformed and appropriated into consensual, common sense understanding (Bauer & Gaskell, 2008), and it is argued that these transformations are necessary for providing the framework for directing and informing communication (Moloney, 2007; Moloney & Walker, 2002; Moloney, Hall, & Walker, 2005). Importantly, social representations are not considered a distortion or vulgarization of scientific phenomena; rather they are the ways in which "objects are understood in the public domain" (Bauer & Gaskell, 2008, p. 338). They are constituted by individual members of a society and as such are not a true reflection of scientific knowledge, but are symbolic and dynamic systems of beliefs, knowledge, practices, attitudes and values (Duveen, 1994; Moloney, 2007; Wagner, Valencia, & Elejabarrieta, 1996).

An important component of the theory is the connection between representations as cultural resources to communication and language (Moscovici, 1988), with a specific focus on both interpersonal and mass media communication (Markova, 2000; Joffé, 2003) The society and the individual are not opposed to one another, and the nature of the representation as it exists in the social world is a reflection of how that representation exists as a cognitive entity. *Core* and *peripheral* elements (Guimelli, 1998) constitute the cognitive structure of a representation, whilst *anchoring* and *objectification* (Purkhardt,

1993) are the cognitive processes involved in the formation of SRs. Social representations are therefore conceptualised as existing simultaneously in the social mind and the individual mind via communication and interaction between members of a society (Gaskell, 2001).

Whilst social representations are considered to be shared across individuals and groups, the notion of consensus in SRT is conceived of as the mutually agreed upon elements of a social-scientific phenomenon, without the requirement that all members of a society agree with those elements (Rose, Efraim, Joffe, Jovchelovitch, & Morant, 1995). That is to say, people are aware of what the issue is about even if they themselves do not agree with this understanding. This highlights the contradictions in meaning and understanding within these consensual frameworks that gives rise to the dynamism in social thinking (Rose et al., 1995). Social change occurs as a product of this dynamism, and is expressed through the theory via the processes of argumentation and controversy (Billig, 1991). The role of language and communication are considered crucial here. Moscovici's (1961/1976) original work on psychoanalysis demonstrated that the content of social representations is directly linked to the communicative modalities used.

Castro (2006) argues that SRT is particularly well suited to articulate human-environment relations by synthesizing and developing a number of prominent social science theories; namely, the Human Exemptionalist Paradigm (HEP) – New Ecological Paradigm (NEP) (Dunlap & Catton, 1979), cultural theory (Douglas & Wildavski, 1982; Douglas, 1985), and the post-materialist values hypothesis (Inglehart, 1977; 1995). Castro (2006) highlights a lack of

conceptual clarification, insufficient dialogue between these approaches and a strong reliance on socio-demographic variables in much of the social science research on human-environment relations. Alternatively, SRT is argued to offer a comprehensive theory that accommodates old and new ideas, as well as the global and the local. It can accommodate contradiction between the normative (ideas) and functional (practices) elements of a representation, which allows it to articulate the incompatibility between attitudes and behaviours that is often reported in social psychological research, especially research on environmental attitudes and behaviours (Castro, 2006). Gillespie (2008) elaborates on this idea by suggesting that alternative representations exist within social representations that orient to competing representations within society.

Social representations therefore accommodate contradictory attitudes and beliefs within their communicative modalities, however the focus on communication has been somewhat neglected in much of the SRT research to date (Gillespie, 2008), which has instead opted for traditional questionnaire techniques over techniques that allow for the analysis of communicative styles (Castro, 2006). This has drawn some criticism for the theory and issues around methodology are well noted (e.g. Potter & Edwards, 1999).

In more recent years SR researchers have attempted to address this criticism and explore the action orientation of SRs as well as the impact of competing representations of the same phenomena. Jaspal, Nerlich and Koteyko (2012) analysed the rhetorical functions of social representations of ACC in relation to the climate-gate controversy. They make a distinction between the 'hegemonic' and 'polemic' representations in regards to social controversies. The

'hegemonic' describes the consensual view that climate change is real and that humans are the primary cause, whilst the 'polemic' representation arises out of social conflict to produce the alternative and competing representation that climate change is not happening, is not caused by humans and is a scam perpetrated by governments, scientists and institutions for political and economic reasons (Jaspal et al., 2012). The authors argue that the climate-gate controversy provides material substance for the polemic representation, thereby disrupting the peripheral elements of the hegemonic representation and challenging its essential 'core' characteristics. The peripheral elements are therefore no longer able to provide support or evidence for the core, ultimately weakening the hegemonic representation (Jaspal et al. 2012).

Whilst Jaspal et al. (2012) use SRT as a theoretical framework, critical discourse analysis (CDA) is used as a methodological framework. By incorporating language and discursive analytic techniques into their analysis, Jaspal et al. (2012) highlight that representations of ACC are much more than cognitive phenomena and even much more than social knowledge. They are the articulation of action.

5.3. Discursive and rhetorical psychology

Discursive Psychology as described by Potter and colleagues (Edwards and Potter, 1992; Potter, 1996; Potter and Wetherell, 1987) has a strong focus on the constitutive nature of language. According to Potter (1996), discourse is

considered to construct the world rather than reflect it. The focus of discursive psychology, then,

> "...is the action orientation of talk and writing. For both participants and analysts, the primary issue is the social actions, or interactional work, being done in the discourse.... [R]ather than seeing such discursive constructions as expressions of speakers' underlying cognitive states, they are examined in the context of their occurrence as situated and occasioned constructions whose precise nature makes sense... in terms of the social actions those descriptions accomplish." (Edwards & Potter, 1992; pp 2-3).

Thus, the action orientation of language is paramount to the discursive psychologist. In this context, discourse may be considered "pervasively rhetorical" (Potter & Edwards, 2001, p. 104) and "used to bolster particular versions of the world and to protect them from criticism" (Potter, 1996, p. 33). That is to say, rhetoric is a critical function of language.

Potter (1996) describes rhetoric as a set of discursive techniques or devices deployed in interaction to produce an account of events that appears real and factual. There are a number of ways in which discursive devices serve as rhetorical. They can be defensive or offensive, constructive or undermining (Potter, 1996), and they can create cohesive and convincing descriptions of reality (see Gilbert & Mulkay, 1984). These discursive constituents of rhetoric, broadly speaking, can work to construct an idea as solid or factual, or undermine an alternative view that threatens notions commonly held as 'factual'. In this way, the process of fact construction, through its particular discursive resources, is intricately embedded in rhetoric to assert a particular version of the 'truth'.

Potter (1996) describes the process of fact construction as the process of building an account as plausible, believable, and factual through the use of very nuanced yet effective discursive strategies. The pervasively rhetorical function of language is achieved through a number of discursive strategies that establish something as real or factual, which Potter (1996) refers to as the *epistemological orientation* of accounts. Categorization, for example, is used to specify both what is and is *not* constituted by the category description (Potter, 1996). For example, it is possible to remove the agency of a person or object through the process of 'nominalization', where a verb is transformed into a noun to remove the need for identification of social agents. In contrast, 'opacity' describes the process where verbs are used to promote intention were there might in fact be none (Potter, 1996). 'Ontological gerrymandering' is the process by which the boundaries of a particular category description are cherry picked, to include some features whilst deliberately excluding others (Potter, 1996). Other descriptive categories may be 'extrematised' or 'minimised', often by the use of quantification to construct a description with a rhetorical strength that can be contrasted to value judgments or qualitative assessments (Potter, 1996). 'Normalisation' and 'abnormalisation' are similarly used to construct a particular description of events, and Potter (1996) stresses that these descriptions are carefully constructed in discourse to achieve particular rhetorical goals. Membership categorizations accommodate our expectations about the kinds of things certain categories of people do, where they live, what they look like, and what inferences can be made about a person; not to mention the facilitation of "economical and intelligent conversation" (Potter & Wetherell, 1987, p. 129).

The techniques used to construct something as real or factual also include 'stake' and 'stake inoculation', 'category entitlement' and 'footing'. This group of techniques describes how an interlocutor positions himself or herself in relation to the account being offered, for example as having no stake in the particular outcome of an account, as a member of a group that is entitled to speak on a particular matter, or as close or distant to the account for the appearance of neutrality or entitlement (Potter, 1996). 'Consensus' and 'corroboration' are used to build outside support for an account, which can be achieved through 'active voicing'; that is, giving the impression of quoting someone in conversation (Potter, 1996). 'Detail' and 'narrative' similarly work to build the plausibility of an account, indeed Potter argues, "that plausible, believable accounts… are produced by placing facts within a narrative" (1996; p. 169).

Rather than viewing these resources as isolated discursive techniques, Potter (1996) stresses that when they are used in subtle, descriptive and creative ways they help to *build up* an account over the course of the interaction that ultimately delivers plausibility. That is to say, the sum of the discursive constituents of fact construction and rhetoric is greater than its parts. Fact construction and rhetoric can therefore be viewed as the discursive tools that assemble opposing accounts of climate change.

The focus on the rhetorical nature of discursive actions has been elaborated extensively by a number of theorists as far back as the ancient Greeks. In recent decades the rhetorical turn in social psychology has had no greater proponent than Michael Billig (1987; 1989; 1991). Billig has aimed to expand the scope of social psychology by explicating the connections between thinking,

rhetoric and ideology (1982; 1987; 1991). The primary focus of Billig's work has been to expand out from the individual to "see how wider patterns of society and of history are being reflected in the thinking of individuals" (1991, p. 2). This process requires that the psychologist 'glance up from the microscope' to see the ideological and historical context in which opinions are expressed (Billig, 1991).

The primary thesis of Billig's rhetorical psychology is that human thinking is defined by disputation, critique, negation and argument (1987; 1989a). According to Billig (1987, 1989; 1991) the nature of our thinking is laid to bear in our unfolding discursive interactions. That is to say that internal dialogue (thinking) and interactional dialogue (conversing) both adhere to the same argumentative structure (Billig, 1989). Because rhetoric and argument are "spread throughout social life" (Billig, 1991, p. 17), one can observe the way in which negation and disputation generate counter-positions, which force the generation of new ideas and new meanings for the social world that we construct. The meaning of a particular position is therefore inter-dependent with its counter-positions (Billig, 1987; 1991). The sceptical position that exists in relation to ACC therefore exists as a counter-position to the consensus view, and vice versa, and both generate their meaning from the other.

The connection Billig (1991) makes between thinking and ideology is concerned with how thinking is affected by the time and place in which people live. The content of one's thinking, including the values and opinions that are commonly shared, are cultural products. The 'common-sense' used by ordinary people is therefore not invented by them, but has a history and is a form of ideology (Billig, 1991; Marx & Engels, 1970). Common-sense thinking is

functional in that it reproduces the assumptions of a given time, which will confirm existing patterns of power and domination (Billig, 1991).

From the early writings of Marx and Engels in *The German Ideology*, the term 'ideology' was given a critical meaning and represented erroneous thinking and the workings of power (Billig, 1991). Dominant ideologies, according to Marx and Engels, impose themselves on 'real' thinking, and serve the interests of the ruling class, concealing their power (Billig, 1991). Billig's conception is somewhat different, with the focus more on the ideological nature of common sense; however Billig also stresses that a rhetorical social psychology that considers thinking both rhetorical and ideological can be used to show how the rhetoric of the ruling class is used to perpetuate the domination of its ideas – its ideology (1991). Within our current western consumer-capitalist paradigm this rhetorical work is achieved through advertising (Billig, 1991), where the encouragement of ever increasing levels of consumption are rhetorically organized within the advertising that accompanies all manner of products, and which goes largely unquestioned.

Because Billig does not conceptualize ideology solely in the Marxist sense that sees the dominant ruling ideas being imposed upon the 'masses', then ideology is not confined to political issues. Billig (1991) argues that political issues underpin so much of our everyday thinking and experiences that they are implicated in ideology, but that ideological positions in themselves are not necessarily political. The point is that it is *thinking itself* that is both rhetorical and ideological.

The relativist approach of rhetorical psychology does pose certain problems that must be theoretically addressed. As Billig (1991) himself notes, opposing points of view can be formulated with the same reasonable logic. This relates to issues of political or ethical uncertainty that don't have 'right' or 'wrong' answers (Billig, 1989). Opposing sides might both have reasonable arguments, and might both employ logical consistency and 'reasonableness' (Billig, 1989). This can be extrapolated to the issue of anthropogenic climate change. Although there is a 'truth' about ACC, the way the public debate is constructed exists outside of this 'truth'; we have access only to the words of the 'debaters', the rhetoric of the rhetoricians. Without direct access to the 'truth' about ACC the 'debate' becomes detached from the reality of the climate change process, and embedded solely within the socially constituted rhetoric of the opposing sides. Therefore the public is forced to make a decision based not upon physical realities, but on our own judgment of what seems not only plausible, but also politically, morally and ethically appropriate.

As for the social psychologist that attempts to analyse social controversy without falling into the relativist quagmire, Billig's rhetorical psychology offers an avenue for gaining traction within the debate itself. In addressing Habermas' critique of Foucault and Derrida, in which he claimed that the radical project of modernism and its critical edge is lost when the analyst does not advocate for some position, but subjects all propositions to equal doubt, Billig (1991) argues that the rhetorical analyst must join the argument. This process contradicts relativism because it requires that a position be taken. Rhetoric is therefore the means of analysis as well as the object of analysis, with the argument produced

by the analyst providing the critique and the dedication to a position (Billig, 1991). The process of analysis is not defined by a particular methodology, but rather is dependent upon the particular rhetorical resources of the analyst to retain the critical edge (Billig, 1991). It is in this sense that rhetorical analysis does not lack the capacity to pass judgment, to make a stance and critique the social world. Moreover, the rhetorical position for social psychology is itself an argument directed against alternative views within social psychology, including the cognitive model. We are taking a critical position, where the theory of argumentation is also an instance of the practice of argument (Billig, 1991).

What we can infer from Billig's rhetorical psychology is that science does not exist in isolation to society. Because no distinction is made between different types of thought or discourse, the processes involved in scientific reasoning are presumed to be the same as the processes involved in other types of reasoning (Potter, 1996). Moreover, the scientific enterprise is a part of social life. Any attempt therefore to understand science as it impacts on social and political life must include the scope for rhetorical and ideological analysis. The following section will elaborate on these ideas and will begin by outlining the tradition of the sociology of science knowledge. I then go on to describe how rhetorical psychology can provide a comprehensive framework for understanding the scientific, social and ideological factors influencing competing constructions of ACC.

5.4. Sociology of Scientific Knowledge

The sociology of scientific knowledge (SSK) derived out of the modern philosophical and sociological analyses of the social contexts in which science 'knowledge' is produced. Early SSK researcher, Robert Merton (1973) maintained the empirical bases of science, not really calling scientific knowledge, theories or practices into question, but focusing primarily on accounting for the error that occurred along the way to establishing facts. However the philosophy of science in the latter half of the 20th century built a radically different view of science that challenged the long held beliefs about the nature of observation and theory (e.g. Barnes, 1977; Kuhn, 1970; Rorty, 1980), and the interconnectedness of scientific ideas, beliefs (Quine, 1961) and practices (Kuhn, 1970). These philosophical ideas were taken up by Collins (1985) to elaborate an *Empirical Program of Relativism*, a relativist approach to SSK (see Potter, 1996). Relativism, it is argued, frees up the social researcher to investigate all that goes into the building of scientific knowledge, rather than being forced to accept the outcomes of scientific empiricism as unproblematic and focus only on errors and anomalies (Potter, 1996). Collins also advocated the study of scientific controversies because they provide scope for social scientific research to investigate that, which is tacit in science. In addition, the disputed nature of social controversies provides the basis for polar positions, thereby accommodating the relativist stance (Potter, 1996). However Potter (1996) argues that Collins had difficulty in maintaining the relativist stance because of his apparent need to construct a definitive account of what was taking place within the controversy.

In contrast, Gilbert and Mulkay's (1984) seminal studies in the 1980's marked a turning point in the field of SSK. Gilbert and Mulkay (1984) conducted research that focused on scientists working in an area of scientific contestation in the field of bioenergetics. They analysed the discourse of scientists on competing sides of a theory about the formation of a specific chemical that moves and stores energy within the cell. Their research exposed patterns in the scientists' discourse, which have come to be known as the *empiricist* and *contingent* repertoires. The *empiricist repertoire* was deployed by scientists most commonly in formal writings, although it also emerged in informal discussions (interviews) supplemented by other types of discourse, thereby differentiating it from the scientific literature (Gilbert & Mulkay, 1984). The empiricist repertoire is defined by an impersonal grammatical style that removes human agency from experimental findings. This repertoire was most commonly deployed when the scientists were describing their own work, and emphasizes the objective nature of scientific facts; the existence of an external reality unmarked by interpretative bias and accessible through the methodical application of the scientific process. As Gilbert and Mulkay describe: "Empiricist discourse is organized in a manner which denies its character as an interpretive product and which denies that its author's actions are relevant to its content" (1984, p. 56). However, in order to account for contestation in the field, and in particular when scientists were asked to explain findings that contradicted their own, the *contingent repertoire* was deployed. The contingent repertoire emphasises the external, situational or personal factors that necessarily tarnish one's rivals' findings. This repertoire employs a far more personal and idiosyncratic style with more varied

grammatical resources than the empiricist repertoire (Gilbert & Mulkay, 1984). Within the contingent repertoire, Gilbert and Mulkay found that the scientists were far more willing to acknowledge the influences on experimental findings that were outside of the actual biochemical phenomena; specifically the external factors that influenced the erroneous findings of their competitors, such as bias, loyalty, ambition or specific university/laboratory cultures. Gilbert and Mulkay (1984) argue that the identification of these discursive repertoires provides insight into how scientists generate and reproduce the different social contexts in which scientific knowledge is produced.

One of the primary elements and indeed the ground-breaking aspect of Gilbert and Mulkay's (1984) work, and what Potter (1996) later described as fundamentally important to their approach, was their relativist position. Their primary focus was not which side of the debate was correct, but rather the way the social agents *constructed* the scientific controversy they were engaged in. However the question arises: *how do we recognize science's constitutive nature, whilst simultaneously recognizing its capacity to uncover 'truths' about the world?*

It is important to emphasize that a relativist inquiry does not necessarily relinquish a position, as scientists do not only 'construct' facts; they also 'discover' facts, which play a crucial role in describing the physical world (McGuire & Melia, 1989). There is a truth about ACC, namely that the climate is in fact changing due to human activity and that it will do so regardless of our attempts to deconstruct climate science. However, what the relativist position offers research on the climate change debate is a broad perspective on the way society grapples with scientific knowledge, and any subsequent political action.

From this perspective there is consistency with political and ethical realism, as the exploration of socio-scientific communication can increase possibilities for advocating action on ACC (Gross, 1994; see also Hepburn, 2000).

