

**School of Psychology and Speech Pathology
Department of Health Sciences**

The Social and Psychological Functions of Responses to Climate Change

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**This thesis is presented for the Degree of
Doctor of Philosophy
of
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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signature: 

Date: 19th of June 2013

Abstract

Climate change is the most pressing environmental threat faced by humans, yet responses – individually, collectively, and politically – have frequently lacked urgency. Why a threat of such magnitude should meet with inaction is a topic of growing conjecture among social science researchers. Social psychologists in particular have increasingly focused on the possible psychological mechanisms underlying denial and scepticism of anthropogenic climate change. I argue that *all* responses to climate change can be considered rational and adaptive, because these responses (be they opinions, emotions, or behaviour) afford the individual functional value.

In this thesis, I examine what underlies the discordance between climate change threat and response by applying a functional analysis to responses associated with climate change. This analysis is theoretically guided by a motivated social cognition approach. I use the term to refer to theories and perspectives that assume that people's values, attitudes, and beliefs have motivational underpinnings, and satisfy certain psychological and social needs. These motivations affect reasoning and belief and attitude formation by biasing how information is processed. The approach incorporates accounts such as motivated reasoning, interpersonal and social identity theories, social and system-level legitimacy theories, moral disengagement, and Terror Management Theory. Drawing upon these accounts, I construct a framework detailing the various goals and needs that responses to climate change might function to fulfil. Five main functional areas are identified: the reduction of internal psychological discomfort, self-image and self-esteem maintenance, the maximisation of positive affect, social-system justification, and effort reduction. To test aspects of the framework, I conducted two online national surveys: one in July-August 2010 ($N = 5036$), the other in July-August 2011 ($N = 5030$). A total of 1355 respondents completed both surveys. Respondents were asked about their beliefs, opinions, attitudes, and behaviours relevant to climate change, as well as individual difference measures, their levels of support for climate change policy, their emotional responses, and personal and image associations with climate change. In addition, four workshops (total $N = 52$) were undertaken in December 2010 and March 2011. These workshops were designed to elicit implicit associations and attendant emotions associated with climate change imagery drawn from the national surveys.

Analyses of national survey data revealed several key findings:

- The scientific consensus that climate change is happening, and is mostly caused by human activity, is not reflected in the opinions of the broader community;
- While opinions about the causes of climate change are important in understanding pro-environmental behaviour, considerable variation in behaviour exists within opinion-types;
- Negative high-arousal emotions are linked to climate change acceptance and pro-environmental behaviour;
- Levels of moral engagement are central to action on climate change, and mediate the link between opinions and behaviour;
- Those sceptical of climate change still consider big-polluting countries and multi-national corporations as partly responsible for both causing and responding to it;
- Estimates about what the Australian community thinks about climate change differ markedly from actual opinions, and nearly everybody overestimates the levels of 'climate change denial' in the Australian community;
- Underlying ideological values associated with system justification explain relationships with climate change responses above and beyond political preferences.

Analyses of both the survey and workshop data revealed that politicians dominate *who* we associate with climate change, while scientists and people close to us are less commonly associated with climate change. Images commonly associated with climate change were broad and remote, although national-level impacts of climate change were salient for many people.

Together, the results support the idea that responses function to fulfil different needs and goals for individuals, such as a need for social support, the negation of guilt and existential anxiety, maintaining a coherent self-identity, feeling morally adequate, and seeing prevailing social and economic systems as just. I conclude the thesis by modelling the psychological processes involved in fulfilling these needs and goals, and the expressions through which they might be observed with respect to responses to climate change. In particular, the model articulates how the implicit associations of individuals are shaped by societal, group, and intra-individual forces, and by the biased searching of sets of rules and

beliefs. A series of recommendations for climate communicators is provided, including framing climate change in such a way as to appeal to competing needs and goals concurrently, alongside an overview of future research directions, and an explanation of why I probably won't ride my bicycle to work tomorrow.

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CHAPTER 1. INTRODUCTION

"We are in an extremely precarious and urgent situation that compels immediate action"

**Professor
David Karoly**

School of Earth Sciences, University of Melbourne
Intergovernmental Panel on Climate Change lead author
Canberra, Monday June 16, 2008

Climate change is the most pressing environmental threat humans face. The Intergovernmental Panel on Climate Change concluded in its Fourth Assessment Report that "warming of the climate system is now unequivocal" (IPCC, 2007, p. 5), and that observed increases in average global temperatures are "very likely due to the observed increase in anthropogenic greenhouse gas concentrations" (p. 10). Despite ongoing scientific consensus and mounting evidence that human-induced climate change threatens the very existence of our societies, the response – individually, collectively, and politically – has frequently lacked urgency. Why a threat of such magnitude should meet with inaction is a topic of growing conjecture in many forums, not least among social scientists.

In this thesis I examine the discordance between climate change threat and our individual responses to climate change by applying a functional analysis to the opinions, attitudes, beliefs, emotions, associations, and behaviours (which collectively I term 'responses') that are linked to the concept of climate change in Australia. The basic premise of my analysis is that *all* responses to climate change afford the individual functional value, be it psychological value, social value, or a mixture of the two. This first chapter commences with an overview of social psychological research in the climate change domain, including the growing interest in climate change 'maladaptation and denial' and the limitations of this focus. The functional approach is then briefly introduced, followed by a statement of aims and an outline of the remainder of the thesis.

1.1 Psychological Investigations into Climate Change Responses

To date, the bulk of social psychological inquiry into human responses to climate change has focused on individual-level behaviour and attitudes toward climate change, despite the potential contribution to understanding that a vast range of disciplinary subfields in psychology promise (Swim et al., 2009, 2011; Uzzell, 2008). Behavioural research has typically investigated climate change mitigation efforts at the household level, such as reduced energy usage, alternative transportation options, reduced water consumption, and barriers to such behavioural changes (Kollmuss & Agyeman, 2002). The effectiveness of social norms, prompts, and educational material has received wide attention, with evidence that interventions making use of these elements can produce at least short-term behaviour change in some areas (e.g., Goldstein, Cialdini, & Griskevicius, 2008; Parnell, 2005; Steg & Vlek, 2009). Further work has identified a range of factors that contribute moderately to support for alternative technologies, intended behaviours, and willingness to pay for mitigation options, including heightened perceptions of ensuing harm from climate change, liberal political preferences, institutional trust, and access to financial resources (Gifford, Kormos, & McIntyre, 2011; Lee & Cameron, 2008; Leiserowitz, Maibach, Roser-Renouf, & Hmielowski, 2011; Leiserowitz, 2006; Viscusi & Zeckhauser, 2006).

Traditional behavioural research has shed useful light on a range of motivators and barriers toward attitudes and behaviours, but (like all research) it has its limitations. A phenomenon that has long plagued social psychological research is the modest correlation between expressed attitudes and actual behaviour (Gifford et al., 2011; Sheeran, 2002). In research focusing on climate change, the relationships between knowledge and attitudes, attitudes and intentions, intentions and observed behaviour, and behaviour and environmental impact have all been criticised for their weakness (Gifford et al., 2011; Kahan et al., 2012; Kollmuss & Agyeman, 2002; Whitmarsh, 2009). These weak relationships call into question the efficacy of research and change programs that simply target increased awareness and/or attitude change. Additionally, the often over-simplified, static, or superficial behavioural indicators designed to measure responses to climate change provide a distorted picture of the true range of responses (Whitmarsh, 2009). Research conclusions are further limited by a dearth of longitudinal studies of changes in perceptions and attitudes on subsequent behaviour, and theoretical ambiguity about the precise nature of environmental concern and beliefs (see Stern, 1992, for an overview).

Given that professed knowledge, attitudes, and intentions are often a poor predictor of behaviour, investigations into the roots of how people connect with their physical environment, and how their values and beliefs relevant to this connection are shaped, is receiving greater attention. For example, research indicates that individuals construct attitudes to new or emergent discoveries about phenomena by evaluating the consequences of such discoveries for their pre-existing values and beliefs (Stern, Kalof, & Dietz, 1995). These pre-existing values and beliefs drive the formation of new attitudes because of an individual's desire for consistency;¹ and it is much easier to form a new attitude that accords with the beliefs we hold already, than it is to restructure our beliefs to align with an attitude undergoing formation. Such approaches address how underlying beliefs and values might affect attitudes and behaviours relating to the natural environment. One such approach, the Value-Belief-Norm theory of environmentalism (Stern, Dietz, & Abel, 1999; Stern, 2000), conceives of environmental behaviour as the outcome of a causal chain starting from values (categorised as either *biospheric*, *egoistic*, or *altruistic*), which inform beliefs about general conditions in the biophysical environment, which in turn inform personal norms for pro-environmental action. These values, beliefs, and norms all influence one's behaviour (Stern, 2000). As an example, if a person intrinsically values species other than humans (a *biospheric* value), they are likely to be concerned about conditions that threaten these species. This person will in turn form attitudes consistent with the protection of the valued object (in this case animals, plants, and so on), which will increase the likelihood of engaging in behaviour consistent with the protection of the natural environment.