5.5. The public understanding of science

As a field of sociological enquiry, SSK has developed to study much more than the processes involved in the development of scientific knowledge. A number of sub-disciplines of SSK have emerged in the latter half of the 20th century including science communication and the public understanding of science. The philosophical developments in the field of SSK outlined above have also impacted on the sub-disciplines. Traditionally, public understanding of science research has been dominated both conceptually and methodologically by the information–deficit model of communication.

The information-deficit model, or simply the deficit model of public understanding of science, is a model that attempts to explain public ignorance of science and scientific knowledge (Irwin & Wynne, 1996). The deficit model purports that the general public do not understand the scientific process, and that by providing them with more information about how science works, and scientific knowledge more generally, the deficit in public understanding of science can be ameliorated. The journalistic reporting of science is argued to inaccurately report scientific findings, make claims of unwarranted certainty, and oversimplify scientific work, which is thus considered to contribute to public ignorance of how science works (Gross, 1994). There is considerable work in the

social sciences demonstrating that simply providing more information to the public does not increase their scientific literacy (see Durant, Evans & Thomas, 1989; Gregory & Miller, 1998). Despite this, the deficit model of science communication is still a pervasive communicative style used by scientists when speaking to the public about their work (Davies, 2008).

The deficit model views scientific sufficiency in contrast to public deficiency (Gross, 1994). The model presumes an asymmetrical, one way flow of information from science to the public, assuming that the public is already persuaded by the value of science and is already trusting of science (Gross, 1994). Moreover the deficit model implies a passive public, and communication is viewed solely as a cognitive exercise; with ethical and political concerns excluded as irrelevant (Gross, 1994).

Whilst the deficit model is still prevalent as a method for scientists to communicate their scientific findings, and as a theoretical framework for social scientific constructions and measurement of public understanding of science (see The Royal Society, 1985) it has been extensively critiqued for lacking the capacity to explain how the general public actually engages with science. Although it has had limited success in some areas of science communication, such as risk communication (Gross, 1994), the deficit model has not produced a more scientifically literate public (Durant, et al., 1989; Gregory & Miller, 1998) and it fails to account for the plethora of social, political, ideological or other experiential factors that impact on public understandings of science.

For example, Gross (1994) argues that the deficit model has three primary defects. The first is that it represents an inaccurate view of science, the

second, that it segregates science from society and the contexts that give it public significance, and the third that it fails to address the ethical and political issues science can and must raise (Gross, 1994). Essentially the deficit model fails to turn a critical eye on science itself (Gross, 1994) and fails to place relevance on those matters outside of science that impact on public responses to scientific matters.

As an alternative to the deficit model, Gross (1994) proposes a *contextual model* of public understanding of science. The contextual model explores the ramifications of the interaction between science and the public; as such, it is symmetrical, accommodating the existence of a two-way flow of information between science and the public (Gross, 1994). It does not assume the public is already persuaded by the value of science, therefore the building of trust is a crucial element of public understanding; an active public is therefore implied (Gross, 1994). Within the contextual model, lay knowledge is treated as different in kind but not in significance to scientific knowledge (Gross, 1994).

The contextual model is offered as a progressive alternative to the deficit model, where rhetoric and rhetorical analysis can play a significant role. By rhetorically reconstructing the public understanding of science as the joint creation of local and scientific knowledge, ethical and political considerations become a concern (Gross, 1994).

Again, such an approach considers that which counts as a fact as relative. However as Gross (1994) points out, these facts are not relative to the material world, but to the trust bestowed by the public on various experts who advocate

for particular policy. Therefore "… what counts as a fact's significance is not the significance science bestows, but the significance the public bestows on scientific knowledge" (Gross, 1994, p. 18).

5.6. Rhetorical psychology and the public understanding of science

According to Gross (1994), rhetoric fulfils two roles in public understanding of science research. The first is as a theory capable of analysing public understanding of science, and the second is as an activity capable of creating public understanding of science. This overview will concentrate on the former – rhetorical psychology's role in the analysis of the public understanding of science.

Locke (2001) argues that science is an activity that is essentially and fundamentally communicative. As such, SSK research must focus on the *context* of science and the way in which it is constructed in discourse; in particular how it is constructed rhetorically for different purposes, and changing demands and situations. The point is not to see technical discourse as *mere* rhetoric, but as *a* rhetoric; one of the many resources scientists have at their disposal for constructing and communicating scientific knowledge (Locke, 2001).

In contrast to the 'rational' conception of the public that the deficit model purports, is the notion that human thought and discourse is often characterized by ambivalence and dilemma (Billig, 1987; Billig et al., 1988; Locke, 2001; Potter, 1996). Rhetorical psychology accommodates this ambivalence and dilemma within its theoretical and analytic parameters because of its focus on the action

orientation of contradictory views. Within Billig's (1987; 1989; 1991) rhetorical psychology, ambivalence, dilemma, contradiction, and irony, are considered essential characteristics of human thought that give rise to the negation, disputation and argumentation that generate counter-positions, forcing the creation of new ideas and new meanings.

According to Locke (2001), Gilbert and Mulkay's (1984) interpretative repertoires encapsulate the argumentative/rhetorical nature of scientists' discourse – the empiricist and contingent repertoires are dilemmatic because they are both repertoires *against* something, as Locke explains:

> "…one employs an impersonal, abstracted, agent-absent discourse, which makes factual claims of *universal* applicability, regardless of human action and belief; a second employs a personalized, localized, agent-centred discourse, which makes factual claims *arte*factual, *particular*, to specific human actions and beliefs (Potter, 1996). In a word, the discourse is dilemmatical (Locke, 1999a)."
>
> (Locke, 2001, p. 13; emphasis in original)

Locke (2001) argues that it is precisely this dilemmatic nature of scientific discourse that leads to controversy. It is because universal claims can be met with particularized counter-claims regarding personal or ideological bias that controversy becomes possible. The discourse is rhetorically designed to allow scientists to defend their universal knowledge claims against accusations of particularization, thereby allowing them to go about the business of generating

science. But Locke (2001) also makes the point that it is not only scientists who are capable of using the dilemmatic nature of science discourse to deconstruct knowledge claims, but that the public also possesses the rhetorical means to localise scientific claims as products of particular contexts or particular scientists. As mentioned, the distinction between the reified (scientific) and consensual (common-sense) knowledge that defines SRT is therefore widely criticised in the contemporary SSK literature (Gross, 1994; Locke, 2001; 2002) for failing to acknowledge the similarities between the communicative modalities between the spheres. In particular it is noted that similar rhetorical devices are deployed by scientists and the public for scientific matters that impact social life, that allow simultaneously for the construction of scientific knowledge claims by scientists *and* for public resistance to such knowledge claims (Locke, 2001).

In addition, public argument with scientific knowledge claims is increasing due to increasing public technical expertise (Waddell, 1994). This expertise is becoming increasingly recognized; the roles of the values, beliefs and emotions of scientific experts in shaping science and science policy is increasingly recognized, and the role of the public's values, beliefs and emotions is also becoming increasingly appropriate and asserted (Waddell, 1994). The role of public rhetoric in response to science, and the 'filling in' of the important moral, ethical and political matters of significance to the public, should therefore be expected as a crucial part of the dissemination of science knowledge throughout society (Locke, 2002).

It is this conceptualisation that underpins rhetorical readings of the public understanding of science. Argumentative discourses allow the public to resist scientific knowledge claims that pose dilemmas in modern, mundane, everyday thought and action (Billig et al., 1988). Public understanding of science research must explore the ways in which members of the public respond to technical rhetoric with other forms of rhetoric (Locke, 2001). In the matter of ACC it is also paramount to consider the rhetorical resources used by politicians because of the power they have in developing the contexts for action and change. The rhetorical reading of the public understanding of science therefore allows us to utilise the same theoretical approach for exploring scientific communication, political communication and public (common-sense) constructions of ACC.

Such an approach re-conceptualizes the contrasts between science, morality, politics, etc., such that these matters are viewed as constituted in a variety of ways for different rhetorical purposes. This is not to say that such matters are merely used for the purpose of persuasion, but rather that our taken for granted notions about difference and contrast between discursive modalities "can be understood as retrospectively read into arguments as part of the process of argumentation" (Locke, 2002, p. 101). The distinction between technical and public knowledge is less important than the argumentative reasoning employed in public debate about science.

5.6. Some final thoughts on social constructionism and anthropogenic climate change

The rhetorical, discursive, relativist and contextual approaches detailed above are representative of a social constructionist epistemological position. As I have elaborated throughout this chapter, these approaches reject the traditional view that language simply reflects an objective truth about the world. Rather, language is viewed as a tradition of sense making relied upon in the course of interaction to describe our experience with the world and others (Gergen, 2009). Social constructionism takes as its premise the construction of the realities in which we live, and that this construction occurs through our descriptions, explanations or representations negotiated through relationships with others. In particular, these terms of understanding our world are not contingent upon what is actually present in the world (Gergen, 2009). This latter point has attracted much criticism as, taken to its logical endpoint it appears to reflect a state of chronic uncertainty, where nothing is real and the constructions we devise are merely arbitrary. However this criticism fails to acknowledge the more nuanced aspects of social constructionism. Ideas and knowledge are the manifestation of engagement with the material world. As Gergen notes: "Our communication cannot exist without all that sustains us" (1999, p. 48). We require the tools of language and culture to understand the material world, thereby engaging the physical surrounds that we inhabit into an interdependent culturally defined relationship with ourselves. Moreover, constructing something as a social 'fact' is done so for social purposes, and social reality is considered real "even if it falls on us to make it real" (Onuf, 2007, p. xiv).

This approach is poignantly relevant regarding the ACC debate, a debate that is so closely tied to our understanding of our relationship with the material environment. How we decide to construct this relationship (that is, the course of action we ultimately take on ACC) will have profound impacts on the material world. Descriptions of the Anthropocene[21] are more than simple descriptions – they are actions (Winch, 1977). Concepts, actions, reality, and experience coalesce, rendering them mutually constitutive. Therefore our constructions, our words, have considerable power in shaping our world (Crist, 2007).

In this context ACC is seen as simultaneously a physical transformation and a cultural object (Hulme, 2007). According to Hulme (2007), popular readings of ACC within geography and the natural sciences have focused on its scientific bases, which have contributed to the 'de-culturing' of climate; that is, "purifying climate and letting it travel across scales detached from its cultural anchors" (Hulme, 2007, p. 8). In so doing, Hulme argues "we have contributed to conditions that yield psychological dissonance in individuals: the contradictions between what people say about climate change and how they act" (Hulme, 2007, p. 8; see also Stoll-Kleeman et al., 2001). Hulme warns that without acknowledgment of the multiple meanings of climate, without awareness of the flowing cultural and psychological symbolism embedded within this phenomenon, we risk relinquishing the idea of ACC to "too many rulers" where it becomes a "malleable envoy", and "out of control" (2007, p. 28). In response,

[21] "… a proposed term for the present geological epoch (from the time of the Industrial Revolution onwards), during which humanity has begun to have a significant impact on the environment". Dictionary.com. Retrieved 21st April 2014 from http://dictionary.reference.com/browse/anthropocene

climate must be re-framed by negotiating new climate knowledge through different ontological and epistemological structuring (Hulme, 2007).

Rosa and Dietz (1998) concur with this thesis and suggest that a hierarchical knowledge domain that preferences knowledge generated within the natural sciences relegates the anthropogenic driving forces of ACC to peripheral considerations. These anthropogenic driving forces are viewed broadly, including not only GHGs but also the social, cultural, political, economic and even moral issues that have given rise to ACC (Rosa & Dietz, 1998). Rosa and Dietz (1998) argue that relegating the anthropogenic driving forces to a subordinate role similarly relegates the social sciences and their potential contribution to the same subordinate role, but that a constructionist approach can address this imbalance by including the social sciences in the very foundations of climate change research (Wynne, 1994) and 'flattening out' the hierarchy of knowledge domains (Shackley & Wynne, 1995).

In climate change we see the connection humans have with the physical world; we see our impact on it as not simply a result of our actions, but also as a result of our historically constituted interpretations of and motives for those actions (see Gergen, 1999). The synthesis of the material and the constructed natures of climate change make it apposite for study. The physical world that we inhabit and our collectively constituted socio-historical/political reality are interdependent. Climate change was born of this relationship and its trajectory will continue to be bound by this relationship. The debate surrounding climate change only highlights the constructed nature of our knowledge and its separation from an objective 'truth'.

5.7. Conclusion

There is more than simply the communication of science to consider in the proliferation of climate science throughout society. Ideological positions influence the dissemination of climate science, but more than this ACC science has had to defend itself against a systematic and deliberate counter-movement aiming to discredit, misrepresent and undermine ACC science and scientists (Oreskes & Conway, 2010). Despite the overwhelming scientific consensus on ACC, this contrarian counter-movement has given rise to an extraordinary amount of debate within the general public, the political sphere and the business community about both the causes of and solutions to global climatic change. The debate has therefore leapt out of the scientific world to infiltrate a range of social and political contexts. A multitude of views now exist that have contributed to public controversy between opposing social/political groups in an attempt to see their political agendas met. The process of argument relies on the building of 'facts' to shape and strengthen particular descriptions of climate change. All sides of the debate deploy scientific 'facts' and 'evidence' to warrant certain positions and thus vie for public and political attention. The treatment of scientific fact by opposing camps in the climate change debate demonstrates the constructive power of talk, as the reality of climate change becomes obscured by the use of opposing facts, which constitute a disparate collection of climate change profiles.

How these profiles battle for attention in the public sphere is a prime area for social research. The discursive techniques used to construct climate change in any number of its various forms are considered crucial to understanding the

social trajectory of climate change, and thus the potential outcomes that are contingent upon our human response to this issue. The ways in which the science of climate change is represented in society, whether through the media, politically, or by the scientific community, represents how knowledge is collectively constituted and negotiated. By tracking these representations through their constituent discourses, a broader view of climate change can be investigated with the hope of identifying the rhetorical landscape that can be deployed to garner greater support for action on climate change. The rhetorical and discursive approaches of Billig, Potter and colleagues, with their capacity for explicating the complexity of scientific knowledge, ideology and debate in the world of human social behaviour, will therefore provide the expansive and eclectic framework for the analyses comprising the rest of this thesis.

Statement of authorship

Reified versus consensual knowledge as rhetorical resources for debating climate change

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I, Peta Callaghan, certify that the conceptualization, collection of data, analysis and interpretation of data, and authorship of the published article contained within this thesis (below) were chiefly performed by me.

Certification that the statement of contribution is accurate.

Signed

.....Date.....

Contributions were made by the co-author in the supervision of work and manuscript evaluation.

Certification that the statement of contribution is accurate.

Signed

.....Date.....

Co-author name

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CHAPTER 7: SCIENCE VERSUS IDEOLOGY: CLIMATE CHANGE SCIENCE AND THE RHETORIC OF IDEOLOGICAL DENIAL

7.1. INTRODUCTION

Thus far, I have explored the ways in which ideological thinking has impacted on the ACC debate. In chapter one, I detailed the ways in which right wing think tanks in the US helped develop sceptical discourses about ACC based on ideological agendas aimed at opposing regulatory policy (Oreskes & Conway, 2010). In the literature review presented in chapter two, I explicated some of the empirical literature that demonstrates the important role played by political ideology in predicting one's views about ACC (e.g. McCright & Dunlap, 2011b). And in chapter four, I examined the ways in which ideological positions find expression in students' constructions of the ACC debate. In this chapter, I will extend my analysis of the role of ideology in the ACC debate, by highlighting the ways in which ideology is used as a rhetorical resource for defending science by both sides of the debate. The pervasiveness of ideological bias within this debate is not lost on the main players within the debate; indeed, highlighting the ideological bases of one's opponent has been a common rhetorical strategy for both sides of the argument, as I will demonstrate in this chapter. Drawing from the same interviews and media search conducted in chapter 6, I will demonstrate how the denial of an ideological position by two leading scientific protagonists in the ACC debate (Brook and Plimer) serves as an identity management technique used to inoculate them against accusations of bias and cement their claims to 'truth'. However in doing so, it undermines the capacity for an effective policy response. With modern politics taking on a more evidence-based, technocratic

approach to policy formation, the capacity of science to provide the answers to social problems must be based on the presumption that the science is not highly contested. In the case of ACC, where competing discourses about both the accuracy of the science and the possible solutions available to address the issue dominate the hegemonic discourse, a technocratic approach to ACC policy cannot provide a simple solution, and ideological positions that encompass moral values may be better situated to engage the general public than appeals to 'the science' alone.

The end of ideology, the third way, and the politics of non-politics

As far back as the 1960's political theorists have argued that modern political systems are moving beyond the left-right continuum that has traditionally defined political thinking (e.g. Bell, 1960; Lipset, 1960). Bell (1960) and Lipset (1960) both argued for a non-ideological 'problem solving' outlook on political matters, suggesting that such an approach was more in keeping with modern political systems that involve technical issues of economic management rather than disputes over big ethical questions (see Weltman, 2004).

This approach was adopted by Tony Blair who, when running for the office of UK Prime Minister in the late 1990s, adopted an approach that claimed to draw on the best of both left and right positions – *the third way* – whilst being ideologically beholden to neither (Giddens, 1998). *The third way* accepts the capitalist free-market and existing economic conditions, is supportive of social democratic ideals and egalitarianism, and is critical of radical politics that

oppose capitalism (see Weltman & Billig, 2001). In this sense, *the third way* represents a push towards solving political issues through rational, technocratic, and scientific-based means, rather than invoking ethical arguments that appear to be subject to disputation.

In research conducted on the construction of *third way* political discourses, Weltman and Billig (2001) investigated the complex rhetoric of local councillors who practice politics within the traditional left/right paradigms. A number of interviews were analysed, with the authors paying particular attention to the ways in which the politicians denied the politics of their beliefs. Weltman and Billig report that councillors consistently constructed their views and their approach to politics as being outside of an ideological position, with one councillor describing himself as a "person with an opinion and with his own opinion" (Weltman & Billig, 2001, p. 375).

Rather than taking these claims at face value – as an expression of non-ideological politics – Weltman and Billig (2001) argue that the *end of ideology* and *the third way* represent "a shared way of talking about politics" (Weltman & Billig, 2001, p. 369) and therefore consider *the third way* an ideological position in the Gramscian (1971) sense, "as shared patterns of belief that function to maintain relations of inequality" (Weltman & Billig, 2001, p. 369). Moreover, many theorists have argued that the *end of ideology* position grew out of anti-Marxist sentiment, and that the *end of ideology* movement is nothing more than an anti-ideology ideology (e.g. Larrain, 1979; Waxman, 1968).

But what are the repercussions of a politics of non-politics? Mouffe (2009) argues that individualism is inherent to *third way* politics because such

non-ideological politics are not based on collective political identities, but rational and universalistic thinking. This makes *third way* politics closed to the possibility of the formation of political movements based upon 'passions' (Mouffe, 2009). Passions are considered the defining feature of antagonistic political identities, and according to Mouffe it is passions that ensure opposing ideologies will never be fully resolved. Instead, democracy functions with the ever-present tension between opposing political forces. To eradicate opposing ideologies within politics is to undermine the very nature of democracy.

Third way politics is therefore blind to political moralising because by its very nature it is attempting to remove traditional moral and ethical frameworks defined by ideological notions about how social life should be organised, and replace them with the rational, logical, evidence-based reasoning of science. This is how the technocratic argument of *third way* politics finds its traction and power; on the surface, it cannot be accused of ideological bias, and therefore cannot be subject to disputation over what is right or morally appropriate. What is considered morally appropriate in *third way* politics is a course of action based solely on rationalism.

Weltman and Billig (2001) compare the politicians' rhetoric – their ideological denials of being ideological – to denials of racism or nationalism that have been so ubiquitously identified in the discursive literature (e.g. Potter & Wetherell, 1987). Weltman and Billig (2001) argue that the rhetoric of ideological denial works in the same way as the rhetoric of racist denial; that is, it permits rather than excludes the expression of ideological opinions. The ideological nature of the view is explicitly rejected, such that the rhetoric of

ideological denial works to hide the assumptions of the technocratic and economic rationalist position that it is in fact defending.

The positioning of oneself outside of an ideological paradigm has important implications for the moral bases of political action. Proponents of the *third way* justify political action in rationalist terms – as the rational, reasonable, economically responsible course of action. Mouffe (2009) argues that we are in an era where politics has transformed the way we morally engage with socio-political issues, and that "instead of thinking in terms of right and left, we are now urged to think in terms of right and wrong" (Mouffe, 2009, p. 4). A highly rationalist and universalistic vocabulary now defines what is considered 'moral' (Mouffe, 2009), and, as a result, what is considered to be 'good governance' is a technocratic, managerialist approach that "denies itself to be a particular political choice" (Weltman & Billig, 2001, p. 380). However it is a particular choice, a choice that obscures its ideological bases, denies the irreconcilability of some antagonistic interests, and discourages challenges to the status quo and powerful vested interests (Weltman & Billig, 2001).

This has important implications for the ACC debate. With both sides citing the ideological biases of their opponents, the possibility for a technocratic policy response informed solely by the scientific evidence becomes radically challenged. Whilst the scientific evidence for ACC is robust, and with 97-98% consensus amongst currently publishing climate scientists (Anderegg et al, 2010), the very existence of competing scientific discourses in the media and political spheres undermines the potential for evidence-based climate policy to generate broad support from the voting public, as well as vested interest

industry groups. The technocratic approach to politics is therefore challenged by the contested nature of ACC science by scientists themselves, and the momentum of the denialist movement within the political sphere undermines the rationalist justification for policy adhering to the *end of ideology* approach. The ways in which prominent scientists in the ACC debate deploy *end of ideology* discourses, and the repercussions of such discourses, are the primary focus of the present analysis.

7.2. METHOD

For the analysis presented here I draw from the same data corpus utilized in the previous chapter: interviews with Ian Plimer and Barry Brook, and newspaper articles from five Australian newspapers in the 3 months after the release of Plimer's book. Unlike in the previous chapter, which included a range of scientific voices, here I draw exclusively on extracts from Brook and Plimer. The nature of the interview process made it possible to direct questions on the scientists' views of the ideological influences on the ACC debate, which has provided a rich source of data for analysis. Complementing these are several newspaper articles that demonstrate the tensions arising from the challenges posed to science by ideology, as the scientists account for this issue in the public arena.

7.2.1. ANALYTIC APPROACH

For the present analysis I will draw upon DP (Edwards & Potter, 1992; Potter & 1996; Potter & Edwards, 2001) and Rhetorical Psychology (Billig, 1987) to explore the ways in which the scientists construct particular versions of ACC science, and the ACC debate more generally. As with the previous chapter, I will adopt a synthetic approach (Wetherell, 1998) to the analysis, in line with CDA (van Dijk, 1993). This method allows attention to be paid to both the situated discursive strategies used by the scientists, and the broader social context that situates the discourse and gives it its meaning.

I also draw on the *empiricist* and *contingent repertoires* (Gilbert & Mulkay, 1984) outlined in chapter 5. To reiterate, the *empiricist repertoire* is a discursive resource that consists of an impersonal grammatical style that removes human agency from scientific findings (Gilbert & Mulkay, 1984). It is a repertoire used to situate the objectivity of scientific findings in order to shield the speaker against accusations of bias. Alternatively, the *contingent repertoire* utilises far less formal language than the *empiricist repertoire*, and highlights the personal, situational, or even ideological factors that have influenced the development of scientific findings. Commonly, scientists use the contingent repertoire to explain the views of competing scientists in relation to the topic in question, and the empiricist repertoire when accounting for their own views (Gilbert & Mulkay, 1984).

7.2.2. Analytic aims

I aim to explore ways in which the scientists deny their positions as ideological whilst simultaneously identifying the ideological nature of their opponents' views. I will explore the unspoken assumptions of the scientists' discourse, and the pragmatic rhetorical effects of their descriptions, such as the ways in which they function to build the facticity of their accounts.

7.3. Analysis

I present six extracts in the following analysis, beginning with a newspaper article authored by Brook, followed by two extracts from the interview with Brook. Extract 1 is taken from an article that appeared in *The Australian* newspaper on the 9th June 2009. In this extract, Brook is defending nuclear power as a viable and responsible alternative to fossil fuels. Brook attends to the challenges of nuclear power as a potential 'sustainable' solution to the ACC problem through appeals to the 'science'. 'What the science says' is contrasted against deep green ideological thinking, to which Brook claims no allegiance.

Extract 1

1 If climate change is the inconvenient truth facing our fossil fuel-dependent society, then
2 advanced nuclear power is the inconvenient solution staring right back at the
3 environmental movement.
4 Since the 1970s, when the Sierra Club and other prominent environmental groups
5 switched from being active supporters to trenchant detractors, nuclear power has
6 fought an ongoing battle to present itself as a clean, safe and sustainable energy source.

7 Today, a mix of myths and old half-truths continue to constrain people's thinking on
8 nuclear power.
9 Some of the most regularly raised are that uranium supplies will run out, nuclear
10 accidents are likely, long-lived radioactive waste will be with us for 100,000 years, large
11 amounts of CO2 are produced over the nuclear cycle, it's too slow and costly, and a
12 build-up of nuclear power will increase the risk of weapons proliferation.
13 Yet the surprising reality is that none of these perceived disadvantages of nuclear power
14 need apply in the future. Indeed, many don't apply now.
15 Worldwide, nuclear power is undergoing a renaissance.

Brook sets up a distinction between his views and the ideological position of environmentalism by immediately constituting opposing interests between nuclear power and the environmental movement – nuclear power is described as an inconvenient solution (l. 2), staring straight back at the environmental movement (ll. 2-3). This allows Brook to distance himself from accusations of political stake or interest. This distinction between nuclear power and the environmental movement continues through lines 4-8. Naming the Sierra Club and 'other prominent environmental groups' (l. 4) provides validity to Brook's claims, as environmentalists are constructed not as an abstract idea, but actual people and organisations. By suggesting that these groups 'switched' allegiance on nuclear power (l. 5), Brook constructs such groups as fickle, and their views contingent upon factors susceptible to change. Brook personifies nuclear power with the phrases 'staring right back' (l. 2), and 'fought an ongoing battle to present itself as…' (l. 6), giving it motivations, and even a moral character with the terms 'safe' and 'clean'. These are terms typically associated with the environmental movement, but by claiming them for nuclear power Brook is able to position it as a viable and environmentally responsible alternative to fossil fuels.

Archaic thinking is invoked in line 7 with the reference to 'myths', and Brook goes on to describe a number of criticisms that have been levelled at nuclear power over the years, before going on to explain that such criticisms are no longer relevant. The extreme case formulation of 'worldwide' (l. 15) builds up the status of nuclear technology within the international community, providing an implicit consensus warrant to position nuclear technology as a global advancement with which Australia could amalgamate. The term 'renaissance' (l. 15) connotes not just a technological advancement, but a cultural advancement, positioning nuclear power as an option that could revolutionise our relationship with energy.

The old is contrasted with the new throughout the remainder of the article, with Brook repeatedly emphasising the differences between the outdated, unsafe nuclear technology with the recent technological advancements of nuclear power, as can be seen in line 17 below.

16 So judging the ESBWR against the type of reactor that was destroyed at Chernobyl in
17 Ukraine is like comparing the safety of a World War I biplane against a modern jetliner.

[2 lines deleted]

Nuclear power is constructed below as the way of the future, in terms of its environmental as well as technological credentials – it is clean (l. 20) and can provide this energy for *thousands* of years.

18 The future of nuclear power is brighter still. Although the 2006 Switkowski report on
19 Nuclear power in Australia hardly mentioned so-called fast reactors, these have the

20 potential to provide vast amounts of clean, base load energy for thousands of years.

Such extreme quantification of the durability of nuclear power constitutes notions of a sustainable and robust technology that is capable of servicing our current *and* future energy needs. Simultaneously, such descriptions signify the possibility of a future where technological and cultural advancement can proceed unhindered by the threat of ACC. Nuclear power is thus invoked as a genuine and long-term solution to the ACC threat, and a solution that doesn't require a restructuring of our energy requirements or our cultural and technological traditions.

Brook is careful to outline his position as someone who is not naïve of the fact that reducing energy consumption will not address the ACC challenge, as seen in the sequence below.

21 The only realistic way out of the climate and sustainability pincer is to find ways to
22 generate more energy, not less.

[1 line deleted]

23 Desalination and electric vehicles will be two new, energy-hungry demands.

[3 lines deleted]

From lines 21 – 23 Brook emphasises the importance of maintaining a high level of energy production, distancing himself from the green position of some environmentalists who argue that energy consumption must be reduced in order to deal effectively with ACC. In this way Brook asserts that he is not a

Luddite, and cannot be accused of being unrealistic about the importance of meeting our energy demands.

In line 24 below, Brook uses his category entitlement 'as a climate scientists' to construct nuclear power as an option whose merit is based on its capacity to deliver energy. By connecting his status as a climate scientist with his belief in the urgency of a public dialogue on nuclear power (ll.24-25), Brook is able to draw parallels between positive action on ACC and nuclear power. Because nuclear power and environmentalism are traditionally incompatible, Brook's connection between the two allows him to position himself and his views on nuclear power outside of traditional environmental thinking. He is therefore also able to inoculate himself against accusations of ideological thinking.

24 As a climate scientist, I consider the public dialogue on nuclear power to be every bit as
25 urgent as the debate on a carbon price and the need for climate change adaptation.

[1 line deleted]

26 Australia's sustainable energy future depends critically on choices made today. It's time
27 for green groups to become rational Promethean environmentalists. Why? Because
28 there's no silver bullet for solving the climate and energy crises. The bullets are made of
29 depleted uranium and thorium.

In lines 26 – 29 Brook continues to constitute 'sustainability' in terms that require a rethinking of the term. Rather than view sustainability as part of an Green environmental agenda that is implicitly positioned as ideological, Brook urges the reader to reconsider sustainability in rational terms. Brook's appeal for

green groups to become 'rational Promethean environmentalists' (l. 27) implicitly constructs traditional green thinking as neither rational nor innovative when it comes to developing solutions to the ACC problem. Alternatively, Brook offers a construction of environmentalism based upon rational thinking about an option that has considerable scientific credentials. Appeals to science in this way allow Brook to position himself as objective, and committed to addressing ACC in a rational and informed manner that will deliver results, much in line with the technocratic approach of *third way* politics. Brook's suggestion that 'there's no silver bullet for solving the climate and energy crises' (l.28) again, situates the solution to the ACC challenge as one that will require a pragmatic response. The metaphor that constructs the 'silver bullet' solution as depleted uranium and thorium serves to emphasise that addressing ACC requires realistic rather than idealistic solutions.

In this way, Brook is able to position his views outside of an ideological agenda, by aligning himself with a scientific, rationalist approach. The separation between Brook and the environmental movement shields him from accusations of ideological thinking and bias. Whilst many in the denialist movement construct the political rise of ACC as the environmental movement's attempt to reshape the economy (see Plimer extracts below), Brook positions himself outside of that group, with his views not motivated by ideological thinking but by rational thinking.

Extract 2 below is taken from the interview with Brook, and here he describes the different ways in which ideology can inform and even bias views on climate change.

Extract 2 - Brook

Brook: I can see sort of similar parallels here as well that there are people who hold strong ideological views about the environment and others who try and take a more objective one, so my opinion: try and take a more objective scientific based approach to it, that's my sort of guiding principal that in each of these cases I'm not trying to base my opinion on what I think is right or wrong, I'm thinking what are the scientific facts and what is the evidence behind it? So for something like nuclear power, it's the classic anti-environmental issue and yet the science says it should be a strongly pro-environmental issue because it produces very little waste, it's manageable, it provides a lot of energy for society and provides us with a means of avoiding exploitation of resources that would damage the planet much more heavily. But I don't know that most people know how to how to pigeon hole me anymore because as I said for a long while I was pigeon holed as a sort of deep green environmentalist and now I get, sort of by the environmental [groups] pigeon holed as a nuclear spruiker and being more and more embraced by the conservative side of this argument so… I find it all a bit amusing

Brook positions himself outside of ideology and 'green politics' by maintaining that his views on nuclear power are 'objective' (l. 3) and informed solely by the 'scientific facts' (l. 6). Moreover, he establishes the agency of science, stating that 'the science says' (ll. 7-8) nuclear power should be 'strongly pro-environmental' (l. 8). The empiricist repertoire is subtly invoked in this account and, deployed in this context, positions his views so outside of ideology that he cannot be 'pigeon holed' (l. 14) into any particular ideological category. This technique serves to neutralize his views and make them appear more objective. However parallels can be drawn here to the work of Weltman and Billig (2001) who suggest such statements are loaded with ideological agendas.

Although Weltman and Billig studied the discourse of local politicians, similarities can be found with the discursive strategies deployed by Brook. The authors found that politicians managed to downplay ideology by asserting the pragmatism of their views. Brook constructs the independence of his views on adaptation to climate change by drawing on science as the contingent factor. This technique serves to distance him from an agenda, position the science of adaptation to climate change as independent from political objectives, and therefore increase the credibility of nuclear power as something that exists independently of messy political agendas, thereby asserting its validity. Moreover, appeals for science to provide the course of action to take on ACC position nuclear power as neither right nor wrong morally; indeed there is no appraisal of what is right or wrong morally in Brook's account; mitigating ACC is simply a matter of scientific fact and objectivity.

Extract 3 below is taken from the interview with Brook. In this extract, Brook attends specifically to the question posed by the interviewer, regarding the role played by the media in promulgating particular ideological positions on this issue. This extract is to be understood in comparison to the following extract (extract 4) from an interview with Plimer. The two men offer their views on the ideological biases of particular media organizations, constructing certain organizations as 'fair' and others as pushing an ideological editorial line. Interestingly, those organizations Brook considers to be impartial are the organizations Plimer constructs as biased, and vice versa.

Extract 3 – Brook

I: So do you think that different media corporations have particular ideologies or particular slants on things?

Brook: yeah, yeah I think that's definitely the case. I mean if you look at, in Australia, there's The Australian newspaper which, at least in the last decade or so has been angling more towards the conservative end of the market. And for some reason, many conservatives have latched onto the idea that climate change is some sort of ideology opposed to economic development and growth and so forth. I think that's a silly argument. What people are trying to do is recognise a scientific problem and look at practical ways of addressing that without destroying our economy or anything like that. Whereas the Fairfax papers – you know The Age and The Sydney Morning Herald – tend to be a lot more sympathetic to the scientific view. And yet in another instance, things like nuclear power, The Australian, to me as a scientist, seems quite rational about it, and is able to talk about it openly and why we need it, and people like The Age and Sydney Morning Herald seem quite hysterical about it, and are quite happy to publish anti-science articles against it. So I wouldn't put any newspaper in the 'good guys' or the 'bad guys' box. I would just say there's a strong sense – and it must come for the editorial team and the owners and so on – that there's a certain line that they'll push and that may evolve over time but I just wish they would be a bit more objective about it.

Whilst Brook attends to the interviewer's category description 'ideologies' (l. 1), he none-the-less affirms immediately the issue that particular media corporations have particular ideological slants (l. 3). He pin points *The Australian* as being driven by a conservative political agenda in line 5, and goes on to state that 'for some reason' (ll. 5-6), conservatives have 'latched onto the idea that climate change is some sort of ideology opposed to economic development and growth' (ll. 6-7). This systematically vague description ('for some reason') allows Brook to construct the conservative's argument that ACC is an ideological

position, as lacking in logic. This construction has shades of the contingent repertoire in the sense that the opposing (conservative) view is based on something other than scientific knowledge about ACC. Brook is thus able to avoid engaging with ACC discourses in terms of the ideological debate. By suggesting that an ideological understanding of climate change is 'a silly argument' (l. 8), Brook again draws on the contingent repertoire to dismiss the conservative's argument and retain the scientific bases of ACC.

Brook goes on to describe what he sees as the reality of ACC science, using the category of 'people' (l. 8) who are 'trying to recognise a scientific problem and look at practical ways of addressing that without destroying the economy' (ll. 8-10). The word 'people' works to remove any particular descriptive category that could be used to undermine those working on the ACC problem – 'people' is generic and neutral, unaligned with any particular profession, ideology, or social group. They therefore cannot be accused of any kind of stake or interest. The scientific basis of ACC is again reiterated with Brook's reference to a 'scientific problem' and 'practical ways of addressing that', such that any particular agenda of those working on ACC is removed. Brook's explicit reference to not destroying the economy again emphasises this line of argument – there is no hidden political or economic agenda – it is a simple matter of devising practical ways to address 'a scientific problem'.

In contrast to *The Australian*, Brook describes the Fairfax papers not as ideological, but 'sympathetic to the scientific view' (l. 12). In this way Brook is not only aligning with the reporting of ACC in the Fairfax press, but simultaneously inoculating the Fairfax papers' reporting on ACC, and ACC

science more generally, against accusations of ideological bias. Without mention of the Fairfax papers' ideological position, their reporting of ACC is simply constructed as reporting the facts.

However in the case of nuclear power, the ideological roles of the media corporations are reversed. Now, *The Australian* is 'quite rational' in Brook's scientific opinion (l. 13), and because *The Australian* talks 'about it openly' (l. 13) a non-biased, objective, and even rational position about nuclear power is asserted. In contrast, the Fairfax papers 'seem quite hysterical about' nuclear power (l. 15) and publish 'anti-science articles against it' (l. 16).

In order for Brook to attend to the contradiction inherent in this description, he suggests that neither news outlet is the 'good guys' or the 'bad guys' (l. 16-17). The inconsistency between the positions the papers take on ACC and nuclear power is subtly constructed as an inconsistent approach to science; where 'good' presumably means following the science and 'bad' does not. The 'certain line that they'll push' (l. 19) is clearly an ideological one, but science does not fall into that category – it sits outside of ideology and therefore is inconsistent within ideological positions.