Social Amplification of Risk theory (Kasperson, Renn, Slovic, & Brown, 1988) goes further by attempting to incorporate individual psychological perceptions of risk into a broader social and cultural framework. With specific reference to climate change, Kasperson et al. propose that scientific information regarding climate change risks intermingles with cultural, social, and institutional processes, in so doing amplifying or attenuating community perceptions of risk. 'Social amplifiers' include scientists, the media, cultural groups and interpersonal networks. Amplification occurs through the filtering of signals accompanying the portrayal of an event, and the cognitive processing of risk information (such as using a cognitive heuristic to draw inferences). People attach social values to

¹ The assumption that individuals always strive for consistency in their beliefs, values, and attitudes will be revisited in the next chapter.

incoming risk information, drawing on cultural and peer groups to interpret and validate signals (e.g. Macneil & Sherif, 1976). On the basis of this interpretation and validation process, people form behavioural intentions and engage in group or individual actions to respond to the risk in question. Behavioural responses can lead to secondary impacts, such as the formation of enduring mental attitudes or images (such as anti-technology attitudes). These in turn can lead to third-order impacts – that is, impacts may ripple or spread to other parties, distant locations, or future generations.

Approaches such as Value-Belief-Norm and Social Amplification are extremely useful in explaining how behaviours are influenced by constructs more stable and enduring than attitudes, and how social factors can exert influence. But they do not fully account for how and why beliefs are constructed in the first place, and what happens when these beliefs are challenged. For instance, advocates of Social Amplification theory have trouble accounting for how and why one person, or group of people, is more receptive to information from one set of social amplifiers, while others are more receptive to different social amplifiers, as well as how and why different people draw different conclusions from the same social amplifiers (or the same people draw different conclusions on different occasions!). There is also an implicit assumption in Value-Belief-Norm theory that people's underlying orientation toward the environment is static; it does not account for the possibility that the way we engage with the environment (expressed through our environmental values) might be malleable, post-hoc constructions discursively employed to provide support for the behaviours we engage in (Verweij et al., 2006).

Recent research suggests that people's views on climate change itself are not necessarily deeply seated at all, but are influenced by superficial, transient factors such as daily fluctuations in temperature (Li, Johnson, & Zaval, 2011). Evidence that community views on climate change and its causes can shift quite dramatically in relatively brief periods (Leviston, Leitch, Greenhill, Leonard, & Walker, 2011) lends further support to the notion that climate change views are malleable.

So we are left with an apparent paradox; views about climate change appear malleable, with evidence that they depend on superficial influences, while counter-evidence suggests that deeply-held, deep-seated beliefs about how the world works drive the formation of views about the environment. In attempting to address why attitudes about the role of human activity in climate change can fluctuate with relative rapidity, when deep-seated

values and beliefs are purported to underlie such attitudes, a new wave of climate change research has emerged: one that focuses on denial, scepticism, and maladaptation.

1.1.1 Research on Denial, Scepticism and Maladaptation

The amount of scientific literature available on climate change has risen steadily since the mid 1970s. The last decade, and especially the last five years, has witnessed an even sharper rise in research focusing on climate change denial and scepticism (as illustrated in Figure 1).² This rise has been at least in part a response to a real or suspected decline of acceptance that climate change is primarily driven by human activity. There is certainly some recent evidence to suggest such a decline (see Leviston et al., 2011 for a review of acceptance levels in Australia, the US, and New Zealand). This avenue of research inquiry is characterised by a focus on (usually active) rejection, opposition, or resistance by individuals to concepts surrounding the nature and threat of climate change, and the mechanisms that might account for this.

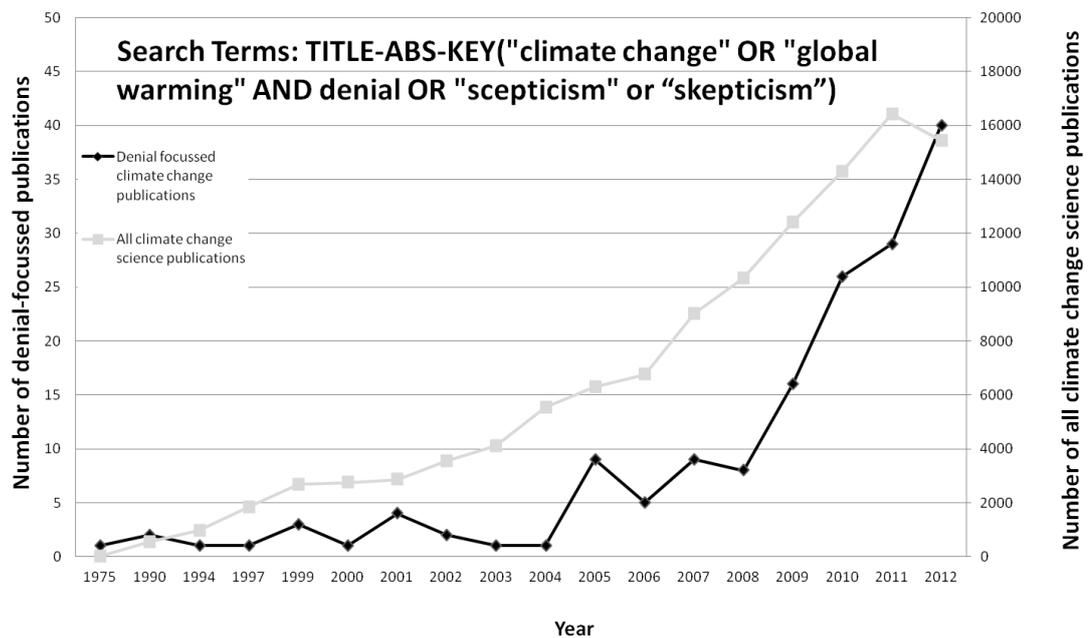


Figure 1. Scopus search results for number of research articles on climate change scepticism or denial, 1975-2012.

² Note that in discourse surrounding climate change, ‘scepticism’ is almost invariably used to refer to the failure to accept that climate change is primarily caused by human activity, rather than its more traditional sense of denoting a disposition to doubt or challenge claims that lack sufficient scientific evidence.

'Climate change denial' is often framed in literal terms (Swim et al., 2009), but has also been applied in a broadly psychodynamic sense (Maiteny, 2000; Randall, 2009). These latter accounts posit that psychological mechanisms (such as splitting and projection) underlie people's reluctance to accept, and therefore act on, anthropogenic climate change. There are variations in the usage of these psychological terms though. For instance, 'splitting' has been used in one sense to refer to the process of compartmentalisation of behaviours and attitudes to reduce dissonance arousal (Lertzman, 2010). In another sense, 'splitting' and 'projection' have been used to denote a dual process, whereby we split off climate change information, which embodies our connection with Earth's ecosystems, to prevent losses associated with climate change impacts from entering our conscious awareness, and to project the anticipated losses and consequences of climate change to the distant future (Lertzman, 2010; Randall, 2009).

More nuanced accounts of denial have recently been put forward that account for varying degrees and types of scepticism and inaction (Hobson & Niemeyer, 2012; Norgaard, 2011; Poortinga, Spence, Whitmarsh, Capstick, & Pidgeon, 2011; Whitmarsh, 2011). In her research on the characteristics of climate change denial among Norwegians, Kari Marie Norgaard (2006) invokes Stanley Cohen's tripartite conception of denial: *literal denial*, which involves clear and outright rejection of the facts; *interpretive denial*, where the essentials of the facts are not disputed, but the meaning of the facts is disputed and re-allocated to another class of event; and *implicatory denial*, where there is no dispute about the facts or their meaning, but there is denial of "the psychological, political or moral implications that conventionally follow" (Cohen, 2001, p. 8). Implicatory denial covers justifications, rationalisations, and evasions for failure to act when the actor knows what can be done and has the resources to do something. With relation to climate change, this last type of denial might be observed in those who accept that climate change is human-induced but employ a host of rationalisations and justifications for not acting... 'I don't consume much anyway', 'nothing I can do will make a real difference', 'I already do enough', and so on.

The more general phrase, 'climate change scepticism', has received similar attention to denial. Psychometric measures have been designed (Whitmarsh, 2011), media analyses conducted (Bacon, 2011), and discursive analyses performed (Glasson, 2011), in a bid to understand how and why scepticism is created, fostered, and perpetuated. Denial and scepticism have also been investigated at the institutional level. These analyses expound

how global corporations and think-tanks with vested interests have purposively worked to sow the seeds of scepticism and denial among communities and influence climate policy (Lahsen, 2008; Oreskes & Conway, 2010).

The last and perhaps most pervasive word in this vein of research is ‘maladaptation’. As evidence mounts that at least some impacts of climate change can no longer be avoided, research institutions have shifted from an almost exclusive focus on climate change mitigation to one of adaptation: how human beings can best anticipate and respond to inevitable and predicted shifts in climatic conditions and their associated biophysical impacts (Preston & Stafford-Smith, 2009). Concurrent with this shifting focus has been a rise in the idea of ‘maladaptive’ responses; that is, faulty or inadequate adaptation to the anticipated impacts of climate change.

Maladaptive responses to climate change can be broadly categorised into two types. The first involves concrete, behavioural maladaptation to one’s local environment. Maladaptive responses in this class might include purchasing a residential property in a zone prone to flooding, or failing to have emergency response plans in place in areas vulnerable to natural disasters.³ The second type concerns internal, psychological maladaptations more closely aligned with the scepticism and denial literature discussed above. Responses here might include wishful thinking or fatalism, which might ultimately result in negative emotional consequences such as fear and high anxiety.