In lines 19-20 where Brook states that 'I just wish they would be a bit more objective about it' (ll. 19-20), he is suggesting that objective, science based thinking equates to the solution to ACC, further constructing both the science of ACC and its solutions (i.e. nuclear power) in a realm outside of ideological thinking, thereby validating its status.

In extract 4 below, Plimer also attends to the question about media corporations, but in relation to the treatment he received subsequent to the release of his book.

Extract 4 – Plimer

I: So do you think then that your views are getting a fair representation in the media?

Plimer: Oh look I've had terrific coverage, and I get that coverage in certain newspapers like the Herald Sun, the Daily Telegraph in Sydney, and The Australian, the Courier Mail, the West Australian. I get no coverage in the Sydney Morning Herald and The Age. I get no coverage on the ABC but I get good coverage on commercial networks. Overseas I've had terrific coverage, on US radio programs, and I'm averaging two, two-hour programs a week on the US networks now. And in the UK I've had some coverage in the Sunday Times, the Sunday Telegraph and The Spectator did a cover story on me. So in the UK it's been the conservative end that's given me a run. The BBC hasn't even opened their window to me despite the fact that some years ago I did a two hour feature television program for the BBC, but on this issue they won't give me a Guernsey. And again, I make the same comment, these organisations are not – their brief is not to do the bidding for the government. Their organisation is to independently give air to different ideas around and unless they argue that I'm not a credible soul and I go around eating babies and raping cows and things, unless they argue that I'm not a credible soul then I think they're showing enormous bias.

Plimer begins by asserting that he has received 'terrific coverage' in a number of papers; all of these papers, with the exception of *The West Australian*, are owned by News Corp., and all five papers are known for their conservative political leanings. Like Brook's description of the Fairfax press, these papers' positive construction of his book is not described as ideological bias, but as 'a fair

representation' (l. 1) – presumably lacking in critical appraisal but rather reporting what Plimer sees to be the facts of his argument.

In stark contrast to Brook, Plimer states he has received 'no coverage in the Sydney Morning Herald or the Age' (ll. 5-6) – both Fairfax papers. Both scientists therefore construct the major newspapers as having particular agendas, however these constructions are opposite to one another. Both men cannot be right, and the likelihood is that all the papers cited have particular ideological agendas, but when Plimer and Brook describe a paper as being particularly objective or fair, clearly they are not. The scientists in this way misrepresent the objectivity of particular papers based on their own positions – if the papers agree with them, they are objective and considerate of the facts, however if they disagree with them, they are pushing an ideological agenda.

Plimer also acknowledges that in the UK, the conservative papers have provided good coverage of his book. He states the BBC will not give any coverage 'despite the fact that some years ago I did a two hour feature television program for the BBC, but on this issue they won't give me a Guernsey' (ll. 13-14). Like Brook, this shows the BBC as inconsistent with their approach – they will not provide an objective reporting of the book, but are clearly motivated by ideological agendas.

The reference to the government in line 15 brings political agendas directly into focus, again with the expectation that the media should not be pushing an ideological line. The final 3 lines (ll. 16-18) use an extreme case formulation of Plimer being a 'credible soul' – as long as he is not 'eating babies and raping

cows' then his views should be reported. By constructing such an extreme description, Plimer is attempting to set himself and his views in contrast, as within a moral or ethical standard that should be receiving airtime. Plimer again uses an extreme formulation when he suggests the BBC is 'showing enormous bias' (l. 18). Because he is simply presenting a view that, according to him, is scientific, the BBC must be demonstrating an oppositional approach that is inherently based in ideology.

Overall, both extracts 3 and 4 demonstrate the scientists are openly aware of the ideological bases of the debate, but maintain their own position as objective, science-based, and outside of ideology.

Extract 5 is an article authored by Plimer that appeared in *The Australian* on the 5th May 2009, just weeks after the release of his book. Here, Plimer talks about the response his book received by many in the scientific community, going to great lengths to highlight the lack of credible challenges to the work presented in the book and to highlight the politicised nature of his opponents' criticisms.

Extract 5 – Plimer

1 In Heaven and Earth -- Global Warming: The Missing Science, I predicted that the critics
2 would play the man and not discuss the science.

[2 lines deleted]

3 Critics, who have everything to gain by frightening us witless with politicised science,
4 have now shown their true colours. No critic has argued science with me. I have just
5 enjoyed a fortnight of being thrashed with a feather.

[10 lines deleted]

6 Robert Manne (The Weekend Australian, Inquirer, April 25-26) claims to be a great
7 democrat yet demonises dissent on a matter of science. He is not a scientist. The gains
8 made in the Enlightenment, the scientific method, history and integrated
9 interdisciplinary science are all ignored in an ideological push to remodel the economy.

Plimer begins this article by suggesting that all of the responses to his book have failed to address the scientific issues he raises, focusing instead on playing 'the man' (l. 2). This sets the tone for the following lines in which Plimer asserts that such critics have something to gain only by 'frightening us witless with politicised science' (l. 3). In this way, Plimer situates the debate that engulfs ACC in entirely contingent terms – he asserts that the science is not being adequately addressed, and that the politicisation of the science is fuelling public debate.

Plimer goes on to construct the non-scientific bases of the debate with reference to Robert Mann, a political scientist whom Plimer rhetorically describes as 'not a scientist' (l. 7). In lines 8 and 9 Plimer explicitly constructs what he sees to be the ideological bases of ACC science, by suggesting it is nothing more than 'a push to remodel the economy' (l. 9). The reference to gains made in the enlightenment (l. 8) serve to construct ACC science as so outside of the traditions of science that it serves to undermine science, with the inference that ACC science is again beholden to political agendas.

[46 lines deleted]

10 … climate politics is just a load of ideological hot air. To argue that human additions to
11 atmospheric CO2, a trace gas in the atmosphere, changes climate requires an

12 abandonment of all we know about history, archaeology, geology, solar physics,
13 chemistry and astronomy. We ignore history at our peril. I await the establishment of a
14 Stalinist-type Truth and Retribution Commission to try me for me crimes against the
15 established order and politicised science.

Again in line 10, Plimer makes explicit his views that climate change is based purely on ideology, even describing the issue as 'climate politics' (l. 10). Plimer then goes on to suggest that 'all we know about history, archaeology, geology, solar physics, chemistry and astronomy' (ll. 12-13) must be abandoned for ACC to be accurate. The extensive listing of so many disciplines serves as an exhaustive and comprehensive account of why ACC is wrong. The listing of these disciplines and the detail with which Plimer uses to construct this list constitutes ACC science as so invalid, so removed from 'all we know' (l. 12), and therefore outside of the rationalist, scientific approach to understanding our world that has defined traditional knowledge systems.

In the following three lines Plimer again uses an explicit and extreme approach to describing the ideological bases of ACC science. By comparing ACC science to the Stalin regime (l. 14), Plimer establishes the ideological position of ACC science as based upon the restriction of free thought and speech, the political control of knowledge, and an agenda that exists outside the realms of actual scientific knowledge. Whilst this comparison to the Stalinist Soviet Union is contestable and extreme to say the least, it none-the-less represents Plimer's argument that ACC science is defined by an ideological agenda that refuses to take the facts into account.

Extract 6 below is taken from the interview with Plimer, where he attends to the interviewers category description of 'political ideology' (l. 1), as an influence on people's views about ACC.

Extract 6

I: how significant do you think political ideology is on people's views about climate change?

Plimer: Oh I think it's quite significant. I think younger people tend to be more left and that's very much related to life experience and having kids and how much debt you've got and all sorts of things. I think political ideology drives it a lot. So we see in the left in this country I know quite a few senators and federal pollies and state pollies who are of the same view that I am. I also see a couple on the right like Turnbull and Greg Hunt and others.
So I think it's a mixed view here. My view has changed considerably. I was always at the left but I'm now not in a position where I could vote left in federal politics because I think this is just sheer bloody-minded stupidity

[4 lines removed]

So I think I've evolved from a left voter to an informal voter. I just couldn't vote for either. I couldn't vote federal – state's very different but I couldn't vote federally for a government that is making the biggest financial decision since federation yet has done neither a financial or a scientific due diligence and where they arrogantly try to bulldoze opinion. I find that a little bit too distasteful.

He begins this account by stating that ideology is 'quite significant' (l. 3) and, as demonstrated in the previous chapter, invokes the membership category of the young person who is not only ideological, but significantly to the left side of politics. He undermines this group by stating their limited 'life experience' (l.

4), which diminishes the weight of their beliefs. In order to counter the potential claim that ideology may be a contributing factor to his own views on climate change, Plimer describes a 'mixed view' (l. 9). This part of the account is ambiguous as Plimer only vaguely refers to some left 'pollies[27] who are of the same view' (l. 7) as he is, but he does not state what the 'couple on the right' (ll. 7-8) are supposed to believe. The ambiguity of this sequence may demonstrate how Plimer is grappling with the potential criticism that his own views are ideologically biased, like those young ideologues he has just described. We see Plimer attending to this potential criticism sequentially – he manages this narrative very subtly through a sequence that allows him to construct his opponents as ideological but not himself. Having just stated that ideology is 'quite significant' (l. 3) he now must reconcile that with an account of himself being outside of ideology, which he goes on to describe with his voting practices. The reference to his own informal voting achieves this aim – he is not committed to any particular political persuasion, but implies that his voting preferences are chosen for pragmatic reasons. His later reference to a 'scientific due diligence' (l. 15) reconnects his views with science and therefore outside of ideology. His political views are based upon sound science, facts. This echoes Brooks' account of the same potential ideological critique demonstrated in extract 2. By providing detail of his own life and identity, Plimer is able to draw together potentially disparate, even contradictory discursive phenomena into a cohesive description of events (see Potter, 1996) that safeguards his views from ideological critique whilst using that very critique to undermine his opponents.

[27] Politicians

7.3. Discussion

In all six extracts presented above, both scientists employ the same rhetorical resources to position themselves outside of an ideological agenda in order to cement their claims to truth. With Brook, we see this predominantly in the form of appealing to scientific facts, particularly around the benefits of nuclear power as a viable alternative to both fossil fuels and renewable energy; and with Plimer we see this predominantly in the form of attacking his critics as nothing but ideologues opposed to current economic structures. Aware of the ideological issues associated with the debate, these scientists attempt to construct the facticity of their accounts and protect their own position on ACC through the rhetoric of ideological denial. Simultaneously, both scientists draw upon the contingent repertoire (Gilbert & Mulkay, 1984) to denounce their opponents' position.

The informal language of the interviews and newspaper articles presented here does not naturally lend itself to the empiricist repertoire, although we do see it subtly invoked, especially by Brook in extract two. However all of the extracts are examples of the contingent repertoire (Gilbert & Mulkay, 1984) in the sense that they attempt to justify why their opponents take the position they do; a position that is non-scientific but rather contingent upon ideological motives.

Because ACC has become so polarized along political lines (e.g. McCright & Dunlap, 2011a) the scientists must attend to the potential criticism that they themselves are beholden to the ideological bases of the debate. The analysis

demonstrates how they attempt to do this by re-positioning themselves outside of ideology. In so doing, the scientists are appealing to science as an authority that can buttress their arguments and serve as an objective account of ACC, which is removed from political agendas. In this way the scientists are inadvertently drawing on *the third way* approach to the political response to ACC that is inherently connected to a technocratic approach that maintains pragmatism and objectivity as a core ideal.

As with the local politicians interviewed by Weltman and Billig (2001), Brook and Plimer both construct narratives about themselves (e.g. their voting practices), positioning themselves in relation to left/right politics for rhetorical purposes. The scientists construct themselves as trustworthy, moderate, and importantly, they demonstrate that their views are based on science and pragmatism, and not on ideological belief. There is a separation of science and ideology in such accounts, such that both scientists construct a moral hierarchy whereby what constitutes 'good' science is an appraisal of the facts and not contingent upon the biases of ideology.

This has resonance with Weltman and Billig's assertion that in the *end of ideology* era, "Good governance involves the assumption that, as a rule, social and economic problems are to be tackled by adopting a technocratic managerialist approach that denies itself to be a particular political choice" (2001, p. 380). The technocratic managerialist approach corresponds to the scientific approach, and is constituted using the same rhetoric of ideological denial and the contingent repertoire used by Brook and Plimer, where 'good governance' is analogous to 'good science'.

However according to Mouffe (2009), such an approach is blind to political moralising such that what is right and wrong cannot be rationalised through explicitly ideological paradigms. However a dilemma is thus invoked, because the economic rationalism with which such policy discourses have engaged in Australia deny the antagonism and genuine debate that can arise from competing ideological positions about what is the morally appropriate course of action. What is considered 'moral' in the current debate is considered entirely in economic terms. However research has shown that the lack of moral appeals within current ACC discourse can undermine the potential for broader public engagement on this issue (Markowitz, & Shariff, 2012). In the following chapter, I argue that the moral dimensions of the ACC challenge in the political arena accommodate only economic concerns, which have undermined the previous Federal government's attempt to implement carbon-pricing policy; and attenuated public support for such a policy. The moral imperatives behind the carbon pricing policy were absent from the government's policy narrative, and the antagonism provided by competing ideological positions, with their competing moral agendas. However, as Mouffe (2009) suggests:

> "A well-functioning democracy calls for a confrontation of democratic political positions. If this is missing there is always the danger that this democratic confrontation will be replaced by a confrontation between non-negotiable moral values or essentialist forms of identifications" (p. 9)

However in the case of ACC, where so many in politics consider the denialist stance as a legitimate and scientific position, there are no singular 'non-negotiable moral values or essentialist forms of identifications'. All values and identities are contestable, which may be why political action on ACC is so difficult to initiate within a technocratic, end of ideology approach. Rationalist models of moral conflict (e.g. technocratic, appeals to science and 'fact') can therefore never provide the actual moral fodder that differentiates ideological positions. Democracy is undermined in this sense, because the technocratic rationalist version becomes the consensual hegemonic discourse, rather than a genuine differentiation and disagreement about how to organise common life. Significantly, Mouffe (2009) argues "those who proclaim the end of antagonism [i.e. between opposing ideologies] and the arrival of a consensual society [i.e. an end of ideology era] are actually jeopardising democracy, creating the conditions for the emergence of antagonisms that will not be manageable by democratic institutions." (p. 13)

Claiming the absolute moral ground in these debates, based on a consensual technocratic approach, places all opposing views outside of rational discourse on the matter. Debates about what kind of policy to implement become entrenched with technocratic, economic rationalist discourses, such that the reasons why such policies are so important are overshadowed by discourses around the fiscally responsible nature of policy, the science-based evidence of potential solutions (e.g. nuclear power), and even the contestable nature of ACC science that puts into question the need for certain types of policy, or even any policy at all.

7.4. Conclusion

In the era of non-ideological politics, are we now relying on science to tell us what is politically right and wrong? In the case of ACC, where competing scientific views have undermined scientific authority, we are forced to confront the inherently ideological nature of non-ideological politics because we must grapple with the realisation that rational, universalistic thinking does not exist for the public in scientific controversies, and cannot form the basis of a non-ideological politics; indeed such a politics cannot exist.

Several questions arise from the present analysis: Are these appeals to science stymieing political action on ACC because they remove the moral argument that has traditionally mobilised the passions of collective political identities? Should ACC discourse acknowledge the ideological connection to the green movement in order to bring to the forefront the moral argument inherent in environmentalism? Whilst the answers to these questions lie beyond the scope of the present analysis, this analysis does highlight the challenges that appealing to science in the ACC debate can pose for political action. Both sides of the debate cannot be right, however if both sides appeal to the science, then the public, the media, and politicians alike, are unable to use an end of ideology approach in a straightforward fashion. When it comes to the social construction of ACC science, 'outside of ideology' rhetoric does not appear to be sufficient to provide the basis for political action.

CHAPTER 8: GETTING THE BALANCE RIGHT: COMPETING MORALITIES IN THE ENVIRONMENT-ECONOMY DILEMMA UNDERPINNING AUSTRALIA'S CLIMATE CHANGE POLICY

8.1. INTRODUCTION

In recent years the debate around the reality of anthropogenic climate change (ACC) has made way for a new debate; that of the appropriateness of economic action aimed at reducing greenhouse gas (GHG) emissions. In Australia the introduction of a carbon price in July 2012 fuelled fierce political debate not so much around the reality of ACC, but around the responsibility of the government to enact economic measures as a response to the threat of ACC. This debate must be understood in the context of Australia's heavy reliance on fossil fuels, particularly coal, both as a source of energy for Australians and its export value. Australia is the world's largest exporter of coal with 78% of the coal we mine exported to 30 countries[28]. The industry accounts for billions of dollars in tax and royalties for the Australian economy. Moreover Australia's per capita carbon emissions rank highest of all OECD countries and amongst the highest in the world[29]. In such a resource rich country, where 'brown' energy accounts for a significant part of the economy, the move towards a less carbon intensive production of energy poses significant challenges.

As with all new scientific theories that challenge our conception of ourselves, and our place in the world (for example, Darwin's theory of evolution), the theory of ACC must penetrate ideological structures that by their

[28] From http://www.newgencoal.com.au/coal-a-energy-security/coal-exports.html; accessed 4th September 2012.

[29] From http://www.garnautreview.org.au/chp7.htm; accessed 4th September 2012.

nature resist accommodating the scientific information coming to light. These ideological structures encompass entrenched economic, political and social institutions that must be reassessed in order to effectively act to reduce GHG emissions, and mitigate as well as adapt to the climatic changes we have now inevitably set ourselves on the path towards. The way we view our position within the ecosystem has been called into question by this threat, and along with it our very way of life. What has been seen as a technological push toward higher standards of living for so many is challenged by the notion that we must curb our emissions, reduce our reliance on fossil fuels, and rely less on the multi-trillion dollar oil, coal and gas industry.

Worldwide, this industry has already approved the extraction and use of 2,795 Gigatons of carbon, five times as much carbon as scientists have suggested we can reasonably emit into the atmosphere to contain warming to 2 degrees this century (McKibbon, 2012). This carbon, although technically still underground, is figured into share prices, it is part of the economics of the big fossil fuel companies and nations and therefore of the global economy (see McKibbon, 2012). Not using these reserves would mean wiping off trillions of dollars already being traded within the current global economy, and at a time of global economic instability this is not only impractical or even impossible, it also raises moral issues associated with threatening already weak economies. Employment, standards of living, and entire countries' livelihoods are bound to economic stability and prosperity. It is this real dilemma that generates resistance to changing the way we produce and trade energy by the economic political elites.

Despite this, recent government policy both in Australia and around the world is attempting to use capitalist market mechanisms to transition to a lower carbon world. In what have come to be known as 'green economies', or 'low carbon economies', political and institutional discourse appears to be striving for a way to bridge the divide between the competing demands of the economy and the environment, constructing a new discourse that purports to maintain the economic structures of capitalism whilst simultaneously protecting the environment.

In Australia, the evolution of this new 'green economy' rhetoric has been bound to the development of the recent carbon pricing system, with its roots evident in the earlier but unsuccessful attempt by former Prime Minister Kevin Rudd, to introduce his Carbon Pollution Reduction Scheme (CPRS). The present study will explore the discursive evolution of political rhetoric and subsequent media reporting of the CPRS and carbon price in Australia, specifically focusing on how the moral tension arising out of seemingly incongruent ideological positions – the economy and the environment – is attended to (or not) in the discursive constructions of this issue.

8.1.1. Morality and ideological dilemmas

Morality is a variously theorized concept in the social sciences, with research on this topic drawing from a range of methodological and interpretive frames from cognitive psychology (e.g. Guglielmo, Monroe & Malle, 2009; Haidt, 2007; Markowitz and Shariff, 2012) through to more constructionist approaches (e.g. Linell & Rommentveit, 1998) I take a social constructionist view of morality,

with a focus on the way in which morality is constructed in discourse through the course of social interaction (Bergmann, 1998). The construction of morality through the descriptive practices of a society generates working, practical, and usable moral discourses for engaging in social controversies (Bergmann, 1998). The purpose of such a working morality is bound to the rhetorical goals of the relevant stakeholders and their ideological positions, and as such will be constituted to uphold certain ideological agendas whilst simultaneously undermining others.

Bergmann (1998) argues that moral discourses have changed dramatically in modern life. The rationalist turn of the modern era has marginalized more traditional means of defining the moral code of a culture/society (such as religion). In turn, morality itself has given way to more bureaucratic forms of regulation, legitimization and decision making, such as economic, legal, or educational imperatives. However the dispensing of traditional, singular approaches to morality has not meant that moral imperatives are not embedded within their more bureaucratic replacements. In particular, the capitalist economic institutions that dominate modern life do not undermine moral reasoning; they have their own moral reasoning embedded within them – in the very structure of their rationalist economic agendas.

Capitalist ideological positions include a moral reasoning that prioritizes job security, nation-building, and economic growth, with the implicit assumption that the whole of society benefits from a strong and growing economy. This ideological position is mirrored in climate sceptic discourses, which construct the environmental movement as the enemy of progress (Jacques et al., 2008).

The moral imperative to uphold and defend the push toward higher standards of living is the foundation of the capitalist doctrine of perpetual growth, which has increased in dominance under the recent neo-liberal economic policies of western liberal democracies.

In contrast to the moral dimensions of capitalism, the moral dimensions of environmentalism are perhaps harder to position within the current structural and institutional parameters that define modern life. Grove-White (1993) argues that a dualistic picture of humankind and nature dominates environmental thinking, where the environment and humanity are constructed in opposition to one another. The environment as a relevant entity for social and political action is a category with no voice of its own, but whose advocates compete for the right to define the needs of non-human species, future generations and the environment more generally (Milton, 1993). As a result, it is suggested that scientific discourses for defining environmentalism have been privileged at the expense of important social and cultural dimensions (Milton, 1993). These dimensions embrace crucial moral, human and relational elements for engaging people's "full beings" (Grove-White, 1993), such as social justice, and equal access to the benefits of sustainable environments, including health-related outcomes. These dimensions have been neglected in part due to the commitments in particular industrialized countries towards progressive economic, industrial, infrastructural, and technological undertakings – institutions committed to "individual motorized mobility, to ever higher levels of energy use, to social, moral and cultural norms encouraging increasing levels of material consumption" (Grove-White, 1993, p. 26). Thus, without inclusion of the

human dimensions of the environmental cause, its potential to be thought of as a successful moral discourse is diminished (Grove-White, 1993; see also Markowitz & Shariff, 2012). The implications of neglecting these human dimensions may be dire, as Grove-White suggests: "Without a richer sense of the nature and extent of the human concerns embedded in the phenomenon, public policy processes in this sphere will continue to operate unconvincingly. Crucial lessons will not be learnt, and we will continue down increasingly confusing, inequitable and dangerous paths" (1993, p. 29).

The capacity for ACC to harness public support through moral channels is further challenged by the human-centred moral imperatives inherent in economic discourses that compete with ACC for political attention. Moreover, ACC poses a serious threat to the capitalist agenda because of its implicit supposition that sustainable production will put limits on the market to continue on its current trajectory. The moral debate that ensues from the polarization of the environment and the economy pits the welfare of people (jobs, growth, standards of living) against the protection of the environment. However this polarized construction fails to adequately account for the reality of the threats posed to humanity, particularly in the here and now, by ACC, such as the impact of the 2012 US droughts on global food prices. Moreover, it exaggerates the costs of action (see Randers, 2012).

Dilemmatic aspects therefore arise as a result of competing ideologies such as these, and they are the primary means by which social controversies are fuelled (Billig, Condor, Edwards, Gane, Middleton and Radley, 1988). However if representations of the environment in general, and climate change in particular,

are failing to adequately account for the reality of the threat to humanity, then the potential exists to reduce the dilemma and focus attention on the way in which climate change can engage our "full beings" (Grove-White, 1993). A number of framings have been suggested for activating moral engagement with ACC, including focusing on the burdens, not benefits, of inaction; expanding group identity to include distant and future groups; and highlighting positive social norms (Markowitz & Shariff, 2012). Such framings are argued to offer more robust moral endowment for challenging the ideological battle that currently engulfs the ACC debate (Markowitz & Shariff, 2012).

8.1.2. Ideological dilemmas and climate policy rhetoric

The presence of competing ideologies in society, with their respective moral underpinnings, provides the content for people to think and reason about their lives (Billig et al, 1988). However the relative merits of each opposing position also gives rise to dilemmas. The value in acting to protect our environment, for example, is pitted against the value of avoiding economic disruption. But, people are capable of accommodating these seemingly opposing ideological positions (Billig et al, 1988). A singular position is not required for psychological cohesion. Quite the contrary, Billig and colleagues (1988) demonstrate that seemingly incongruent positions and the tensions that arise out of them can be smoothed over effortlessly in the course of discursive interaction.

In the context of climate change we see this dilemma play out and, in recent years, we have witnessed attempts to resolve the environment-economy dilemma. The terms 'green economy' and 'low carbon economy' are discursive examples of this, as they are in themselves oxymorons: the economy by its very nature is 'high carbon', and 'anti-green', especially in the 20th and early 21st centuries. The global economy lives and breathes through fossil fuel driven industry. Using the market as a mechanism for reducing GHG emissions introduces a paradox into social and economic life. Those attempting to reduce GHG emissions and mitigate climate change through market mechanisms are attempting to resolve this paradox in order to instigate action.

What remains unclear however is how the two opposing sides (the environment and the economy) are brought discursively into alignment, resolving the paradox. How do the dilemmatic aspects of these seemingly competing agendas become consolidated into an overarching narrative that establishes them as not incompatible?

8.1.3. The environment-economy dilemma and Australia's policy response

Ecological modernization (see Hajer, 1995; 1996) gained recognition throughout Western democratic countries during the 1980s as a policy framework or discourse that aims to reconcile the distinction between environmental protection and economic growth by positioning modern economic structures within ecological limits (Bulkeley, 2001; Sunderlin, 2003). As Crowley (1998) explains, ecological modernism is both a pragmatic and an

inspired framework, describing both the industrial restructuring for sustainable development and a self-conscious cultural transformation. In Australia, this framework was adopted as far back as 1990-2 with the aim of developing an effective policy framework to incorporate both environmental and economic coalitions in an equitable manner. However the strategies devised within this framework proved difficult and ineffective (Bulkeley, 2001), maintaining voluntary participation, no disadvantage for non-participation, and no incentives to set or reach emissions reductions targets (Bailey & Maresh, 2008). Environmental values and particularly their moral underpinnings remained marginalized in Australia throughout the 1990's, whilst too much attention was given to business-interested parties advocating no undue economic burdens (Bulkeley, 2001). Moreover, the Howard government (1996-2007) to repeatedly prioritize economic imperatives over environmental ones in two reports commissioned in 1999 and 2002, which stressed the detrimental economic effects of action on climate change, were used by. Indeed, Crowley (1998) has argued that political rhetoric focusing on the polarization of the environment and the economy, in particular jobs *versus* the environment has circumvented innovative environmental policy in Australia.

In contrast to the Howard government and in line with public sentiment at the time (Devinney et al. 2012), Kevin Rudd's 2007 election campaign had a strong focus on climate change action. In what has been described as the 'climate change election' (Kurz, et al., 2010) Rudd successfully positioned his government as the reasonable middle ground between a sceptical Liberal party who had done little to enact climate policy in its 12 years in power, and a radical Greens party

that had proposed shutting down coal generated electricity in Australia (Kurz et al., 2010). Rudd's first official act as PM was to ratify the Kyoto protocol and by July of 2008 the Government had released its Green Paper outlining plans for a CPRS. Despite early signs that Australia might now be moving forward with its climate policy, the CPRS proved to be a political disaster and a major contributor to Rudd losing his leadership to Julia Gillard in 2010.

Baily, MacGill, Passey and Compston (2012) have drawn from a policy network approach to explore the complicated and uneasy evolution of the CPRS under Rudd's leadership. They acknowledge that Australia's fossil-fuel dependent economy has inhibited the government's ability to introduce emissions reduction policies that would conflict with fossil-fuel interests. However they also suggest that flaws in the Rudd Government's political tactics opened avenues for the opposition to inflict political damage and undermine the government's attempts to introduce the CPRS.

Seen in this light, political tactics are considered pivotal to the legislative passage of new climate policies. Amongst resource exchange and unilateral action, Bailey et al. (2012) cite the role of communication as an important element in what constituted the government's political tactics. In particular they demonstrate a number of communication failures of the Rudd Government regarding the development of the CPRS. These include the absence of discourses detailing the challenges Australia would face for not acting to reduce GHGs[30], and

[30] Note that this parallels Markowitz and Shariff's (2012) communication tactics for impressing the importance of action.

raising unrealistic expectations about what Australia could achieve in climate policy, and failing to deliver. However they do not explore the role of the moral discourse used by the Government during this time and in particular the moral tension arising from the environment-economy dilemma. Furthermore, how this dilemma and its moral underpinnings have been managed in political rhetoric around later attempts to develop and enact climate change policy by the Gillard Government is an area yet to be studied.

8.1.4. Analytic aims and data

The analysis in this chapter draws from the theoretical tenets of Discursive Psychology (DP: Edwards & Potter, 1992; Potter & Edwards; 2001), which prioritizes the constitutive and functional nature of discourse. This social constructionist approach treats words as actions that have the power to shape our realities (Gergen, 1999). The analytic approach is in keeping with Wetherell's (1998) *synthetic* approach to discourse analysis, which allows for the simultaneous analysis of situated discursive practices and the social context in which they arise. DP therefore provides the framework to explore the rhetorical nature of political discourse around climate policy, and to assess that rhetoric for the power it has in helping to shape the social and political climate into which Australian climate policy was entering. I also draw from the theoretical tenets of Rhetorical Psychology (Billig, 1987), with a particular focus on ideological dilemmas (Billig et al, 1988). The primary aim is to explicate the ways in which political elites crafted climate change rhetoric in relation to climate policy,

drawing from the moral dilemmas inherent in constructions that pit economic imperatives against environmental ones.

I draw from a range of media releases, media interviews, and speeches to parliament and industry groups by members of parliament prior to Rudd's election win in 2007 through to the introduction of the carbon price policy in 2012. This time period covers several key events in the development of Australia's current climate change policy. Table 8.1 below outlines these key events in a timeline, demonstrating the policy evolution in the context of important national and international events including the Copenhagen conference, the Liberal and Labor leadership changes, the Garnaut review, and the release of geologist Ian Plimer's controversial book denouncing the science of climate change. Also worthy of note is that the timeframe encompasses the global financial crisis of 2007-8, and subsequent economic instability throughout much of the world. The analysis will be presented in 4 parts, representing the successive changes to Australia's climate change policy during this period: 1) The great moral challenge; 2) getting the balance right; 3) the retreat of the moral discourse, and 4) taking the environment out of climate policy. I will demonstrate how, amid a vacillating political and economic climate, the environment's moral ground – that once worked so well to engage community allegiance – was gradually eclipsed by an emerging and rival economic discourse.

Table 8.1. Timeline of events in Australia's carbon pricing policy: 2007-2012.

	2007	2008	2009	2010	2011	2012
January						
February					News in The Australian of the Government's plan for a carbon pricing system	
March	National Climate Change Summit					
April	Garnaut report commissioned		Ian Plimer releases book denouncing the science of climate change	27th: CPRS postponed until 2013		
May			1st changes to CPRS legislation			
June				24th: Gillard takes leadership from Rudd		
July		'Green paper' released, describing the intended CPRS			11th: Announcement of the carbon price	1st: Carbon price begins
August			13th: Senate votes down CPRS	Gillard: "There will be no carbon tax under a government I lead" 21st: election resulting in hung parliament	22nd: Convoy of no confidence arrives in Canberra	
September		30th: Garnaut report released			14th: Carbon pricing system introduced into parliament	
October		30th: 'The Australian Treasury's report on the economics of climate change mitigation'			11th: Carbon price passes through the lower house	
November	Federal election – Rudd and the ALP take leadership		2nd changes to the CPRS legislation 'Climate-gate'		Carbon price passes through the senate	
December	Ratification of Kyoto Protocol Bali Climate Change Summit	'White paper' – announce CPRS	1st: Abbott takes leadership of liberal party 2nd: Senate votes down CPRS for second time 7th-8th: COP15			

8.2. Analysis and Discussion

8.2.1. The Great Moral Challenge

In 2006 whilst still in opposition, federal Labor leader Kevin Rudd was highly vocal on the issue of climate change and indeed framed climate change repeatedly as "the greatest moral, economic and social challenge of our time" [31]. In February of 2007 Rudd called for a National Climate Change Summit to be held at the end of March. The summit was designed to bring together key representatives from business, science, academic, political and community sectors in panel discussions aimed at understanding the challenges associated with developing sustainable solutions to ACC. One of the speeches made by Rudd during the summit is presented here in extract 1, and represents the tone of Rudd's moral discourse up to and beyond the federal election in 2007.

Extract 1:

1 Climate change is the great moral challenge of our generation.
2 Climate change is not just an environmental challenge.
3 Climate change is an economic challenge, a social challenge and actually
4 represents a big challenge on the overall question of national security.
5 Because the dimensions of this challenge are so great, and they reach so far,
6 and they extend over such a wide period of time, and cross so many of the
7 traditional portfolio delineations within government and between
8 governments, that we should be at a stage now in this country where climate
9 change is beyond politics.
10 None of us individually have the answers, all the answers, on climate change.
11 But together, we can identify the best answers possible on climate change.
12 And that's why we're here.

[31] http://www.theaustralian.com.au/opinion/rule-of-reckless-vows/story-e6frg6zo-1111118413753

The challenge described by Rudd is encompassed within a number of categories overarched by the 'great moral' imperative: Rudd acknowledges the environmental, economic and social challenge, as well as the 'big challenge on the overall question of national security' (l. 4). But his discourse is focused on the overarching theme that action on ACC is much bigger than all of the individual elements. This is evident in lines 5-9 where Rudd uses lists (Jefferson, 1990) to emphasize the extent of the challenge throughout government sectors. From lines 10 - 12 Rudd constructs a collective category to demonstrate the importance of multi-lateral action. His use of the terms 'together' and 'we can' imply the uniting nature of action, which invoke superordinate categories of identification at the national level. This is a challenge that requires us to think outside of traditional political processes – it stretches across time scales (l. 6), portfolio delineations (l. 7), and beyond individuals (l. 10), where Traditional ideological and political barriers are broken down, and what is required is united action against a common threat.

This discourse was arguably appropriate and effective at the time, when community concern for ACC was high in Australia and elsewhere (Brulle et al., 2012; Devinney et al., 2012) and the incumbent Liberal Howard government's lack of action was becoming a political sticking point. Rudd provided a rhetoric that harnessed public sentiment by focusing on altruistic motives, superordinate identification, and responsibility. The difference between the two parties' positions on ACC continued throughout 2007. By the end of the year, Howard is

on record saying ACC is "not the end of the world"[32], delineating the difference between the two parties even further. The election campaign saw Howard fail to provide the kind of rhetoric on ACC that Rudd used to engage and persuade the Australian electorate. Overall, Rudd took a moral position, he acknowledged the economics associated with action but this was situated within a broader narrative that positioned action on ACC as the responsible and moral thing to do.

We see this discourse of responsibility in even greater effect after Labor won power. Extract 2 is taken from Minister Penny Wong's speech to the Australian Industry Group luncheon on the 6th February 2008. This is her first major address on ACC since her appointment to the Ministry for Climate Change and Water. The notion of responsibility is encapsulated by the speech's title: 'Climate Change: A Responsibility Agenda'.

Extract 2:

(17 lines omitted)

18 Businesses have been looking at the looming threat of climate
19 change – and at the new opportunities it presents

(12 lines omitted)

32 Two months ago, Australians delivered a clear message. They said we need a
33 new sense of responsibility in this country: a responsibility to protect not only
34 today's economy but also prepare for the economy of the future; responsibility

[32] http://pandora.nla.gov.au/pan/77542/20071125-0000/www.news.com.au/story/0,23599,22729562-5013464,00.html accessed 22nd August 2012.

for protecting our country, our values and lifestyles beyond the next electoral cycle.

(5 lines omitted)

The results of this behaviour have inspired one of the most enduring human values: taking responsibility.
The world now sees that we must also be responsible in how we use the earth's resources. The earth's gifts --- that we have always taken for granted – are not guaranteed.

(24 lines omitted)

So it is no embellishment to say that climate change is the challenge of our generation. But it is also the opportunity of our generation.
It's fair to say that most of the talk about the economic impact of climate change has been of the potential threat. Yet we should also look to the opportunity – for new growth; for innovation; for a modern economy.
Australia is blessed with resources to exploit developments in clean energy, and we have the scientists, engineers and capacity to deliver.
Opportunity or threat, this is a challenge we need to solve together. We must look to each other, and we must ask of ourselves whether we have done enough.

Wong uses 'responsibility' throughout the speech to define the parameters of her moral accounting for action on ACC. Lines 18-19 in Extract 2 sets the tone for the speech, invoking opportunity over threat. There is a positivity throughout this speech which, when used alongside the responsibility rhetoric, serves to construct action on ACC as both the responsible thing to do as well as being an opportunity rather than a challenge.