Much of the research exploring maladaptive responses of this second type has its roots in the stress and coping literature, such as the application of Protection Motivation Theory (PMT) to explain climate change responses (Grothmann & Patt, 2005). A derivative of the Health Belief Model, PMT (Rogers, 1983) was originally developed to account for people’s behavioural and coping responses to stressful situations, such as threats to one’s health. PMT has two components: a ‘threat or risk appraisal’, whereby the individual assesses the severity of threat to something they value posed by an external stimulus, and their vulnerability to the threat; and a ‘coping appraisal’, which refers to the assessment of self

³ It should be noted that some researchers prefer the term ‘negative adaptation’ (adaptation that fails to reduce lasting vulnerability, increases vulnerability, or adaptations that increase CO₂ emission) over ‘maladaptation’ (Davies & Hossain, 1996; Preston & Stafford-Smith, 2009). Others make a clear delineation between ‘non-adaptation’ and ‘maladaptation’ (Niemeyer, Petts, & Hobson, 2005). These alternatives are in my view preferable as they avoid connotations of dysfunctionality embedded in the term ‘maladaptive’, as I discuss below.

efficacy, response efficacy, and the costs of responding to the threat. One of two general response types – ‘adaptation’ or ‘maladaptation’ – is the outcome of these appraisals.

Hamilton and Kasser (2009) categorise climate change coping strategies into three sequential classes (Table 1). It is worth presenting here as it synthesises much of the climate change literature to date on denial, scepticism, and maladaptation. They suggest that coping mechanisms can be grouped into three types: *Denial strategies*, which are primarily designed to suppress anxiety associated with predictions of climate disruption; *Maladaptive coping strategies*, where climate change is acknowledged but downplayed in order to blunt unpleasant emotions, and; *Adaptive coping strategies*, where climate change is accepted and actions appropriate to this new reality taken. The authors suggest that these three types of responses be considered as sequential stages, in as much as belonging to the third type requires that psychological barriers associated with the first and second types are overcome.

Table 1. Hamilton and Kasser’s (2009) three coping strategies to deal with climate change.

Strategy Type	Manifestations	
Denial Strategies	<ul style="list-style-type: none"> * Denial of the problem * Denial of responsibility * Cognitive dissonance 	<ul style="list-style-type: none"> * Avoidance of information * Bolstering worldviews
Maladaptive Coping Strategies	<ul style="list-style-type: none"> * Management of unpleasant emotions * Reinterpretation of the threat * Threat ‘distancing’ * Wishful thinking 	<ul style="list-style-type: none"> * Diverting attention * Materialism * Blame-shifting * Denial of guilt * Indifference
Adaptive Coping Strategies	<ul style="list-style-type: none"> * Expressing and controlling emotions 	<ul style="list-style-type: none"> * Problem solving * New value orientation

1.1.2 Some Limitations of the Denial, Scepticism, and Maladaptation

Focus

The literature focusing on denial, scepticism, and maladaptation to climate change has provided many useful insights into how best to communicate the impacts of climate change, and how to shape and frame mitigation and adaptation policies. It does have some drawbacks however. First, many accounts of why climate change denial exists are concerned with psychological mechanisms (such as the psychoanalytic mechanisms of splitting and projection) that are supposedly inherent and universal characteristics of human beings. Although different experiences with the effects of climate change might mean that some mechanisms are more likely to be activated for some people than for others, these accounts do not in themselves explain different and varied responses within communities of relative homogeneity. That is, if two people who have the same exposure to climate change demonstrate in the one case denial and in the other adaptive coping, the accounts tell us little of the life experiences or intra-psychic processes that predict the manifestation of denial and repression in one person but not the other. Further, such accounts do not explain why the expression of these processes may shift rapidly *within* an individual.

The emphasis on intra-individual processes leads to further limitations, including one that I suggest highlights a chief limitation of stress and coping models in their application to climate change. Traditionally, these theories have been successfully applied to health threats such as cancer and heart disease. In such cases, notions of response efficacy leading to threat reduction are relatively untroublesome, as there is presumably a corresponding *actual* decrease in external threat when an individual-level behaviour change occurs (such as regulating one's diet or stopping smoking). In the case of climate change, threat reduction depends on not only individual-level behaviour change but on collective behaviour change. That is, threat reduction cannot be achieved solely through an amendment to one's own actions; it may help, certainly, but most individuals are aware that threat to self, in this case, is mostly contingent on the actions of others. This awareness might even lead to a paradoxical outcome: increasing one's own efforts in the face of climate change might lead one to be more conscious of others' (including governments and industry) failings to act similarly, thereby increasing rather than decreasing levels of perceived threat. Individual-level threat response might also increase exposure to other threats, such as financial insecurity if one invests heavily in protecting one's own property

for instance. Arguably, this could perversely lead the individual to cope *less well* with their immediate environment. If there is no accounting mechanism for these inter-individual and social influences in such models, their application is of limited value.⁴

Segmentation approaches (such as Cohen's three types of denial) and sequential staging approaches (such as in Hamilton and Kasser's coping strategy typology) fail to account adequately for the possibility that people may hold competing, contradictory, and inconsistent attitudes, beliefs, and behaviours towards climate change that might manifest differentially under changing circumstances.

There is also a more socio-political consideration associated with this vein of enquiry: There is a slightly pejorative flavour to some of the research, or at least to the media's dissemination of it (e.g. the reporting of McCright & Dunlap's 2011 "Cool Dudes" paper). Research identifying individual, political, and value-orientation predictors of non-acceptance of anthropogenic climate change (at the expense of explaining acceptance, and at the expense of considering how people actually *act*) runs the risk of further entrenching a once non-existent 'debate'; branding segments of the community as 'maladaptive' – reminiscent of some kind of evolutionary malfunction, or 'in denial' – which has a hint of pseudo-psychological name-calling, is of little benefit if it serves only to perpetuate and deepen a divide based on ideological differences. Further, the psychoanalytic roots of terms such as denial and repression imply that individuals possessing these qualities are dysfunctional and unable to cope with major life obstacles; the research tends to ignore (or at least obscure) the possibility that non-acceptance of anthropogenic climate change might be due to a wide variety of every-day defences regularly employed by healthy, stable, well-coping, and well-intentioned individuals.

Finally, there is often an underlying assumption within research on denial, scepticism, and maladaptation that there are two forms of responses to climate change: one is the correct, logical, and rational response (acceptance, mitigation, and adaptation), and one that is faulty, illogical, and irrational (denial, inaction, and maladaptation). One needs only apply a commons dilemma approach (as some have, e.g. Dietz, Ostrom, & Stern, 2003) to conclude that individual action that involves effortful activity (such as installing solar panels, or taking public transport to work) is, from a utility-maximising perspective at least, not the logical

⁴ This is not to say such models should be ignored altogether, as I discuss in future chapters.

and rational thing to do. Other upscaled applications of long-observed phenomena in social psychology, such as the bystander effect – whereby people are less inclined to act when the experience is shared by many (Fielding & Head, 2012) – also make one question the assumption that acting to mitigate climate change is the default option, and whether there really is a response that can be considered ‘maladaptive’. Given these considerations, I propose that equal weight should be given to understanding what motivates the arguably *irrational* behaviour of actually doing something about climate change, as much as to understanding people’s non-responsiveness.

1.1.3 A functional approach to understanding climate change responses

In this thesis I set out to identify what social and psychological functions different responses to climate change serve. Responses might include a person’s attitudes, beliefs, opinions, emotions, associations, and behaviour to information either directly or indirectly related to climate change. Responses can be thought of as mediators between the inner needs, goals, and desires of an individual, and the external world. Needs and goals might be satisfied through opinions and attitudes alone, or by behaviour alone, or it might take a blend to satisfy an individual’s needs and goals.

The basic premise of the functional approach is that individuals adaptively strive towards personal and social goals (Snyder, 1993). A central feature is that people can perform the same behaviours, or hold the same attitudes, opinions, or beliefs, for different psychological functions (Clary et al., 1998). Conversely, behaviours, beliefs, opinions, and attitudes may vary from individual to individual, while the functions they serve are the same (Allport, 1937). Under this rationale, attempts to persuade and change attitudes and behaviours will *only succeed to the extent that they account for the functions the initial opinions, attitudes, and behaviours serve in the first place*.

Functional explanations hinge on “interpreting data by establishing their consequences for larger structures in which they are implicated” (Merton, 1957, pp. 56-57). This characteristic means that accounts can be established for different levels of analysis: e.g. intra-individual, inter-individual, groups, and cultures (Doise & Mapstone, 1986; Keltner & Haidt, 1999). By blending the approaches of motivational accounts of personality psychology (which focus on how dispositional attributes influence an individual’s motivations) and social psychology (which emphasises the role that groups, societies, and cultures play in shaping an individual’s motivations), a functional approach avoids some of

the limitations of purely intra-individual approaches while allowing deep constructs such as values and beliefs to operate. Given the increased politicisation of climate change in public discourse (something that will be explored in later chapters), an approach that encompasses multi-level processes (intra-personal, inter-personal, and social) is not only pertinent, but necessary.

The advantage of a functional approach is that it promises to explain not just 'maladaptive' attitudes and behaviour, but also attitudes and behaviour that concern doing good for others and society. The breadth of the functional approach is perhaps also its most limiting quality from an applied perspective. To identify an exhaustive list of the psychological and social functions served by climate change responses is practically impossible, not least because needs and goals such as self-presentation and avoidance are inherently difficult to investigate. This notwithstanding, there is already a good deal of research on climate change that is influenced by the functional approach, especially motivational accounts of beliefs, attitudes, and behaviours. To date though, climate change responses have not been subject to an in-depth systematic functional analysis.

In this thesis I have several aims:

Aim 1: To understand more fully what underlies people's responses to climate change

Aim 2: To pursue the above aim by analysing responses in terms of the psychological and social functions they serve

Aim 3: To develop a theoretical framework for understanding climate change responses as serving social and psychological functions, which in turn fulfil individual needs and goals

Aim 4: To construct a conceptual model of how and why people respond to climate change as they do. The intention of this model is to provide an account of the antecedents and consequences of climate change denial and scepticism, and the broader range of possible responses to climate change, including acceptance and action, and how and why these processes and outcomes may change over time.