The use of the word 'inspired' (l. 42) sets the tone for the next passage in which Wong invokes a heroic version of humanity. It is responsibility itself that is inspired, which is also described as 'the most enduring human value'. Again

this helps construct the problem as beyond politics or individuals, reinforcing the collective superordinate identification and the imperative for collective action across the world. The universal and fundamental construction of human values as the driving force behind action idealizes the case for action. This tone is continued on through line 45 where Wong makes reference to 'the earth's gifts'. The use of idealism in this way helps emphasize the moral imperative underpinning Wong's case for action on ACC – it is not simply about politics or economics, it is about what it means to be human.

Lines 71-80 construct the 'opportunity' inherent in the challenge posed by ACC, which implicitly reduces the tension between the economy and the environment. ACC is re-framed as something that will provide the impetus for transitioning to a 'modern economy' that is associated with innovation and new growth. There is positivity in the challenge posed by ACC and again there is a sense that these new opportunities represent a positive shift in not only the way we do business but in the way we think. The opportunities for business therefore downplay the economic threats that may be associated with economic action on ACC. This then draws the economic factors associated with ACC into an overarching narrative that still prioritizes action on ACC as the morally appropriate course of action. The morality of this issue is emphasized in lines 78-80 where Wong draws on the collective: 'together', 'look to each other', and 'have we done enough'. This draws clear boundaries around action on ACC being the morally appropriate action to take, reducing the tension caused by the traditional environment-economy dilemma.

The government's ACC policy, the CPRS, was detailed in July of that year with the release of the Green Paper, and in September the Garnaut Climate Change Review was released outlining the economic factors associated with action on ACC. Throughout 2008 the government deployed similar rhetoric to that demonstrated in extracts 1-3: bridging the environment and the economy (thereby reducing the ideological tension) in an overarching moral narrative focusing on responsibility and opportunity. During this time there is also the repeated use of terms such as 'highly intensive carbon economy' and 'low carbon economy'. In these phrases we see that the economy itself is described as either high or low carbon; that is, it is either an environmentally friendly economy or not. This served to bridge the two positions, thereby reducing the polarity; the economy itself is intimately connected with the environment.

Despite this moral appeal the Rudd government in its early days provided little detail on how such economies would work. In fact Bailey and colleagues (2012) have criticized the Rudd government for their failure to provide a comprehensive economic narrative that could work as a moral argument in its own right. Whilst the Rudd government communicated the opportunities for business within a heroic and moral responsibility narrative, they lacked a detailed and explicit communication of the economic costs of inaction (Bailey et al, 2012). In essence, the environment-economy dilemma was weighted too much to the environment and future generations, subordinating the moral foundations of strong economic policy.

This imbalance gained prominence by the end of 2008 when the GFC was causing major financial meltdown across the United States and Europe, and the

reality of implementing economic reform drew focus to the economics of Rudd's plan. At this point, the government's discursive tactics changed to encompass a stronger economic focus, and achieving a balance between the environment and the economy. The livelihoods of everyday people – their financial security in particular – becomes the primary moral issues arising out of the global economic disruption. In this sense, the morality underpinning economic strength is no longer subordinate to the responsibility agenda in the government's discourse. Rather, economic factors become explicitly stated as a crucial factor in the government's response to ACC.

8.2.2. GETTING THE BALANCE RIGHT

The moral discourse used by Wong in extract 2 gave way for a new focus by the time the government released their White Paper for the CPRS in the wake of the GFC in December 2008. Rudd had presented the white paper at a National Press Club conference and extract 3 is the media release associated with this speech.

Extract 3:

Today I announced one of the largest and most important structural reforms to our economy in a generation, the introduction of a Carbon Pollution Reduction Scheme. Climate change is one of the greatest, enduring challenges that we face as a nation and as an international community. Climate change is nothing less than a threat to our people, our nation and our planet. We are the first generation to experience the tangible effects of climate change on our planet.

7 The case for action is clear. The cost of inaction is equally clear. Our announcement
8 today sets out our medium-term target range: in other words, our 2020 target to reduce
9 carbon pollution.
10 These targets are appropriate and responsible. They strike the right balance between
11 tackling climate change and supporting our economy and jobs during this global
12 recession.

(4 lines omitted)

17 We will also use the funds raised to invest in the green-collar jobs of the future – in solar
18 energy, on wind farms and in jobs using new technologies like clean coal and geo-thermal
19 energy.

(5 lines omitted)

25 I think you will agree we have achieved the right balance. Of course people are going to
26 have different views and we will get attacked from the left and from the right for either
27 not doing enough or for doing too much. That's why it's important to get the balance
28 right. Get the balance right for the environment; get the balance right for the economy
29 and jobs.

In contrast to Extracts 1 and 2, where ACC was framed primarily as a moral issue, right at the outset Rudd frames climate change in economic terms – he is announcing the most important structural reform to *the economy*, putting the economy at the forefront. The moral discourse that once defined Rudd's ACC agenda is now subordinate to the economy; lines 3-4 are notable because of the absence of the word 'moral' (given Rudd's previous use), and the use of the term 'one of' implies the existence of more than one great and enduring challenge. Constructing ACC in this way minimizes the moral imperative inherent in action on ACC in the face of the growing and competing importance of economic issues. The GFC forced the Rudd government to attend to economic matters, such that the possibility of constructing ACC as an opportunity for reforming the economy

is no longer possible. The economy is now pitted against the environment as an alternative issue vying for political attention.

This is most salient in lines 10-12 where the GFC is explicitly indexed: Rudd attends to the environment/economy dilemma now arising out of taking drastic economic action amid global economic uncertainty. Polarization of the economy and the environment occurs within a discursive division made between the two, most notably in line 10 with the metaphor 'striking the right balance between'. Here, the words 'between' and 'balance' work to separate the environment and the economy, pitting them against each other. The implicit call for action on ACC for its own sake is still there (the necessity to act bears witness to this), however the moral imperative is much less explicit than in the previous extracts.

Rudd further attends to economic issues in line 17 where he mentions 'green-collar jobs of the future'. The implication is that these will replace blue-collar jobs although, again, this is a systematically vague epithet (see Potter, 1996). Although he lists possible areas where these new green-collar jobs would exist, he omits details about possible job losses and other economically detrimental effects of structural reform posed by the CPRS, such as increases in the cost of electricity.

In lines 25-27 Rudd highlights the ideological nature of his policy: those on the left will say the CPRS doesn't do enough, those on the right will say it goes too far. This echoes the rhetorical manoeuvre used in the 2007 election campaign where Rudd was able to position Labor as the reasonable middle

ground between the sceptical Liberal party and the radical Greens (Kurz et al., 2010). This allows him to position himself again in the middle ground and reiterates his repeatedly used phrase of 'getting the balance right'. In lines 27-29 he makes this explicit, it's a balance between the environment and the economy/jobs. However the word 'balance' in this context suggests compromise, and ultimately that is what the CPRS was.

The IPCC recommended developed countries cut GHG emissions by 25 to 40% compared to 1990 level, in order to keep CO_2 below 450ppm and stand a reasonable chance of keeping global warming below 2 degrees Celsius above pre-industrial times (IPCC, 2007). However, the Rudd Labor government's target for GHG emission reductions was a modest 5% below 2000 by 2020. If other major emitters agreed to reduce their emissions, Australia's target could increase up to 15% below 2000 by 2020 (Department of Climate Change, 2008). The Greens, as well as other environmental organisations such as Greenpeace, the Wilderness Society, and the Climate Institute considered this a 'watering down' of the CPRS legislation in order to accommodate the expectations of big business and the Opposition. Subsequently, the Greens refused to support the legislation on the grounds that it would not have reduced carbon emissions[33]. On the 13th August 2009, the senate voted down the CPRS for the first time.

In early December 2009 the government made a second attempt at passing the CPRS through the senate, just prior to the Copenhagen conference. Again they were unsuccessful. Moreover, on December 1 Tony Abbott ousted

[33] http://braidwood.nsw.greens.org.au/2010/08/06/why-the-greens-did-not-support-the-ets/

Malcolm Turnbull as Liberal leader amid controversy about the 'sceptics' taking hold of the Liberal party (Ferguson, 2009). Where once Rudd and his ministers successfully sidelined the economic moral narrative, now the environmental moral narrative was being sidelined, indeed undermined by an opposition comprised of a number of (and in fact lead by) climate change sceptics. Ultimately, the government failed to develop a successful narrative that could carry their ACC policy and sell the importance of action on ACC to the public especially in the face of growing anxieties about the GFC and its potential impact on Australia. As Bailey notes:

> "If one thing wrecked the CPRS, it was the Rudd Government's failure to make a sustained and evidence-based case for carbon pricing based on the risks climate change poses to Australian water supplies, agriculture, ecosystems and mobility. Instead, it became sucked into debates on the working of emissions trading and how compensation to industry would be calculated. It is little surprise that voters and business lost sight of the case for action and started seeing only the costs." (Bailey, 2011, p 33).

In other words, the Rudd government failed spectacularly to 'get the balance right'.

8.2.3. THE RETREATING MORAL DISCOURSE

By April 2010 the government announced that it would be postponing its CPRS. This announcement was met with waves of criticism throughout the parliament and media, and forced Rudd and his ministers to defend this decision in light of the moral urgency they had previously attributed to action on ACC. Moreover, the rejection of the CPRS twice in the senate would have allowed the government to hold a double dissolution election, where they could take the CPRS as an election issue to the public, gaining the mandate they would need to pass the bill through parliament. However Rudd refused this option and the media were quick to pounce on the government's perceived back flipping over their climate policy. Extract 4 below is taken from an interview with Minster Penny Wong (PW) on ABC television's 7.30 Report on the 28th April 2010. Here we see the interviewer, Kerry O'Brien (KO), forcing Wong to attend to the government's decision to postpone the CPRS, their refusal to go to a double dissolution election and the apparent rejection of Rudd's strong moral stance that economic action on ACC was paramount despite the challenges.

Extract 4:

(27 lines omitted)

KO: If this really is the great moral and environmental challenge of our time, as Kevin Rudd has said, it is still clearly within the Government's power to call a double dissolution election and include the ETS bill that's been rejected twice by the Senate, fight the election on this great moral challenge, win the election and have the bill passed by a joint sitting of the both houses of Parliament. Why has that option been rejected?

PW: Well, on the double dissolution, Kerry, I think the Prime Minister has made

clear, possibly on this program as well, his view about what the Australian people expect of governments and they expect them to serve full term. We have advocated very strongly for this policy because it's the right thing to do. It remains the right thing to do.

(51 lines omitted)

PW: I think what is important here is this: unlike Mr Abbott, we recognize the science, we accept the science, unlike Mr Abbott we remain committed to action on climate change and unlike Mr Abbott we're not pretending that you can reach the targets that he also has signed up to unless we pass legislation which puts a price on carbon pollution. What we are having to do, given what has happened domestically and internationally, is defer the introduction of this scheme.
We've outlined the basis on which we're going to do that and we hope in the next two years what we can see is the same consensus that was in place in Australia, bipartisan consensus, but also across the business community and others, for this sort of action on climate change, because it is what Australia and the world will need to do.

The moral issues associated with the government's delay to the legislation are explicitly stated in lines 28-32, where O'Brien challenges Wong, calling the government to account in the context of the double dissolution option. He makes clear that the government still has the power to act by going to a national election on their climate change policy, but is refusing to do so, and that this refusal in itself undermines their moral position. Wong's response is evasive, with lines 33-36 offering an explanation that the government must serve its full term. Fundamentally this is a rejection of the moral urgency of the issue. However Wong attempts to retrieve the moral space by describing the government's policy repeatedly as 'the right thing to do' (ll. 37-38), despite their failure to gain the parliamentary support required to pass the legislation.

In her remaining response, Wong contrasts her government's acceptance of ACC science and commitment to action with Abbott's climate science scepticism and inaction. By comparison the government retains some moral credibility on this issue. However the conviction with which such moral discourses were previously delivered is absent in this extract. By line 94 Wong is blaming the failure of the CPRS on external issues like lack of bipartisanship or consensus.

This extract therefore exemplifies how the government's moral discourse retreated during this time. Although it is not entirely absent, it is far less explicit and is argued with far less conviction than had previously been the case. However, the failure of the CPRS cannot simply be attributed to the government's failure to adhere consistently to a moral narrative about ACC. The political and indeed economic realities of implementing a market mechanism for reducing GHGs during the GFC proved a significant challenge for the Government. The Government's attempts to 'get the balance right' were unsuccessful. Moreover, they failed to sell the policy to the public with poll surveys demonstrating that the public concern over climate change had waned significantly during this period (Devinney et al., 2012).

Rudd's popularity soon declined and by 24th June that year Julia Gillard mounted a leadership challenge, which Rudd did not contest. However the Labor government's integrity was called into question and the urgency to act to reduce GHGs and mitigate ACC was severely undermined, so much so that action on ACC remained almost a taboo topic for the government in the lead up to the 2010 election. In fact on the 16th August, a week before the election, Gillard appeared

on a Channel Ten morning news program and stated, “There will be no carbon tax under a government I lead. But let me be clear, I will be putting a price on carbon and we will be moving to an emissions trading scheme” (Walsh, 2013). However the latter sentence was left out of all future references to this quote, and Gillard was constructed in the media as breaking this promise when the ‘price on carbon’ was announced in September 2011 amid a storm of controversy, and the policy became ubiquitously referenced as ‘the carbon tax’.

8.2.4. TAKING THE ENVIRONMENT OUT OF CLIMATE POLICY

By Feb 2011 the national broadsheet newspaper *The Australian* ran an article indicating that the Gillard government did in fact plan to impose a ‘carbon tax’. The government formally announced this on 11th June of that year. By this time, opposition to the policy was galvanized in the community, and Abbot’s opposition was relentless. In the weeks following the announcement of the carbon pricing system, thousands of protesters from around Australia descended onto Canberra to oppose the introduction of a ‘carbon tax’ and Gillard’s leadership.

Extract 5 is taken from Gillard’s address to the nation announcing the carbon pricing system in July 2011. This announcement is to be analysed and understood in connection with extract 6, which is taken from Abbott’s address to the nation in response to Gillard’s announcement. What is to be noted from Gillard’s announcement is the overall lack of an environmental agenda underpinning the policy narrative.

Extract 5:

(3 lines omitted)

Around five hundred big polluters will pay for every tonne of carbon pollution they put into our atmosphere.
By 2020 this will cut carbon pollution by 160 million tonnes a year.
And because some businesses will put prices up, there will be tax cuts, increased pensions and increased family payments.
We have had a long debate about climate change in this country.
Most Australians now agree our climate is changing; this is caused by carbon pollution, this has harmful effects on our environment and on the economy – and the Government should act. Economists and experts agree that the best way is to make polluters pay by putting a price on carbon.

(16 lines omitted)

Some of the cost paid by big polluters will be passed through to the prices of the goods you buy.
The price impact will be modest but I know family budgets are always tight.
So I have decided most of the money raised from the carbon price will be used to fund tax cuts, pension increases and higher family payments.
These will be permanent, matching the carbon price over time.
Not everyone will be financially better off – there is no money tree. The budget has to add up. But I want people who need help most to get the help they need.
That's why 9 in 10 households will get a combination of tax cuts and payment increases.
For almost 6 million households this will fully meet your average extra costs.
And of these, 4 million Australian households – including every older Australian who relies solely on the pension – will get a "buffer" for your budget, with the extra payments being 20 per cent higher than your average extra costs.

This extract begins by emphasizing the magnitude of carbon pollution through the use of quantification rhetoric – 'five hundred big polluters' (l. 4); 'every tonne of carbon' (l. 4); 'cut carbon pollution by 160 million tonnes a year' (l. 6). This demonstrates the urgency of the problem and the need to implement

policy (ll. 4-6). However a statement about the compensation to families and pensioners following its implementation follows this immediately (ll. 7-8). In lines 9-10 Gillard describes the debate in the past tense, relegating the debate to times past. Gillard uses a consensus warrant (Potter, 1996) at line 10, with 'most Australians now agree our climate is changing', which constructs ACC as a well-accepted fact. This allows Gillard to avoid a narrative about why she is enacting this policy. The focus instead is on how the compensation will work for average Australians and their families.

This is clearly demonstrated in lines 38-42: Gillard provides details of the compensation but, as Bailey (2011) has highlighted, this discursive move focuses only on the details of compensation, diverting attention away from why the policy has been enacted. Gillard tries to gain moral ground by offering compensation to 'people who need help most' (l. 37) and positioning herself as personally involved in the compensation families will receive with the use of personal pronouns: '*I* know family budgets are always tight' (32), 'so *I* have decided' (33), and '*I* want people who need help most…' (37). This identity management allows Gillard to position herself in relation to this policy as a leader who is acutely concerned with the economic wellbeing of the electorate and as someone who would not wilfully compromise this to mitigate carbon pollution. However, somewhat ironically it also works to reinforce fears that a carbon 'tax' will lead to increases in cost of living as her opponents had claimed.

Moreover this rhetoric is in direct competition to Abbott's unswerving opposition to this policy (see extract 6 below). Abbott's fierce political opposition echoed strong public opposition to the 'carbon tax' at the time. Yet

Gillard rhetorically competing with Abbott solely on the economic platform attenuates the debate. It effectively relegates a crucial part of the story (i.e. the environment and the human dimensions associated with that) to the fringes. The only reference to the 'environment' comes at line 11, where it is mentioned alongside the economy.

The absence of environmental imperatives when talking about climate change policy was noted around the same time with the Obama administration (Bullis, 2011). In his State of the Union address in 2011, Obama announced one of his administration's most significant energy-related policy proposals, which called for 80% of US energy to come from 'clean sources', without once mentioning carbon dioxide, greenhouse gases, or climate change (Bullis, 2011). Instead, Obama framed his policy in terms of American competitiveness and energy independence. Whilst the Gillard government took a different discursive approach to explaining climate policy (focusing on compensation), the discourse still demonstrates a lack of clearly defined policy goals by talking 'around' climate change (Bullis, 2011). Rudd was widely criticized for the same discursive failures with the CPRS (Bailey, 2011; see also Hetherington and Soutphommasane, 2010). Extract 6 demonstrates how the Gillard government similarly removed the substance of the argument for action on ACC, opting instead for a narrative focused primarily on countering Abbott's claims that the policy will increase the cost of living for the general public.

The alternative narrative offered by Abbott at the time no doubt contributed further to the unpopularity of the policy. Figure 8.1 is a word cloud highlighting the differences between the two leaders' constructions of the carbon

tax in their respective addresses to the nation. From even a cursory glance it is obvious their narratives had an entirely different focus. Whilst 'carbon' appears frequently in both politicians' speeches, Abbott's use of the word 'tax' dominates his address. In contrast, Gillard uses the word 'tax' sparingly, opting instead for the descriptor 'price', and reinforcing the term 'pollution' and 'polluters' to emphasise big business as the actual target of the policy.

Extract 6 below is taken from Abbott's address to the nation, in response to Gillard's presented in extract 6 above.

Extract 6:

(2 lines omitted)

People think our country is drifting and it's hard to know whether the Labor Party or the Greens are really in charge.
Australians are worried about jobs and about the cost of living that just goes up and up and now there's the carbon tax that's just going to make a difficult situation worse.
Like you, Margie and I want a better future for our children. We only have one planet and I want to preserve it. But you don't protect the environment by making everyday life more expensive and by exporting Australian jobs.
This carbon tax is a bad idea because everything will cost more: at $23 a tonne, power prices will immediately rise by 10 per cent and the cost of living of average households will rise by $515 a year that you can't afford.

(10 lines omitted)

So I say "no" to a carbon tax because I say "yes" to manufacturing in Australia and "yes" to affordable electricity and transport.
The whole point of this carbon tax is to make coal, gas and oil more expensive. The price signal won't work if the price isn't high. The tax doesn't work if it doesn't hurt.
It has to make turning on your heater more expensive and make using transport more

expensive to work.
Under a carbon tax, Australians won't use less steel, aluminium, and cement – we will just import them from countries without a carbon tax and without any plan to reduce their own emissions.
The world's emissions won't change at all but Australia will have fewer jobs because there is no such thing as a solar-powered steel mill, a wind-driven motor manufacturing plant, an electric passenger plane or cheap base load power other than from coal or gas.

(9 lines omitted)

This is the kind of innovation and ingenuity that our plan would fund. Our plan is costed, capped, and fully funded from savings in the budget. It means no extra burden on taxpayers and no extra costs to consumers. It's not a tax policy pretending to be an environment policy. The Coalition's plan means a fair go for pensioners – without a carbon tax. And tax cuts funded from savings – not from a carbon tax.

Abbott manages to draw from an economic morality discourse throughout his address, with a strong focus on households and job security. In lines 3-4 Abbott undermines the government by making reference to the hung parliament, highlighting the issue of leadership and 'who's in charge' of this 'drifting' country; the implication being the carbon price is a result of the Greens having too much power. The Greens reference here also establishes the ideological opposition for ACC action, where the carbon price policy is contrasted with Abbott's anti-'carbon tax' position that is instead committed to supporting the livelihoods of the Australian people. In lines 5-6 Abbott makes explicit this contrast with references to jobs and cost of living, with the extreme case formulation (Potter, 1996) of 'up and up' emphasizing this contrast. Abbott can be seen to be taking the moral position in this debate: a moral position that prioritizes economic stability, as well as family values. The reference to his

family in lines 7-8 is an attempt to position himself as trustworthy, demonstrate family values and mark his credentials as someone who cares about our children's future and the environment.

Abbott's narrative is primarily committed to maintaining jobs and cost of living. In this way Abbott is attending to the environment/economy dilemma by asserting his dedication to both. However he goes on to undermine the government's policy in lines 8-12, where he details how the carbon price is meant to work, highlighting that it will not protect the environment. In this way Abbott is establishing the environment/economy duality *within* the carbon price policy. This works to undermine the government's credentials to deliver a policy that resolves this dilemma, whilst simultaneously presenting himself as someone who is attuned to the dilemma.

The dilemma is further accentuated in lines 23-24 where Abbott says 'no' to a carbon tax but 'yes' to manufacturing, affordable electricity and transport. He is implicitly arguing that the two are incompatible. Lines 25-28 demonstrate how Abbott personalizes the impact of the carbon price. The formulation 'The tax doesn't work if it doesn't hurt' (l. 26) is particularly effective in condensing the complex nature of the carbon price into a simplistic, catchy formulation. In effect this is what the carbon price is supposed to do, however this simplistic and vague description fails to demonstrate how this type of policy is designed to change behaviour, to make an unwanted product (GHG emissions) economically undesirable. Despite the economic logic that underpins the policy, Abbott only emphasizes the economic burden it poses for the electorate/general public, especially in terms of jobs and cost of living. As such, he is appealing to the

general public by reminding them that their economic livelihoods are paramount to his concerns.

Abbott also draws on the well-worn argument that we should not act if the rest of the world does not (ll. 29-31). This constructs Australian disadvantage for taking action and is continued on through lines 32-34, with the three part list – 'Australians won't use less steel, aluminium, and cement' – naming the industries Australia will lose due to the carbon price. The line 'There's no such thing as a solar powered steel mill' (l. 33) is use ironically here, and is deployed as a bottom line argument given the absence of such technology. The technologies he describes do not yet exist, but by focusing attention on this he is cherry picking, drawing very tight boundaries around his narrative to deliberately exclude possibilities for innovation that the carbon pricing revenue was expected to support.

In the missing lines leading up to lines 44-48, Abbott was describing examples of alternative ways to reduce emissions, such as carbon farming, and at line 44 he offers an alternative plan that supports innovation and ingenuity. Most importantly it would be affordable with no cost to the public. Here there is an implicit assertion that environmental policy does not have to change the economy. This polarizes the environment and the economy again and simultaneously diminishes the importance of the environment by failing to acknowledge the inevitability of economic reform to address ACC. At line 46 he again constructs the environment and the economy as two separate phenomena: 'It's not a tax policy pretending to be an environment policy'. In fact, any policy designed to effectively reduce the amount of GHGs released into the atmosphere

will be both. It also undermines the credentials of the carbon price to work as an environmental policy, and without an adequate narrative from Gillard to the contrary, this may be persuasive for the general public.

Extract 6 (cont.)

(3 lines omitted)

52 We will deliver the hope, reward and opportunity that good government fosters.
53 That's why there should be no carbon tax, why the Australian people are entitled to a
54 vote, and why the next election will be a referendum on this bad tax based on a lie.
55 Together, we can fight this tax before it becomes law.

Abbott's closing comments incite challenging the carbon pricing policy in lines 52-55 by calling for an election on this issue. This suggests there is the possibility for fighting this policy before it becomes law, which is enhanced with the use of positive language: the 'hope, reward and opportunity' of 'good government' can bring about this change. This narrative is important because Abbott vowed a 'blood oath' to rescind the policy, and much of the 'convoy of no confidence' protest was fuelled by this rhetoric. After winning the 2013 election, one of Abbott's first priorities was to make good on this promise. At the time of writing of this thesis, plans were in place to repeal the carbon pricing system. We await the outcomes of this complex political conflict.

8.3. Conclusion

The present analysis has demonstrated how ACC policy discourse evolved from 2007 and Rudd's CPRS legislation, through to Gillard's 2012 carbon price. From the early Rudd days there was a strong focus on the moral dimensions of action on ACC. However a comprehensive economic morality was somewhat neglected in favour of the moralizing imperative to act for the environment, lifestyles, and future generations. In this sense, the dilemma posed by the environment/economy duality was attended to with an overarching narrative that pulled focus away from the economic challenges posed by economic reform. But by the time the GFC eclipsed all else in the global political landscape, Rudd was forced to attend to the moral dimensions inherent in the economic costs of ACC action. This he achieved by striving to 'get the balance right', prioritizing economic imperatives and relinquishing his strong moral rhetoric.

By late 2008, when the GFC reached its crescendo, the political discourse changed and we see Rudd and his ministers attending with greater focus to maintaining economic stability during uncertain economic times. This dilemma was made salient through descriptions of the environment and the economy in opposition to one another, as competitors in a hostile political landscape. The moral dimensions of maintaining the economy, particularly job security and cost of living, ultimately takes priority. Despite the government's claims to get the balance right, the economy clearly takes precedence over the environment.

Once the CPRS is postponed it becomes harder and harder for the government to maintain their environmental position, especially the moral imperative it represents. They come under attack from the media and are forced

to attend to their 'hypocrisy', as demonstrated in extract 5 where Senator Wong is held to account by Kerry O'Brien. Here the moral environment discourse is abandoned and the dilemma attended to by shifting the blame of the failure of the CPRS legislation to external forces. But ultimately it is the economic moral discourse that is upheld during this time, perhaps due to the GFC, perhaps due to Abbott's relentless campaigning against the policy. But again, we see the economic position elevated and the environmental discourse (especially its moral foundation) sidelined.

Gillard's succession to the leadership sees this strategy continued – the environmental discourse is all but absent from her policy rhetoric. This echoes events around the world, most notably in the Obama administration (Bullis, 2011). The government is attempting to resolve the dilemma by denying one pivotal element in it, by denying the environmental dimensions of climate policy altogether. As Markowitz and Shariff (2012) highlight, ACC must be communicated as a moral issue, and a significant part of that is to establish the environmental factors it embodies. And as Grove-White suggests, the environment and ACC can only be considered a successful moral discourse if they incorporate the relevant human dimensions. But these dimensions must be incorporated into an overarching narrative, similar to Rudd's early narrative, but encompassing all of the crucial elements of ACC: the difficulty of economic action, the long term costs of inaction both for the environment and the economy (Bailey & Maresh, 2008), public health issues, social and global justice, climate change refugees and sea level rise, threats to food and water supplies, the impacts of extreme weather events with over-population, insurance premiums

and global food prices, the effects of positive feedback cycles on warming trends, and of course, the threats posed to other species, habitats, ecosystems, and food chains, etc. ACC is a problem of great complexity and scale that stands to threaten all aspects of our lives and our world.

The present analysis demonstrates the difficulty ACC faces in competing for political attention. Although the weight of other political matters, such as the GFC, serves as an external barrier to having ACC prioritised as a political issue, there are none-the-less internal barriers within the ACC problem that can be addressed. Specifically, as demonstrated here, are matters relating to the discursive construction of ACC. A discourse that can do adequate justice to the complexity and scale of ACC is required in order to articulate accurately the potential outcomes we can expect, regardless now of the action we take.

The presence of a positive discourse is also imperative; a discourse that highlights the inherent morality in economic reform, the power of innovation, and the importance of putting our efforts towards developing the technology that can help mitigate the problem. This is similar to Wong's 'opportunity' rhetoric highlighted in extract 2, but with a broader and more comprehensive focus that highlights specific areas for reform. A focus only on the difficulty of implementing policy will reproduce the economic narrative that works to undermine the moral imperative to act; reproducing the dilemma and a discourse that has failed thus far to ignite a genuine counter-argument to the complacency that defines political and social opposition to effective climate policy, in Australia and elsewhere.

Throughout the present analysis the tension posed by the

environment/economy dilemma is never fully resolved, and this corresponds with the inertia Australia has faced in attempting to develop an adequate policy response for reducing GHG emissions. Emissions targets reductions of 5%, according to the latest science, are simply inadequate for limiting temperature rise to 2 degrees by 2100 (see Bernie, Gohar and Lowe, 2011). The rate and extent of Arctic ice and Greenland ice-sheet melt over the 2012 and 2013 summers demonstrate just how present this threat is, and with the positive feedbacks this melting ice is expected to trigger, it seems we may have already reached a crucial tipping point, and are committed to simply watching dramatic climate changes unfold around us (Spratt & Sutton, 2008; Spratt, 2012). In this context it becomes significantly important that leaders construct a comprehensive ACC discourse that contains the seeds of both the environment and the economy in a new moral narrative that impresses the urgency to act. The complex nature of the carbon price and CPRS makes this policy difficult for the public to understand, therefore the importance of a coherent and strong narrative that the public can relate to, is paramount if it is to gain public support.

As Bailey and colleagues (2012) observe, the most effective political strategy may simply be conviction and explaining the problem properly. Australia has been in a prime position to reignite the environment's moral discourse in a comprehensive, informed and sophisticated way – it has survived the GFC and as Gillard herself pointed out, "our economy is the envy of the world". Opoortunities exist in this space to reframe the ACC challenge as an opportunity to continue to grow our economy. Moreover, the extreme weather events experienced globally over the last 2 years provide the environmental

impetus to stimulate re-engagement with ACC; of the kind experienced in 2007 both in Australia and around the world (see Brulle et al., 2012). However with the Abbott government winning office in September of 2013, the progress made on Australia's carbon pricing policy is being unwound. A number of policy initiatives and government bodies set up to deal with ACC have been dismantled, including the carbon price and the renewable energy target; and the Abbott government's alternative Direct Action Plan is widely recognized as being inadequate for reducing GHG emissions. It is one thing to resolve dilemmas in discourse, to smooth over the contradiction as epithets like the 'green economy' symbolize. But in political and institutionalized realities these dilemmas must be resolved within the policy context, and the competing agendas of those in positions of power.

CHAPTER 9: CONCLUSION

In this concluding chapter I will provide an overview of the central findings from my analytic chapters, suggesting avenues for future research. I will discuss the implications of my findings, particularly for developing communication strategies aimed at promoting greater support within the community for action on ACC. I will also discuss the broader concept of ACC as an issue of human values, commenting on my own experiences of the ACC debate throughout the duration of my candidature. It is my hope that my concluding comments can highlight the benefits of using a mixed methods approach for eliciting a range of data that can help inform our understanding of some of the dynamics of this issue within multiple social domains.

In chapter three I presented quantitative research in the form of an online survey to assess university students' views about ACC. The evidence from the UK suggesting that business schools may not be developing the epistemological bases for supporting, implementing and operating business strategies to address ACC (Goodall, 2008; Patenaude, 2010), informed the rationale for this study. Here I investigated university students' views about the anthropogenic origins of climate change, specifically comparing the views of students enrolled in business degrees with students enrolled in other educational domains, including science, arts, social science and environmental science. I hypothesized that business students would be more sceptical of the role played by humans in climate change than other students. Results suggested that despite overall high levels of acceptance of the human role in climate change, business students, and male

business students in particular, are significantly more likely than their counterparts in the arts, social sciences, sciences, and environmental sciences, to reject the human origins of climate change and the scientific evidence for climate change. The increasingly important role of business and industry in developing and implementing action to mitigate the effects of ACC makes this a worrying trend. However the modest sample consisting of data from only two universities limits the degree to which these results can be generalized. Future research in this area could take a more comprehensive approach, investigating a number of universities; interviewing students and faculty members for their views on the issue; exploring the views of members of the business world more generally, including a measure of political affiliation; and assessing the efficacy and popularity of ACC adaptation and mitigation programs that have so far been developed within some business schools around the globe (e.g. Issa et al., 2014). It is expected that further exploration of this phenomenon may produce practical outcomes for engaging students and members of the business community more generally, to view action to reduce GHG emissions as 'good business sense'.

Chapter four marked the beginning of the qualitative chapters of my thesis, where I extended upon the findings presented in chapter three by analysing qualitative data collected simultaneously with the survey data presented in chapter three. This study again compared student groups, with an analytic focus on ideological differences along the Left-Centre-Right political spectrum (Sunderlin, 2003) in the students' formulations of the ACC problem. Using thematic analysis (Braun & Clarke, 2006), and rhetorical analysis (Billig, 1987), important ideological differences were identified between students

enrolled in the faculties of Sciences, Professions, and Humanities and Social Sciences (HUMSS). The science students focused primarily on the scientific facts about ACC, in particular that it is both a natural and human induced phenomenon, thereby demonstrating less politically motivated views about ACC than the other two student groups. The HUMSS students demonstrated a strong critique of consumer capitalism, describing it as both the cause of ACC and the main obstacle to addressing the problem. In this sense the HUMSS students demonstrated views about ACC that critique and denounce the unfettered capitalist agenda. The students enrolled in the Professions provided descriptions focused on solutions to the ACC problem, primarily identifying the important role played by government, business and industry. Such comments are reflective of a managerial or centred political position. Whilst these differences appeared in the students' comments, important similarities were identified across the majority of the data corpus: the students were highly critical of capitalism and cited it as the primary cause of ACC. The ideological paradigms identified here raise opportunities for tailoring communication strategies about ACC.

In chapter 5, I provided an overview of the theoretical and methodological considerations that informed and directed my three social constructionist analytic chapters. In particular I focused on the theories most relevant to the public understanding of science, including Social Representations Theory, the Information Deficit Model of science communication, Discursive Psychology, Rhetorical Psychology, and Critical Discourse Analysis. This methodological and theoretical explication detailed the rationale for the following three chapters.

Chapter six focused on the voices of ACC contrarianism that have emerged from within the scientific establishment itself, exploring the challenges posed when those within the scientific establishment publicly undermine scientific theories of political, social and environmental significance. I conducted a media analysis to explore the modes of communication used by a number of Australian scientists who regularly speak publicly on the issue of ACC. In addition I included interviews with Professor Ian Plimer – a geologist and well-known ACC contrarian, and Professor Barry Brook, a leading figure in Australian ACC research and communication.

The analysis demonstrates how the two competing sides of the debate draw from different constructions of science to argue their positions on ACC in the public sphere. In particular, the consensus scientists adhere to a reified view of science and communicate using a one-way flow of information, much in line with the deficit model of science communication. They construct the public as largely deficient in knowledge, and make extensive use of facts and figures to relay information about ACC. In contrast, the contrarian scientists communicate using an interactive style, using inclusive and colloquial language to elevate common sense knowledge, intuitive feelings and the purported political and economic interests of the average citizen. This study demonstrates that competing constructions of science are not simply abstract ideas but are used as rhetorical resources deployed in concrete ways to construct problematic identities for scientists, the public, and science itself.

I argued that it is precisely this interactive discursive style that positions contrarian discourses as not only plausible, but also appealing to the general

public. By better understanding the elements of discursive style that engage audiences, we are better equipped to facilitate the production of positive social engagement with the scientific issues that pose threats to our environment, and call our modern lifestyles, as reliant as they are upon the energy produced through the burning of fossil fuels, into question. Plimer and the contrarians therefore provide us with a stylistic standard for communicating science to the public. If the use of inclusive language, the recognition of lay forms of knowledge, and repositioning an ethical or moral position in relation to ACC, can be used to garner support for the contrarian view, then it can likewise be redirected to promote greater support for political action designed to mitigate climate change.

In chapter 7 I drew on both the denial of ideology and the empiricist and contingent repertoires to show how Plimer and Brook construct the ideological bases of the ACC debate, whilst denying their own perspectives as ideological. There is a strong separation of science and ideology in both scientists' discourse – the 'other' is ideological, but they are 'scientific'. Ideology in this way is constructed as flawed, biased, a belief system; contrasted against science which is factual, objective, and representative of 'truth'. Plimer argues that whilst the debate in the public sphere is driven by ideological imperatives, the real debate about the science is being ignored. In contrast, Brook's distancing of his views from the deep green environmental position is an attempt to inoculate ACC science against claims of ideological bias and position it as credible science. Both scientists position science as 'above' or 'outside' of ideology. However, part of the problem with ACC policy is that the economic rationalism with which such policy discourses have engaged in Australia, deny the antagonism and genuine debate

that can arise from competing ideological positions about what is the morally appropriate course of action. What is considered 'moral' in the current debate is considered entirely in technocratic, economic terms. Whilst science as a framework can provide the details necessary for communicating ACC, it cannot provide the broader, overarching narrative that explains why action on ACC is so important. For this, we need a narrative that can do justice to the moral imperatives of action on ACC, which can come in the form of ideological discourse. Yet ideological discourses have traditionally been avoided because of the supposed 'bias' inherent in ideology. Indeed, ideological thinking is a pervasive rhetorical strategy used to undermine one's opponent in this debate. How to reconcile this disjuncture, and present a narrative that can provide a strong moral argument for action on ACC, is an area worthy of extensive future research.