1.2 Thesis Structure

In the next chapter I investigate Motivated Social Cognition accounts of attitudes, beliefs, and behaviours that promise to have applicability to climate change responses from a functionalist perspective. I list the functions that responses to climate change may serve, mechanisms through which these functions operate, and the theories from which these are derived.

A methodological overview follows (Chapter 3). A short history of functional analyses is provided, alongside the benefits and limitations of previous approaches. I describe broadly the development of two national surveys, and a series of climate change image workshops, that provide the data for my investigation of the functions that climate change responses might serve.

The cultural context of climate change is provided in Chapter 4, alongside an exploratory investigation of the data from two national surveys. The results of these exploratory investigations prompt the more focussed investigations occurring in Chapters 5 through to 7.

Chapters 5 through to 7 are concentrated on specific theory-testing. Drawing on the theoretical discussions in Chapter 3, these chapters are organised around the following themes: moral responses to climate change; false consensus effects about what *others* think about climate change; and the social-system legitimising functions of climate change responses. These chapters contain specific hypotheses and/or research questions, made on the basis of the findings in Chapter 4, previous research on how people respond to climate change information, and what we know about the functions of these responses from the Motivated Social Cognition literature.

In Chapter 8 I look at explicit and implicit associations with climate change, using both survey and workshop data.

In the concluding chapter, I bring the lines of evidence together to build a conceptual model of the social and psychological functions of responses to climate change.

CHAPTER 2. MOTIVATIONAL ACCOUNTS OF FUNCTIONS: A THEORETICAL REVIEW

In the first chapter I reviewed the major investigative trends of social and psychological responses to climate change. In light of research findings suggesting high response differentiation within communities, seemingly driven by different reasons under different circumstances, I argued that a functional approach would yield insight into the underlying causes of these response differences. In this chapter I discuss some theories and perspectives that have functional relevance. These theories have at their heart concepts that relate to *why* people hold the attitudes and beliefs that they do, why people behave and respond as they do, and the underlying social and psychological needs and goals that these responses ultimately fulfil.

2.1.1 Motivated Social Cognition

The theories and perspectives I present in this chapter can be grouped under the umbrella term Motivated Social Cognition. I use the term here to refer to the assumption that people's values, attitudes, and beliefs have *motivational underpinnings*, and satisfy certain psychological and social needs. These motivations affect the reasoning process and belief and attitude formation by biasing how information is processed (Jost, Glaser, Kruglanski, & Sulloway, 2003; Kunda, 1990). Motivated Social Cognition blends 'cold cognition' approaches that emphasise the limits of information-processing as guiding social judgements, with 'hot cognition' approaches that emphasise the role of affect and emotion in influencing perceptions and judgements (Jost et al., 2003). Theories according with Motivated Social Cognition may be purely intra-individual accounts, or they might allow for collective, social, and cultural influences; alternatively they may blend the two. A Motivated Social Cognition approach is highly suited as a theoretical framework for a functional analysis of climate change responses, because it is concerned with the underlying drivers of why people respond to information as they do, and accounts for potential social and cultural influences as well as intra-psychic processes that may lead to response differentiation.

The review below starts with theories that have their roots in intra-individual processes; it then proceeds to more inter-individual accounts, and on to perspectives that are more socio-cultural in their orientation. With the exception of stress and coping models, the ordering also roughly reflects the chronological sequence of the development of each of the theories and perspectives. While some of these theories and perspectives sit less comfortably under the Motivated Social Cognition banner than others, they share a common history, with their origins in a motivational account of human behaviour. Accordingly, there are numerous overlaps in content, the psychological mechanisms involved, and the functions these mechanisms are thought to serve. These overlaps reflect the influence these perspectives have had on each other throughout the decades, and continue to have. What follows is not an exhaustive list of Motivated Social Cognition accounts; rather I select approaches for their relevance to understanding responses to climate change in particular. To illustrate this relevance, accompanying the description of each theory is a section identifying the underlying functions that each type of motivated cognition serves, and why they might be relevant for responses to climate change in Australia.

2.2 Stress and Coping Models

Stress and coping models were developed to explain both avoidant and positive choices in relation to threats to an individual's health. In the previous chapter I noted how stress and coping models such as Protection Motivation Theory have also been used to explain and predict responses to climate change. Despite the limitations of applying such intra-individual theories to collective dilemmas, they are still important. First, they introduce the concept that individuals are motivated to act to fulfil certain needs and goals they find important. They also provide a framework for conceptualising and understanding other theories of motivated cognition, such as system justification (see below).

In addition to Protection Motivation Theory, one of the main stress and coping models is the Health Belief Model (HBM; Janz & Becker, 1984). The HBM was developed to explain and predict acceptance of health and medical care recommendations, and to understand people's failure to take preventative health measures. HBM posits that behaviour depends mainly upon the *value* placed on a particular goal, and the individual's estimate that a given action will achieve that goal (*response efficacy*). The dimensions of the model consist of

perceived susceptibility to a threat, perceived severity of the threat, perceived benefits of acting against the threat, and perceived barriers to acting against the threat.

Recent attempts to overcome the limitations of stress and coping models have embedded its original constructs within broader models that account for external social processes such as social capital and social networks, the influence of media representations, and one's physical environment (Gifford, Kormos, & McIntyre, 2011). Such holistic models promise more meaningful outcomes in relation to understanding climate change responses, though to my knowledge they have yet to be empirically tested.

2.2.1 The Functions in Stress & Coping Models

The functions contained in stress and coping models fulfil several goals: the reduction of stress and threat, and the enhancement of coping. These goals are attained through the motivating mechanisms of value importance, the perceived efficacy of acting, and the costs and benefits of action: that is, a coping appraisal.

It is becoming increasingly evident that climate change will affect people's health; this is particularly so for the more vulnerable in society (Frumkin, Hess, Luber, Malilay, & McGeehin, 2008). As such, behaviour motivated to protect individual health, as outlined in stress and coping models, may play an important function in adapting to the impacts of a changing climate. While climate change mitigation measures such as driving less and green-purchasing might not assuage threat to an individual's health, an enhanced perception of the efficacy of collective responses to climate change may do. This in turn may promote engagement with adaptive health behaviours, such as making preparations for the increased prevalence and severity of natural disasters.

2.3 Cognitive Dissonance Theory

Leon Festinger (1957) coined the term 'cognitive dissonance' to describe the psychological discomfort that arises when an inconsistency between two cognitions is made salient. The inconsistency might be between two attitudes, between two behaviours, or between an attitude and a behaviour. This discomfort places the individual in a motivational state that

drives them to reduce the discomfort by resolving the inconsistency. The resolution of inconsistency is achieved by changing either one's behaviour, one's attitudes, or by introducing a third cognition that serves to rationalise or justify the discordance. This change is the mechanism through which consistency is restored, and the aversive state assuaged.

Cognitive Dissonance is one of a family of Consistency and Balance theories popular in the 1950s and 1960s (see Abelson, 1983, for a review). The underlying assumption of these theories is that individuals desire and strive for cognitive consistency. This assumption was first challenged in the 1960s, when researchers found that discrepant cognitions only aroused dissonance under certain conditions, such as when apprehension at being negatively evaluated by others was present (Rosenberg, 1965). These conditions were summarised in Cooper and Fazio's (1984) 'New Look' cognitive dissonance, which suggested that dissonance arousal occurred, not through cognitive inconsistency *per se*, but when one perceived themselves as responsible for bringing about an unwanted event. Here, *the acceptance of personal responsibility* is a necessary condition for dissonance arousal. Personal responsibility is made up of two components: the ability to freely choose a behaviour, and the ability to see the adverse consequences of that behaviour. Further, the aversive consequences of a behaviour must be reasonably foreseeable. Once these conditions are met, the individual is motivated to change behaviour, or to *change perceptions* about the aversive outcomes, or to change perceptions about whether they are responsible for the aversive outcomes. If an individual accepts personal responsibility, dissonance occurs; if they deny responsibility, the unpleasant state of dissonance is avoided (Cooper, 2012).

Both traditional accounts of cognitive dissonance and the New Look approach have been criticised for focussing solely on the *conditions* that give rise to dissonance while neglecting the mechanisms that give rise to it in the first place (Kunda, 1990). The newer Self-Standards model of cognitive dissonance (Stone & Cooper, 2001) sought to address what might be underlying the drive-reduction state. Key here was the notion of an 'aversive consequence'. Theorists reason that what is aversive is subjective, and depends on two key criteria: what most *other people* think is aversive (termed the normative standard of judgement), and what the *individual* considers aversive (personal standard of judgement). If

a behaviour violates one or both of these standards, dissonance might occur (Stone & Cooper, 2001). Whether a normative or personal standard of judgement is applied depends on the salience of either, or a chronic disposition to refer to one of these standards over the other (Cooper, 2012).

Under these standards of judgement, individuals are motivated to rationalise behaviour that could be viewed by others, or by oneself, as somehow immoral, foolish, or unintelligent. So discomfort arises not from the inconsistency itself, but from the consequent threat to self-esteem and self-identity that an observed inconsistency may arouse (Dunning, 1999; Scher & Cooper, 1989). Steele (1988) is one such theorist who suggests that people are motivated to rationalise inconsistencies because they threaten one's self-concept. Central to a positive self-concept, Steele argues, is the sense of being "adaptively and morally adequate" (p. 30): that is, as a competent, stable, and agentic social citizen. Steele goes on to suggest that overcoming discomfort associated with dissonance need not have relevance to the dissonant attitudes, beliefs, or behaviours themselves; discomfort can be assuaged by taking part in other activities that are valued by the individual (or society) for their integrity and worth, such as donating to charities or succeeding at work.