In the ACC debate, the dilemma posed by post-normal science (Funtowicz & Ravetz, 1993) is most salient. Whilst science can be viewed as a discourse that has powerful rhetorical effects, it is nonetheless a method – the most pervasive and comprehensive method – for thinking in a way that requires a consideration of observable 'facts'; that requires a very thorough approach to considering the facts in order to understand the world, and thereby change it. In this sense, science is much more than just a discourse. However the language it draws upon is fallible and open to critique. Thus, the communication of climate science is thwarted by the need to communicate the facts, whilst simultaneously being beholden to the same types of linguistic deconstruction that post modernism applies to all areas of contemporary and historical discourse. In the era of post

normal science (Funtowicz & Ravetz, 1993), what is it that we understand science to be? What status or authority can we expect science to hold? This dilemma is embodied by ACC, and provides an effective framework for understanding why this issue has become so contentious, and so difficult to address through traditional scientific discourse.

Chapter 8 extended upon the ideological foundations of the ACC problem by exploring the debate around the appropriateness of economic action aimed at reducing GHG emissions. Here I explored the discursive evolution of political rhetoric and subsequent media reporting of the CPRS and carbon price in Australia, specifically focusing on how the moral tension arising out of seemingly incongruent ideological positions – the economy and the environment – is attended to (or not) in the discursive constructions of this issue. Again drawing on Discursive Psychology, Rhetorical Psychology, and the notion of Ideological Dilemmas, I explored the ways in which the moral underpinnings of maintaining a strong economy, especially in the face of the GFC, are pitted against moral imperatives to take action on ACC. In particular I highlighted how former Prime Minister Rudd's framings of ACC as "the great moral challenge of our generation" were superseded as the GFC unfolded, to rhetoric promoting 'balance' between the economy and the environment. Over time, the moral narrative about ACC was abandoned, and by the time the carbon price was implemented in 2012, the environment is virtually absent from climate policy discourse. I argued that Australian political leaders' discourse has failed to construct a comprehensive ACC discourse that contains the seeds of both the environment and the economy in a new moral narrative that impresses the urgency to act. Without a coherent

and strong narrative that includes an environmental component, the public are not provided with the moral imperatives of acting on ACC through market-based responses. Political leaders can easily undermine market-based responses to ACC by representing them as threats to both national and individual interests.

My own experience throughout the writing of this thesis has surprised me. Choosing a topic such as ACC required me to immerse myself in the discourses, the narratives, and the rhetoric of the most influential Australian protagonists in this global debate. I have experienced, to some degree, all of the interpretative communities identified by Lieserowitz et al. (2011). I have been concerned and cautious, doubtful and dismissive, alarmed and (like most PhD candidates, I suspect) disengaged. Moreover, the social constructionist perspective I have articulated throughout this thesis has only highlighted the contingent nature of my knowledge. These chapters represent my understanding of this issue, as relative as that may be. As the Satre quote at the beginning of this thesis attests, I cannot 'prove' that ACC is real, but I have attempted to make reasonable hypotheses that take the facts into account, as a way of unifying my own as well as our collective knowledge. What has unfolded is an attempt to develop my own understanding of this complex issue, an attempt to make sense of ACC through a fluctuating and unpredictable political, social, and climatic landscape.

This has only highlighted to me the complex and difficult phenomenon of ACC, and why so many people have switched off, or even failed to engage with it at all. Members of the public are not expected to understand science in the way that scientists understand science, yet some understanding of the science that

informs this issue is crucial from a policy perspective. However, ACC is fundamentally an issue of what and how we value, whether that be the natural environment, the economic status quo, or the authoritative status of science. But without a consensus on values, indeed in an increasingly diverse world, the idea of gaining any kind of consensus on the ACC problem appears unrealistic. However, that does not mean that significant change in our energy-producing practices is not possible.

The ideological forces of capitalism, environmentalism, and even scientific knowledge, crashing up against each other, forcing social and paradigm change, can be seen in the ACC problem. Friction between ideological structures is created as ACC challenges the dominant capitalist paradigm. Such clashes lead to contradictions in logic and perception in social life, which give rise to dilemmas within current structural and institutional parameters (Billig et al, 1988). And yet in political realities, attending to the contradictions arising out of opposing ideological positions is a critical part of enacting and managing policy that must deliver tangible outcomes. In the case of ACC, these policy outcomes require structural changes to current practice; they require transitioning not only to new ways of thinking, but to new ideological practices that must be underpinned by robust moral narratives in order to engage the public. A turn to the technocratic approach to ACC politics, as evidenced in chapter 7, will only serve to undermine action on ACC and, according to Mouffe (2009), democracy in general. The promise of third way politics where science is used unproblematically to inform policy remains unfulfilled. Indeed, the ACC challenge highlights just how important political 'passions' are in delivering challenging policy. Compounding

this, the challenges posed by ACC are not well understood in our collective mind, such that many of us may be unaware of what is at stake – of precisely what it is we should feel passionate about. The challenge of ACC, the efforts and changes required to deal with this issue span all areas of modern life, from political, economic, business and industry, through to social and lifestyle factors. This challenge is forcing a changing of times, and our moral landscape must be redrawn if we are to transition to a future that can accommodate us.

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Appendix A. *Survey information letter and online questionnaire*

Accessed via:

http://www.psychology.adelaide.edu.au/expts/climatechange.html

Information email:

Community Perceptions of Climate Change Study

Thank you for your interest in this study looking at social perceptions of climate change.

About this Study: I would like to invite you to participate in a study that investigates community perceptions of climate change. The purpose of the study is to gain insight into the variety and prevalence of different attitudes towards climate change. The study is a part of my PhD research, supervised by Professor Martha Augoustinos and Dr Gail Moloney.

Participation: You are asked to complete an online self-report questionnaire expected to take approximately 15 - 20 minutes.
There are no foreseeable discomforts or risks from involvement in this study.
The questionnaire is completely confidential and your identity will remain anonymous.
If you would like feedback on the study or have any questions or concerns about your involvement in the study, you may contact me, or my supervisors using the details provided below. If you choose to take part but change your mind once you have started, you can stop at any time.

Researcher: Peta Callaghan
peta.callaghan@adelaide.edu.au, Ph. 0437 47 60 53

Supervisor: Prof. Martha Augoustinos (The University of Adelaide)
martha.augoustinos@adelaide.edu.au, Ph. 08 8303 4627

External Supervisor: Dr Gail Moloney (Southern Cross University)

gail.moloney@scu.edu.au, Ph. (02) 6659 3191

Ethics of Study: The University of Adelaide Human Research Ethics Committee has approved the ethical aspects of this study. The Approval Number is 10/85. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through:
The Psychology Research Ethics Committee, Dr. Paul DelFabbro
paul.delfabbro@adelaide.edu.au, Ph.08 8303 4936

Consent: I acknowledge that I have read and understood the information provided above.
I understand that:

- I am free to withdraw from the project at any time.
- No identifying information other than name will be requested, and this will be kept separately from survey responses for the purpose of matching parental/guardian and student consent forms with appropriate data.
- It is not expected that there will be any adverse effects of participation in this research. However, information has been provided to me on the Information sheet regarding where to seek further support should any issues arise.

If you agree to these terms and wish to participate in this survey please press the 'Agree' button.

Online questionnaire:

COMMUNITY PERCEPTIONS OF CLIMATE CHANGE

Please answer the following questions.
We would like you to give us your own personal opinions about climate change in response to a series of statements. The statements are hypothetical and should not be taken as the views of the University of Adelaide. Please indicate the extent to which you agree with each statement by selecting the alternative that best represents your opinion.

1. Climate change poses a serious threat to humanity.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

2. The climate system is too complex for us to properly know what the human impact is on climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

3. The scientists working on climate change understand the issue very well.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

4. Climate change sceptics receive too much media attention.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

5. The scientific method is rigorous and precise.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

6. Climate change is happening, but humans are not the main drivers of it.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

7. Climate change is just a natural fluctuation in earth's temperatures.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

8. I do not believe climate change is really happening.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

9. We can all do our bit to reduce the effects of climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

10. Humans are part of the ecosystem. Whatever we do to it is ok.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

11. The media exaggerates the severity of climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

12. There is nothing we can do about climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

13. World leaders are doing enough to mitigate climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

14. I worry about climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

15. I understand the science of climate change well

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

16. Media reporters do a good job of explaining the science on climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

17. If I come across information on climate change I will tend to look at it.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

18. Radical changes to society are needed to tackle climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

19. Claims that human activities are changing the climate are exaggerated.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

20. Recent droughts and floods in this country are due to climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

21. Climate change is inevitable because of the way modern society works.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

22. There is too much conflicting evidence about climate change to know whether it is actually happening.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

23. I feel a moral duty to do something about climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

24. Extreme weather events are not increasing, there is just more reporting of it in the media these days.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

25. The environment will balance itself out.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

26. Climate change sceptics are receiving too much support from the oil and coal industries.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

27. Experts are agreed that climate change is a real problem.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

28. Industry and business should be doing more to tackle climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

29. We don't have to worry about climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

30. The scientific method is to be trusted.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

31. Climate change is a consequence of modern life.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

32. Nothing I do makes any difference to climate change one way or the other.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

33. People should be made to reduce their energy consumption if it reduces climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

34. Climate change is happening, humans are the main drivers of it, but the projected outcomes are exaggerated.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

35. I would only do my bit to reduce climate change if everyone else did as well.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

36. I am uncertain about whether climate change is really happening.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

37. The government is not doing enough to tackle climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

38. Nothing I do on a daily basis contributes to the problem of climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

39. I tend to consider information about climate change to be irrelevant to me.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

40. It is already too late to do anything about climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

41. Leaving the lights on in my home adds to climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

42. People are too selfish to do anything about climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

43. For the most part, the government honestly wants to reduce climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

44. Pollution from industry is the main cause of climate change.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

45. The evidence for climate change is unreliable.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

46. Human activities have no significant impact on global temperatures.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

47. Climate change will improve Australia's weather.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

48. The effects of climate change are likely to be catastrophic.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

49. It is too early to say whether climate change is really a problem.

Strongly disagree ○ ○ ○ ○ ○ ○ ○ Strongly agree

50. Please feel free to write any additional comments in the space below

---

51. By how many more degrees Celsius do you believe the world's average temperature could rise before the situation becomes dangerous?

- ○ 1-2ºC
- ○ 3-4ºC
- ○ 5-6ºC
- ○ 7-8ºC
- ○ >8ºC
- ○ Don't know

52. Ross Garnaut's Climate Change Review recommended that the Australian Government should support an international agreement aiming for a concentration of carbon dioxide and other greenhouse gases in the atmosphere of 450 parts per million. Do you think that is:

- ○ Too high
- ○ Correct
- ○ Too low
- ○ Don't know

53. Enter your age (in whole years as from last birthday)

54. What is your gender?

- ○ Male
- ○ Female

55. What degree are you enrolled in?

56. What faculty are you enrolled in?

57. What Institution are you enrolled in?

- ○ SCU
- ○ Adelaide Uni

58. Number of full time years of study completed for this degree (including this year)

59. What is your current employment status?

- ☐ Employed full-time plus study
- ☐ Employed part-time or casual plus study
- ☐ Student only

Once you are happy with the response you have made to each of the items click the box at the bottom of the questionnaire to say you have finished entering your answers.

Appendix B. *Items used by Whitmarsh (2008) for uncertainty scale*

Climate change is something that frightens me

The effects of climate change are likely to be catastrophic

Claims that human activities are changing the climate are exaggerated

The evidence for climate change is unreliable

I do not believe climate change is a real problem

The media is often too alarmist about issues like climate change

It is too early to say whether climate change is really a problem

Appendix C. *Correlation Matrix for confirmatory factor analysis*

Correlations - Spearman

			Q1	Q3	Q5	Q7	Q9	Q12	Q14	Q15	Q18	Q19	Q23	Q28	Q29	Q30	Q32	Q37	Q38	Q41	Q46
Spearman's rho	Q1	Correlation Coefficient	1.000	.412**	.361**	-.497**	.578**	-.539**	.675**	.201**	.607**	-.652**	.653**	.685**	-.685**	.365**	-.482**	.640**	-.523**	.520**	-.595**
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Q3	Correlation Coefficient	.412**	1.000	.507**	-.385**	.338**	-.305**	.314**	.186**	.311**	-.416**	.353**	.431**	-.378**	.481**	-.270**	.397**	-.273**	.353**	-.422**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Q5	Correlation Coefficient	.361**	.507**	1.000	-.280**	.230**	-.217**	.284**	.277**	.268**	-.354**	.300**	.312**	-.296**	.705**	-.142**	.332**	-.182**	.247**	-.325**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.003	.000	.000	.000	.000
		N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Q7	Correlation Coefficient	-.497**	-.385**	-.280**	1.000	-.420**	.525**	-.399**	-.059	-.376**	.607**	-.414**	-.505**	.459**	-.313**	.372**	-.445**	.353**	-.376**	.585**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.219	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Correlation Coefficient	.578**	.338**	.230**	-.420**	1.000	-.612**	.528**	.059	.456**	-.562**	.627**	.615**	-.558**	.225**	-.579**	.476**	-.534**	.640**	-.562**
Q9	Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000	.216	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Correlation Coefficient	-.539**	-.305**	-.217**	.525**	-.612**	1.000	-.534**	-.068	-.478**	.631**	-.614**	-.643**	.626**	-.254**	.592**	-.559**	.518**	-.554**	.650**
Q12	Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000	.153	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Correlation Coefficient	.675**	.314**	.284**	-.399**	.528**	-.534**	1.000	.147**	.576**	-.582**	.725**	.666**	-.686**	.293**	-.479**	.570**	-.527**	.512**	-.543**
Q14	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.	.002	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Correlation Coefficient	.201**	.186**	.277**	-.059	.059	-.068	.147**	1.000	.182**	-.109*	.129**	.131**	-.115*	.323**	-.043	.219**	-.080	.023	-.154**
Q15	Sig. (2-tailed)	.000	.000	.000	.219	.216	.153	.002	.	.000	.022	.007	.006	.016	.000	.363	.000	.092	.628	.001
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
Q18	Correlation Coefficient	.607**	.311**	.268**	-.376**	.456**	-.478**	.576**	.182**	1.000	-.588**	.606**	.648**	-.567**	.283**	-.383**	.591**	-.449**	.510**	-.555**

	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Correlation Coefficient	-.652**	-.416**	-.354**	.607**	-.562**	.631**	-.582**	-.109*	-.588**	1.000	-.625**	-.681**	.644**	-.412**	.496**	-.605**	.525**	-.537**	.677**
Q19	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.022	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Correlation Coefficient	.653**	.353**	.300**	-.414**	.627**	-.614**	.725**	.129**	.606**	-.625**	1.000	.721**	-.707**	.313**	-.592**	.619**	-.594**	.615**	-.593**
Q23	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.007	.000	.000	.	.000	.000	.000	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Correlation Coefficient	.685**	.431**	.312**	-.505**	.615**	-.643**	.666**	.131**	.648**	-.681**	.721**	1.000	-.782**	.370**	-.519**	.737**	-.537**	.567**	-.683**
Q28	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.006	.000	.000	.000	.	.000	.000	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
	Correlation Coefficient	-.685**	-.378**	-.296**	.459**	-.558**	.626**	-.686**	-.115*	-.567**	.644**	-.707**	-.782**	1.000	-.331**	.583**	-.628**	.601**	-.507**	.655**
Q29	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.016	.000	.000	.000	.000	.	.000	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442

Q30	Correlation Coefficient	.365**	.481**	.705**	-.313**	.225**	-.254**	.293**	.323**	.283**	-.412**	.313**	.370**	-.331**	1.000	-.175**	.392**	-.243**	.260**	-.382**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.	.000	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
Q32	Correlation Coefficient	-.482**	-.270**	-.142**	.372**	-.579**	.592**	-.479**	-.043	-.383**	.496**	-.592**	-.519**	.583**	-.175**	1.000	-.424**	.585**	-.551**	.513**
	Sig. (2-tailed)	.000	.000	.003	.000	.000	.000	.000	.363	.000	.000	.000	.000	.000	.000	.	.000	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
Q37	Correlation Coefficient	.640**	.397**	.332**	-.445**	.476**	-.559**	.570**	.219**	.591**	-.605**	.619**	.737**	-.628**	.392**	-.424**	1.000	-.422**	.442**	-.596**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.	.000	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
Q38	Correlation Coefficient	-.523**	-.273**	-.182**	.353**	-.534**	.518**	-.527**	-.080	-.449**	.525**	-.594**	-.537**	.601**	-.243**	.585**	-.422**	1.000	-.558**	.546**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.092	.000	.000	.000	.000	.000	.000	.000	.000	.	.000	.000
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
Q41	Correlation Coefficient	.520**	.353**	.247**	-.376**	.640**	-.554**	.512**	.023	.510**	-.537**	.615**	.567**	-.507**	.260**	-.551**	.442**	-.558**	1.000	-.538**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.628	.000	.000	.000	.000	.000	.000	.000	.000	.000	.	.000

	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
Q46	Correlation Coefficient	-.595**	-.422**	-.325**	.585**	-.562**	.650**	-.543**	-.154**	-.555**	.677**	-.593**	-.683**	.655**	-.382**	.513**	-.596**	.546**	-.538**	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.
	N	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix D. *Faculty Organisational Structure for SCU*

Faculty	**Schools/departments**
Arts and sciences	Arts and social sciences Education Environmental science and management (including marine science centre) College of indigenous Australian people (Gnibi) Health and human sciences
Business and Law	Business Law and justice Tourism and hospitality management

Appendix E. *Faculty Organisational Structure for Adelaide University and SCU Conversion*

	University of Adelaide	**SCU**
Faculty	**Schools/departments**	**Schools/departments**
Science	Agriculture, food and wine Chemistry and physics Earth and environmental science Molecular and biomedical science Animal and veterinary science	Environmental science and management (including marine science centre) Plant conservation and genetics Geo-science
HUMSS	Music History and Politics Humanities Social sciences	Arts and social sciences College of Indigenous Australian people (Gnibi)
Professions	Architecture, landscape architecture and urban design Business Economics Education Law	Business Law and justice Tourism, hospitality and management Education
Health sciences	Dentistry Medical sciences Medicine Nursing Paediatrics and reproductive health Population health and clinical practice Psychology	Health and human science (including psychology and nursing) Rural health Phytochemistry and pharmacology
ECMS	Petroleum Chemical engineering Civil, environmental and mining engineering Computer science Entrepreneurship, commercialization and innovation Mathematical science Mechanical engineering	Information technology