2.3.1 The Functions in Cognitive Dissonance Theory

The functions implied in traditional cognitive dissonance theory fulfil the goal of reduced internal psychological discomfort arising from discordant beliefs, attitudes, and behaviours. The mechanism through which this is achieved is the changing of one's behaviour or attitude, or the rationalisation and justification of the behaviour or attitude so that consistency is realised. Under the reconceptualised cognitive dissonance approach, the underlying goals and needs become the protection of self-esteem, and the enhancement of self-identity. These goals and needs are satisfied through maintaining the perception that one is moral, intelligent, in control, and stable. The mechanisms for achieving this include abdicating responsibility for aversive outcomes, and changing perceptions about whether the outcomes are aversive in the first place. Another goal of dissonance reduction is self-presentational, whereby appearing moral, intelligent, in control, and stable *in the eyes of others* is achieved by adopting, amending, or rationalising inconsistent behaviours and

attitudes observed by other people. Self-esteem and self-presentation can also be achieved by taking part in unrelated activities that are valued for their worth and integrity.

Climate change is something we might hold discrepant cognitions about. For instance, we might think climate change is an important problem that needs to be addressed, yet we might be aware that our own daily actions are inconsistent with our views. Whether or not that discrepancy will be sufficient to change our behaviour will depend upon how responsible we feel for the impacts of climate change, or whether we think we have any control over those impacts. If we answer “yes” to both these questions, we might still resolve the discord by introducing third cognitions: justifications and rationalisations aimed at excusing (either to ourselves or to others) our inaction.

2.4 Motivated Reasoning

In her theory on motivated reasoning, Ziva Kunda (1990) suggests that people rely on cognitive representations and processes to arrive at a desired conclusion, and motivation influences which of these representations and processes will be used on which occasion. These biases in turn influence the determination of new beliefs and attitudes, impression-formation, the evaluation of evidence, and decision-making. Kunda distinguishes between directionally and non-directionally motivated reasoning. Non-directionally motivated reasoning is driven by accuracy goals, and therefore requires greater cognitive effort as it is processed more deeply and attended by more complex and elaborate reasoning. By contrast, directionally motivated reasoning involves searching one’s memory for beliefs and rules that support a *desired conclusion*. This latter type of reasoning is biased by goals that determine which subsets of pre-existing beliefs and rules are accessed first (that is, the ones that accord best with the desired conclusion). Put simply, people access different beliefs and rules on different occasions to achieve desired ends.

A key component of directionally motivated reasoning is that during and after arriving at a conclusion, people attempt to construct a rational justification for it, one that would persuade a dispassionate observer. As such, the pre-desired conclusion is only upheld should the individual muster up enough ‘evidence’ for it; to do so may require selective memory searches or an on-the-spot combination of different beliefs and rules. When

confronted with strong or irrefutable arguments that run counter to the pre-desired conclusion, the individual may be forced to switch to an undesirable or counter-attitudinal conclusion (Kunda, 1990).

An important outcome of this biased search for information is that *new* beliefs and theories can be constructed to account for, or justify, the individual's eventual conclusion. Just as importantly, pre-existing beliefs and theories can be bolstered, or reinforced, by repeated preferential access. The subset of beliefs and rules people access also depends on external contextual cues, such as when politically relevant information is made salient (Redlawsk, 2002). Subset selection is also influenced by different goals; for instance, different rules and beliefs will be accessed when one wants to present well in front of other people, than if one wanted to avoid engaging in a behaviour requiring a lot of effort.

In relation to behavioural responses, Bersoff (1999) found that participants were less likely to engage in unethical behaviour (in this case, keeping an over-payment) if their ability to construct a 'neutralisation' for it was impeded. Under a motivated reasoning approach, Bersoff argues that people redefine and reconstrue unethical behaviour (a process he calls 'neutralisation'), and that this process often precedes and fosters decisions to act in an unethical manner. An example of a neutralisation is to deny the material benefits accruing from an unethical act, or to deny that it would cause harm to others. This neutralisation, a general tendency among the population, allows people to maintain a positive self-image and avoid dissonance arousal and its negative corollaries, such as social embarrassment or guilt. Reconstrual and redefinition are directional forms of motivated reasoning that allow individuals to feel committed to pro-social norms, values, and actions, while allowing them to concurrently engage in behaviour that violates these standards. Bersoff's argument is similar to a cognitive dissonance approach, but for an important difference. Under a cognitive dissonance approach, dissonance is thought to occur *after* a person has committed a behaviour. By contrast, Bersoff argues that reconstruals and justifications happen *before* a conscious decision is made to undertake the behaviour. This accounts for how people *initially decide* to perform an action that is contrary to their own attitudes or values (Bersoff, 1999).

2.4.1 Motivated Reasoning and Emotion Regulation

For Kunda, arousal is important in motivated reasoning because it can provide the cue that *conflicting* beliefs, attitudes, and behaviours may be in play. The arousal is the “red light” that indicates concern about a particular cognition (Kunda, 1990, p.492). Further, arousal is more important in cases where the attribution of arousal is uncertain.

More recently, some authors have conceptualised motivated reasoning as a form of implicit emotion regulation, whereby people are drawn to judgements that assuage negative affect and maximise positive affect (Eldaief, Deckersbach, Carlson, Beucke, & Dougherty, 2012; Westen, Blagov, Harenski, Kilts, & Hamann, 2006). From this perspective, reasoning is governed by approach-and-avoid systems, where judgements are made based on affect or anticipated affect. That is, people are motivated to arrive at a certain conclusion based on the implicit emotional associations with what is being considered. Functional neural-imaging work on political judgement and decision-making suggests that when people are engaged in motivated reasoning, the parts of the brain associated with ‘cold’ cognition remain inactive, and that people instead engage in implicit emotion regulation and psychological defence; however, they stress that this occurs predominantly in emotionally relevant situations (Westen et al., 2006). When the situation is not so emotionally relevant, explicit conscious processes are used to regulate emotions, such as suppression and distraction, or ‘motivated forgetting’ (Anderson et al., 2004).

An interesting result from Westen et al.’s work is that, when people are evaluating negative information about a preferred political candidate that would logically lead them to an emotionally aversive conclusion, the parts of the brain activated were those associated with self-referencing and sympathy, suggesting that identity-needs partially underpin motivated reasoning (these identity-needs are further explored in the next section).

2.4.2 The Functions in Motivated Reasoning

Taylor and Browne (1988) suggest that motivated reasoning and its attendant biases adaptively functions to promote mental health. They point to the outcomes of biased motivated cognitions as including positive self-concepts, positive thoughts about the world, feeling a sense of control over things, and feeling happy and contented. Similarly, Dunning

(1999) sees selective biases involved in directionally motivated reasoning as functioning to retain a flattering self-image. Mechanisms include attending to the sets of beliefs and rules and referencing associations and representations most likely to produce these outcomes.

Non-directional motivation has a function for those with dispositional needs for accuracy, or a strong need for cognition. However, the functions of non-directional motivation go beyond providing accurate information about phenomena. Kruglanski (1980) conceives of accuracy goals as the fear of invalidity, in some ways mirroring the self-presentational goals of wanting to appear consistent to others (in that we want to appear correct and knowledgeable to others) (see also Kruglanski & Ajzen, 1983). The social function of non-directional reasoning is further evidenced by experimental findings that non-directional reasoning can be *induced* by telling participants they will have to justify their decisions to others (Tetlock & Kim, 1987).

Motivated reasoning may also serve material self-interest. Bersoff's (1999) empirical work on unethical behaviour demonstrates how motivated reasoning to justify unethical behaviour before it occurs can translate into direct material benefit for the individual.

Finally, the emotion regulation work suggests that motivated reasoning functions to decrease negative emotions (such as guilt and shame), to increase positive emotions, and to maintain a positive self-identity. This last goal may be achieved by activating empathy and self-reference systems, and by referring to implicit emotional associations. Mechanisms for avoiding negative affect include suppression and distraction.

The idea that people are motivated reasoners, accessing different beliefs and rules on different occasions, is a potential explanation for why we witness fluctuations in people's opinions about climate change over time and under different circumstances. Changing circumstances might include the coupling of climate change information with different stimuli on different occasions, or by framing climate change communication with reference to different social information. To reach a pre-desired conclusion, one may base their decision-making on different sets of rules and beliefs dependent on which set has been activated by the associated stimuli. However, some sets may be more chronically available

than others. Recent research suggests that exposure to contentious information, such as climate change and emerging technologies, activates political predispositions through the motivated reasoning process (Hart & Nisbet, 2012; Mutz, 2006). This, combined with the repeated preferential accessing of particular subsets of rules and beliefs, may reinforce and entrench opinions and associations, and ultimately lead to issue polarisation. There is also evidence that directional goals can bias the evaluation of scientific evidence by biasing the selection of beliefs and rules (Kunda, 1990). But if the evidence becomes irrefutable and overwhelming, the individual might be forced to concede their pre-desired conclusions, if maintaining that climate change is a myth, for instance, becomes too cognitively difficult to sustain. Finally, responding behaviourally to climate change entails a sacrifice of material benefit; it costs money to install solar panels, and time and effort to take public transport, or write to the local member of parliament. If unethical behaviour (or a lack of ethical behaviour) can be rationalised away, then one might avoid cost to self while maintaining self-esteem.

2.5 Theories of Interpersonal and Social Identity

Interpersonal and social identity theories explore how our interactions with others influence our beliefs, attitudes, and behaviours, and the public expression of these. Other individuals, or groups of individuals, can act as 'referents' (those to whom we refer) when considering how to think, feel, or behave. Referents may be those with whom we frequently interact or have a close relationship with, such as a family member or close friend. Conversely, referents may be (groups of) people that we have never met, but hold in high regard, such as a politician or a scientist (or scientists in general). Referents can also be negative; if a person or group of people is particularly disliked, they may serve as indicators for precisely how *not* to think or behave (Granberg, Jefferson, Brent, & King, 1981; Rokeach, 1973). Other people also influence the *expression* of our attitudes and opinions, and how we behave. For instance, people are more likely to express an opinion if they think it will meet with social approval (Shavitt, 1989; Smith, Bruner, & White, 1956).

Social Identity Theory (SIT; Tajfel & Turner, 1986) describes that part of our self-identity derived from awareness of being part of a certain social group, and the associated emotional significance of being part of that group. When membership of a particular group is made salient, we tend to emphasise similarity between in-group members and

accentuate differences with people outside our group, or in an opposing group. We also make judgements about *other people* based on their group-membership; people we are unfamiliar with become defined by the characteristics of their group. From an SIT perspective, being part of a group affords functional value because it allows us to make sense of complex and new situations.

An off-shoot of SIT, Self-Categorisation Theory (SCT; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) posits that we categorise ourselves into groups at different levels of abstraction concurrently (for instance, one might identify as a female, a German, and a philosopher, all at once), and that the group that is referred to depends on the specifics of a situation. In a given situation, the referent group (German, female, or philosopher) will be the one that best emphasises similarity with the in-group and accentuates differences with the out-group.

Drawing from SIT, and from SCT in particular, Uncertainty-Identity Theory (UIT; Hogg, 2007) posits that a central role of social identification is to reduce uncertainty. When we are uncertain about our attitudes, feelings, or behaviours, it can provoke anxiety associated with reduced feelings of coping and a lowered sense of control. By identifying with social groups, uncertainty is reduced because we are able to draw on the attitudes, feelings, and behaviours of that group to infer what our own position should be. That is, people are more likely to self-categorise when they are less certain of how to respond.

An underlying assumption of UIT is that people strive for a coherent sense of self (Rokeach, 1973). Because of this, the more important the cause of the uncertainty is to our central concept of self-identity, or the more the cause is something we care about, the stronger the drive to reduce the uncertainty through social identification. As with SCT, people have many groups on hand under which they can categorise themselves. Some groups are 'chronic' – they are prominent, unchanging, and accessed frequently (e.g. gender), and some are 'situational' – they are prominent because of a particular situation (e.g. political affiliation). When uncertainty about how to think, feel, or behave is made prominent, we will unconsciously cycle through the available categories that best fits our *existing self-identity* in that particular context. This maintains our coherent sense of self. Once a

category is decided on, this triggers social-identity related perceptions, feelings, and behaviours.

2.5.1 The Functions in Theories of Interpersonal and Social Identity

The functions contained in accounts of interpersonal and social identity can be private or public. Privately, social identification functions to reduce uncertainty and attendant states of anxiety. Social identification may also mean that cognitive effort is reduced (consistent with a 'cognitive miser' approach) because our referents act as 'quick guides' for how to think, feel, and behave. Publically, social identification may function to increase social approval, and fulfil a need for social support in uncertain circumstances. There is also a value-expressive function: identifying with social groups allows us to indicate to others what sort of person we are, shaping and reinforcing our own self-identity (Shavitt, 1989).

The scientific complexity of climate change is such that it is beyond most people's knowledge to be certain about its properties, hence uncertainty may be considered a default position. Uncertainty-Identity Theory instructs us that such uncertainty would lead individuals to draw heavily on social categories; this should be particularly so for people who care about environmental issues, or for whom environmentalism is an important part of their self-concept (whether positively or negatively). But exactly *which* social groups are made salient when presented with climate change information, and whether the level of group made salient differs from person to person, remains largely unexplored. Motivations to *express* opinions about climate change are also important. If certain referents are primed by climate change information, then perceptions of broad community sentiment may become distorted if those who think like us on the issue are the ones that repeatedly come to mind. A possible consequence of this distortion is that, if people think they will gain social support from expressing an opinion they believe the majority of people share, they will presumably be more vocal about it than those thinking they hold a minority opinion (Noelle-Nuemann, 1993). At a societal level these biases may exert subtle yet cumulative influences on public discourse surrounding opinions about climate change. For instance, if people *perceive* the majority opinion about climate change to be that it doesn't exist, then they might be more likely to express this opinion than if they thought the opinion was held by very few, in doing so reinforcing the perception that their expressed opinion is the majority view.

2.6 Terror Management Theory

Terror Management Theory (TMT) (Greenberg, Pyszczynski, & Solomon, 1986) builds on work by Ernest Becker, who investigated the role of culture and self-esteem in creating a sense of meaning, value, and security (Becker, 1973). TMT, which went through a resurgence in the wake of the September 11 attacks on the World Trade Center, starts with the premise that humans can be viewed as distinct from other animals due to intellectual abilities that produce three characteristics: the ability to think about reality in terms of causality; the ability to conceive of future events; and the ability for self-reflection. The ability to apply causality and to conceptualise future events provides us with a basis for predicting and controlling future outcomes. Inward reflection, meanwhile, allows us to self-regulate, and thus allows flexibility in responses to environmental events. These same cognitive abilities also allow us to recognise fundamental aspects about the nature of our life that are beyond our control; most crucially, the inevitability of our death in an uncontrollable and indeterminate universe (Solomon, Greenberg, & Pyszczynski, 1991). The recognition of future events, it is argued, is a perpetual source of potential anxiety, and without an assurance that aversive events can be avoided, this anxiety would become paralysing terror (hence the term 'terror management'). Anything that threatens one's existence is a potential source of ongoing and intense anxiety. Becker believes that humans deal with this anxiety through the construction of culture – humanly created constructions of meanings shared by groups; a shared symbolic conception of the universe that imbues the world with meaning, stability, order, and permanence. The resulting cultural worldview is a “symbolic social construction that provides a meaningful context in which relatively anxiety-free action is possible” (Solomon et al., 1991, p. 96).

The overriding goal of the individual, it is argued, is self-preservation. This can take direct or symbolic forms. Direct forms include basic biological needs such as food, water and shelter. Symbolic forms of self-preservation are ways of reducing existential anxiety through the 'cultural anxiety buffer', of which there are two components - worldview and self-esteem. Self-esteem, as defined by terror management theorists, is a product of the individual's perception of the extent to which they are meeting cultural standards of value. In relation to behaviour, an individual's self-esteem depends on how that behaviour is viewed in a particular cultural context. Cultural standards of behaviour acquire their power because

“they are legitimized by the cultural worldview rather than because of any adaptive or utilitarian function that they might serve” (Solomon et al., 1991, p. 104). Suppression of the inevitability of our own death is facilitated in part by immersion in and preoccupation with the ‘cultural drama’; the preoccupation with the everyday functions to keep one’s deeper fears out of accessible consciousness. This cultural buffer allows a sense that we are part of a meaningful and enduring existence. But the cultural anxiety buffer is fragile, and under constant attack from competing beliefs and worldviews. As such, it requires continual maintenance and defence. Coupled with frequent reminders of our vulnerability and mortality, we are always on the lookout for confirmation of the validity of our worldviews.

Numerous experiments have shown that self-esteem-threatening situations produce anxiety that engage defensive reactions to diffuse the threat in order to restore one’s self-esteem (Hansen, Winzeler, & Topolinski, 2010; Jessop & Wade, 2008). Such diffusion may occur through various mechanisms, such as denying the relevance of the threat for one’s self-esteem, or by selectively seeking information that supports a self-serving interpretation. For instance, Paulhus and Levitt (1987) found that people had a greater tendency to rate positive traits as consistent with their own characteristics after being exposed to death-related words. Different types of worldview can filter what will be perceived as threatening to the cultural anxiety buffer. For example, Greenberg et al. (1990) found that high authoritarians derogated dissimilar others while low authoritarians did not; as a result the researchers surmised that liberal bolstering of worldviews may include an increased display of tolerance and open-mindedness. There may also be cross-cultural variations in the operation of the anxiety buffer; for example, protection of self-esteem may not be as potent in collectively-oriented societies (though the underlying dynamics of terror management are thought to apply universally).

Terror Management Theory has received its share of criticism, particularly from evolutionary psychologists, who believe that intergroup biases found under mortality salience conditions may occur in response to a much wider variety of situations that pose adaptive problems where the marshalling of social support is an adaptive response (Navarrete, Kurzban, Fessler, & Kirkpatrick, 2004). A related criticism is that the theory falls for the fallacy of ‘asserting the consequent’. That is, it is a significant leap to conclude that evidence of worldview bolstering in the face of mortality salience supports the notion that

worldviews exist to ward off existential anxiety and despair (Koltko-Rivera, 2004). Despite these weaknesses, the theory bands together several strands of social psychology that have hitherto been treated separately, and in doing so, provide a parsimonious theoretical explanation for a host of empirical data (Solomon et al., 1991).

2.6.1 The Functions in Terror Management Theory

Terror management functions to reduce existential anxiety. The mechanism through which this is achieved is our cultural worldview: our shared symbolic conceptions that imbue the world with meaning, stability, order, and permanence. These worldviews are bolstered when existential anxieties enter our consciousness. A secondary outcome in TMT is self-esteem maintenance. This is achieved through mechanisms such as self-serving attribution biases, denying the relevance of threats to self-esteem for one's self, or by selectively seeking information that supports a self-serving interpretation.

The threat to existence posed by climate change is arguably of sufficient magnitude and scale to trigger existential anxiety. Such a threat should, from a utilitarian point of view, result in adaptive behaviours designed to alleviate or negate the threatening situation (e.g., by reducing behaviours that result in carbon emissions). However, our capacity to recognise future threatening events and the associated inevitable futility (at the individual level) of self-preservation efforts may, paradoxically, prevent such actions from occurring, as they are admissions of personal vulnerability.

2.7 Theories of Social-System Legitimacy

By theories of social-system legitimacy I refer to those theories that share the following features: first, individuals are motivated to defend prevailing social systems, and to see them as moral, just, and fair outcomes of inherent differences in worth between people, or groups of people. Second, ideologies, justifications, and myths function to legitimise social inequalities, and to sustain dominant groups' position of power over subordinate groups. Third, these ideologies, justifications, and myths are believed by a significant proportion of people within a society, whether they are members of dominant or subordinate groups (Della Fave, 1980; Pareto, 1963).

Social-system legitimacy theories explain how individual differences and values interact with social institutions. There are numerous theories that have social legitimacy concerns as either one of their central or secondary tenets, including conflict theories grounded in Marxism and Feminism. Here, I focus on two theories – Social Dominance Theory and System Justification Theory – that synthesise many of these traditional conflict theories with some of the concepts introduced above, such as those within Self Identity Theory and Cognitive Dissonance.

2.7.1 Social Dominance Theory

Social Dominance Theory (SDT; Sidanius & Pratto, 1999) considers societies as organised along group-based hierarchies. Members of dominant groups have greater access to resources (such as good quality housing, education, and health services) and members of subordinate groups less. Hierarchies are maintained through intergroup oppression, discrimination, and prejudice.

SDT is a multi-level theory. At the personal level, individual predispositions (principally ‘social dominance orientation’) and other group orientations make the expression of social dominance more or less likely. The result of aggregated individual expression is systemic discrimination.⁵ At the intergroup level, members of dominant groups are more likely to act in ways that benefit their own group than are members of subordinate groups: an imbalance termed *behavioural asymmetry* (Sidanius & Pratto, 1999). This behavioural asymmetry implies that group-based hierarchies are maintained, to some extent, by agency on the part of subordinate groups and individuals (Sidanius & Pratto, 1999). As with Uncertainty-Identity Theory, context is an important consideration in the salience of group identities. In situations where the inequality between two groups is a prominent feature of a contentious issue, stereotypes and beliefs that separate the identities of the groups are made salient, leading to stereotype reinforcement and prejudice. At a system level, group-based hierarchy is maintained by ‘legitimising myths’, which can be ‘hierarchy-enhancing’ or ‘hierarchy-attenuating’. Hierarchy-enhancing myths involve moral and intellectual

⁵ Recent cross-national research with 27 nations suggests aggregate levels of social dominance orientation depend on the institutional characteristics of societies, suggesting that, in addition to individual difference tendencies, high social dominance is at least partly a product of socialisation processes (Fischer, Hanke, & Sibley, 2012)

justification of the hierarchy. Hierarchy-attenuating myths, on the other hand, *challenge* existing social structures and promote equality and democracy; they are concerned with how people and institutions *should* behave rather than justifying how people and institutions *do* behave (Sidanius & Pratto, 2012). There is a constant tension and battle for supremacy between these two kinds of myths that keeps systems relatively stable, and ultimately determines the amount of hierarchy within a society. The concept of hierarchy-*attenuating* myths is an important characteristic of SDT that distinguishes it from other theories of social-system legitimacy. That people strive for equality acknowledges that there are oppositional and transformative modes of power, as well as oppressive modes.

2.7.2 System Justification Theory

Stemming from intergroup process perspectives, System Justification Theory's (SJT; Jost & Banaji, 1994) central tenet is that there is a general ideological motive that functions to justify the existing social order. Building on social identity and social dominance theories, John Jost and his colleagues identify three main motives, or 'justification tendencies', thought to underlie intergroup conflict: *ego justification*, or the need to maintain a positive self-image and to feel justified, valued, and a legitimate member of society; *group justification*, the need to maintain a favourable image of one's own group and fellow group members; and to these they add *system justification*, the need to maintain a favourable view of the status-quo and to see it as fair, legitimate, desirable, natural, and inevitable (Jost, Banaji, & Nosek, 2004).

System justification works predominantly at the implicit, non-conscious level, and occurs *even if this comes at the expense of personal and/or group interests* (Jost et al., 2004). These points distinguish SJT from classic conflict theories of intergroup relations that portray dominant groups as pre-occupied with acting to maintain their superiority over the disadvantaged. Jost et al. point to the small correspondence between political ideological preferences and indicators of self-interest (such as wealth and class) as an example of how a propensity to maintain, justify, and rationalise the status-quo can actively work to discriminate against the interests of the individual or group, particularly by those who are disadvantaged. Indeed, ideological bolstering and system justification are observed more commonly among members of under-privileged groups. System justification tendencies are also bolstered when a prevailing socio-political system is threatened.

A lack of knowledge or propensity to avoid an issue can lead to the bolstering of system justification tendencies. For example, Shepherd and Kay (2011) found that, rather than motivating an increased search for information, a lack of knowledge about a specific socio-political issue fostered feelings of dependence on the government, which in turn increased system justification and government trust, which increased desires to avoid learning about the relevant issue when the information was negative.

While SJT theorists posit the motivation to defend the status-quo is universal, they point to a number of system justifying *tendencies* (or ‘ideologies’) that predict a person’s *propensity* to defend the status-quo. Such ideologies include right-wing authoritarianism, high belief in a just world, endorsing a Protestant work ethic, economic system justification, power distance, and social dominance orientation (Jost et al., 2004; Jost & Thompson, 2000).⁶

An advantage of SJT is that, like SDT, it accounts for the fact that disadvantaged groups often act in a way that is counter to their self-interest. From an SDT perspective, *behavioural asymmetry* is an outcome of power imbalances between dominant and subservient groups. SJT also incorporates systemic processes, but adds an intra-psychic motivational explanation for this behavioural asymmetry, and the functions these motivations serve.

2.7.3 The Functions in Social-System Legitimacy Theories

Whereas ego and group justifications function to protect the interests and positive image of the self and the group, social-system legitimacy provides *ideological justifications*. These justifications are a sense-making mechanism to explain why things are as they are, serving to satisfy people’s drive to think the world is just and fair, and increasing satisfaction with one’s own situation and life circumstances (Lerner, 1980). In addition, in seeking to understand *why* people engage in system justification, Jost and Hunyady (2003) conclude that system-justifying ideologies have a more immediate, palliative function. Specifically, these ideologies reduce anxiety, guilt, dissonance, discomfort, and uncertainty for both

⁶ From an SJT perspective, these individual difference factors are not thought to be genetically mandated but rather are socially constructed (Jost et al., 2004)

those who are advantaged by prevailing systems, and those who are disadvantaged by them. These goals are achieved by bolstering one's defence of the status quo, and by rationalisations, justifications, and legitimising myths for prevailing social systems and inequities.

Jost and Hunyady (2003) also suggest the functions of system justification can be understood through the lens of stress and coping models (see above). The set of beliefs and assumptions about existing social systems, they argue, serve a stress-prevention function by letting the individual believe that the world is predictable, consistent, and meaningful. System justification also acts as a coping *resource* by fostering a sense of control and hope, and as a coping *response* to stressors felt by both low and high status groups as a consequence of their unequal positions within the prevailing system.

One of the implications of a system justification tendency is that people favour likely outcomes over unlikely ones, regardless of the perceived attractiveness of competing outcomes (Kay, Jimenez, & Jost, 2002; McGuire & McGuire, 1991). A possible implication for climate change responses is that, as the perceived efficacy of climate change adaptation and mitigation strategies increase, so too might support for policies designed to do just this. Conversely, any policies that involve the redistribution of goods and resources might be interpreted as a threat to the status quo, or prevailing power-based hierarchies – therefore under a social legitimacy perspective one might anticipate system legitimising rationalisations to increase rather than decrease, *even if the individual is a recipient of such redistribution policies*. Further, we might expect people from both dominant and subordinate groups to employ a range of hierarchy-enhancing myths to ensure that redistribution policies are met with resistance.

2.8 Moral Disengagement

The concept of moral disengagement is an extension of Albert Bandura's (1991) Social Cognitive Theory. This agentic theory of human behaviour posits that we exercise control over our life through self-regulatory processes, and that this personal agency operates within a network of socio-structural influences (Bandura, 1991, 2006).

An important feature of Bandura's Social Cognitive Theory is the exercise of moral agency. As individuals we adopt internal moral standards of right and wrong, which are 'culturally situated' in our own social context. Internal moral standards guide or deter our conduct, as they allow us to anticipate, monitor, and judge our own actions. When we act in opposition to these moral standards, self-censure occurs. But moral standards and self-censure do not function unwaveringly. Moral self-sanctions can be selectively disengaged, leading us to act in ways that belie our ethical standards. Such disengagement is most likely to occur when the outcomes of acting immorally are in some way *valued* or *valuable*. Moral disengagement frees us from our own self-sanctions and therefore from the attendant guilt arising from violating our internal moral standards.

Disengagement processes can include cognitive misconstrual of reprehensible behaviour to increase its moral acceptability, obscuring or distorting the effects of harmful actions, and reducing identification with the targets of harmful acts (Bandura, 1990).

2.8.1 Misconstrual of Reprehensible Behaviour

Misconstrual of reprehensible behaviour can occur through the act of *moral justification*, where what is culpable is made justifiable, even righteous, through the act of cognitive reconstrual. In so doing, detrimental behaviour and attitudes are made personally and socially acceptable, justifiable, and morally passable. Cognitive reconstruals can mean that moral justifications become a conscious offence mechanism, rather than an unconscious defence mechanism (Bandura, 1990).

Sanitising language (or *euphemistic labelling*) is another mechanism through which misconstrual of reprehensible behaviour occurs. Bandura argues that sanitising euphemisms, often expressed in the passive form, are a linguistic device for creating the appearance that nameless forces, rather than people, are responsible for culpable acts (Bandura, 1990). This is similar to Cohen's notion (discussed in the previous chapter) of interpretive denial, where euphemisms are employed to alter the meaning of something (e.g. 'population exchange' and 'ethnic cleansing' for genocide, and 'collateral damage' for the killing of civilians) (Cohen, 2001). Those who engage in sanitising language and euphemistic labelling are relieved of personal agency.

A third mechanism is *advantageous comparisons*, which refers to invidious comparisons made by presenting two things contiguously. By using as a contrast an immoral act of much greater import and social condemnation, one's own transgression becomes trivial by comparison, or even righteous if the comparison is made in opposition.

2.8.2 Obscuring or Distorting Harmful Effects

Obscuring or distorting harmful effects can occur through the *displacement of responsibility*, which operates by distorting or obscuring the relationship between one's actions and their consequences. This is more likely to occur in circumstances where responsibility can be displaced to those in authority (Bandura, 1990). Such a mechanism mitigates moral judgements about a situation, thereby preserving one's integrity in the eyes of others. The relinquishment of personal control occurs more easily when there is higher perceived social consensus about the morality of an enterprise, and when those who authorise the enterprise are seen as legitimate.

Another obscuring mechanism is the *diffusion of responsibility*. We tend to act more harshly when responsibility is attributed to the collective level than when we hold ourselves personally accountable for the outcomes of our actions. That is, diffusion of responsibility is more likely to occur when the problem is a collective one. Further, the more detrimental collectively shared acts are, the less people feel personally responsible for them (Bandura, 1990).

Finally, *minimisation or disputation of harm* occurs through processes such as selective attention biases and distortion of the consequences of one's behaviour, including outright disbelief in detrimental effects or misrepresentation. Misrepresentation may include active efforts to discredit evidence of the harm caused. These processes are easier to maintain when detrimental consequences of our actions are not directly visible, or if they are geographically and temporally remote (Bandura, 1990).

2.8.3 Reducing Identification with Targets of Harmful Acts

Moral disengagement can also occur through the processes of *dehumanisation* and *attribution of blame*. Self-censure requires a level of empathetic or vicarious emotional reactions triggered by some perceived similarity with the victims of harmful acts. These emotional reactions are cognitively mediated rather than automatically elicited, therefore any dehumanising tendencies or ascriptions of insensateness toward the victims lowers the tendency for self-censure to be activated. Bandura points to the mass of literature on human atrocities as evidence for the central role that dehumanisation plays in allowing people to morally disengage with their actions (Bandura, 1990).

In *attribution of blame*, the aim is to portray oneself as a faultless victim, compelled by forcible provocation or environmental circumstances, to allow our engagement in conduct that is morally questionable. In some cases this goes as far as to lay the burden of blame on the victims themselves. Self-exoneration is thus achieved by viewing one's behaviour as forced by circumstances rather than freely chosen.

The mechanisms described above are not thought to act in isolation, but in various combinations. Moral disengagement does not act suddenly, but can be thought of as the gradual weakening of self-sanctions, a characteristic that helps keep the actor consciously unaware of the mechanisms through which it is operating. Moral disengagement occurs in extreme circumstances (such as in rape and torture) but also in everyday situations where otherwise ethical people routinely engage in activities that have some element of injurious effect on others.

2.8.4 The Functions of Moral Disengagement

Moral disengagement functions to reduce and/or avoid feelings of guilt arising from the breach of one's internal moral standards. The mechanisms through which this occurs are moral justification, sanitising and euphemistic language, advantageous comparisons, displacement and diffusion of responsibility, minimisation or disputation of harm, dehumanisation, and re-attribution of blame.

Climate change is as much as anything a moral issue (as will be discussed in Chapter 5). Understanding the ways in which we are able to morally disengage with something of such enormity therefore has particular relevance, and raises numerous questions. Is the term ‘climate change’ itself a form of euphemistic labelling – something that the climate does that does not necessarily imply any directionality, causality, and therefore culpability on our behalf? Do we tend to dehumanise those who are hardest hit by climate change, while exonerating our own actions? And do we tend to justify our own inactions by pointing out people who are even worse than us? The abdication of individual responsibility and the reinterpretation of aversive outcomes are particularly relevant for climate change, as it is a collective problem with obvious targets for culpability (oil companies and big-polluting industries, governments, and so on). The fact that much of this culpability is real and justified perhaps means that disavowal and diffusion of responsibility are appealing and accessible ways to avoid action and excuse inaction.

2.9 Toward a Functional Framework

The common thread of the theories and perspectives outlined above is that they identify the possible functions that people’s attitudes, opinions, beliefs, and behaviours might serve, and how underlying needs and goals can influence evaluations and judgements. Table 2 provides an overview of these needs and goals, the functional mechanisms through which these needs and goals might be fulfilled, and the theories from which they are derived, sorted by broad functional area. I do not purport that this is an exhaustive list, but it nevertheless serves to illustrate the overlap between needs and goals, functional mechanisms, and theories. The broad functional areas can be summarised as follows:

The reduction of internal psychological discomfort. This might encompass responses aimed at reducing levels of stress associated with some external threat, and an avoidance of negative affect (such as that arising from guilt and anxiety). Responses may take the form of distraction, disengagement from the issue, or asserting one’s moral credentials as a valuable citizen.

Effort reduction. This incorporates responses designed to reduce the need to engage in effortful behaviour (such as climate change mitigation behaviours), or effortful cognitions

(such as digesting complex scientific information). Responses here might include social categorisation, so that opinions and behaviour can be based on referents, and rationalisations and justifications to excuse unethical behaviours.

Social-System justification. This area refers to responses aimed at confirming social, cultural, and economic systems (and their outcomes) as fair, just, and desirable. Responses here might include the belief that the impacts of climate change will only affect those who deserve it, or a faith that present governance arrangements will be sufficient (or sufficiently rearranged) to combat climate change impacts.

Self-image and self-esteem maintenance. This area might include responses designed to make the individual seem and/or feel moral, intelligent, and in control. Here, responses may take the form of changing one's perceptions about the seriousness of climate change impacts, or constructing mental representations of climate change in such a way that the person feels less obliged to act.

The maximisation of positive affect. This might include responses that preference positive information about climate change over negative information. This could include giving more weight to information casting doubt on climate science, or conversely, a focus on the positive effects of transitioning to green economies.

Table 2. Functions and their mechanisms in motivated social cognition theory.

FUNCTIONAL AREA (needs & goals served)	FUNCTIONAL RESPONSE MECHANISMS & STRATEGIES	CONTRIBUTING THEORIES	
Reduction of internal discomfort, including: <ul style="list-style-type: none"> • Stress and threat reduction • Avoidance of negative affect • Guilt reduction • Anxiety reduction • Terror management • Dissonance reduction • Uncertainty reduction 	Positive coping appraisals	Stress and Coping Models	
			System Justification Theory
		Attitude change	Cognitive Dissonance Theory
		Behaviour change	Cognitive Dissonance Theory
		Cultural worldview buffering	Terror Management Theory
		Preoccupation with the cultural drama	Terror Management Theory
		Suppression	Motivated Reasoning
		Distraction	Motivated Reasoning
		Moral Disengagement	Social Cognitive Theory of Moral Agency
		Rationalisations and Justifications	Social Cognitive Theory of Moral Agency
			Motivated Reasoning
		System justification	System Justification Theory
	Status-quo bolstering	System Justification Theory	
	Social Identity and self-categorisation	Uncertainty-Identity Theory	
Effort reduction: <ul style="list-style-type: none"> • Reduced cognitive effort • Reduced behavioural effort 	Rationalisations and Justifications	Social Cognitive Theory of Moral Agency	
			Motivated Reasoning
		Group Identification	Interpersonal and Social Identity Theories
		Advantageous comparison	Social Cognitive Theory of Moral Agency
	Directionally motivated reasoning	Motivated Reasoning	
Social-System Justification: <ul style="list-style-type: none"> • Positive concepts about the world 	Cultural worldview buffering	Terror Management Theory	
		Selective processing	Motivated Reasoning
		Directionally motivated reasoning	Motivated Reasoning
		Status-quo bolstering	System Justification Theory
		Positive coping appraisal	System Justification Theory
		Legitimising Myths	Social Dominance Theory

Table 2 Continued...

Self-image, self-esteem and self-enhancement functions, including: <ul style="list-style-type: none"> • Appearing moral, intelligent, in control, stable • Fear of invalidity reduction • Need for social support • Social adjustment 	Moral Disengagement	Social Cognitive Theory of Moral Agency
	Abdication of responsibility for averse outcomes	Cognitive Dissonance Theory
		Social Cognitive Theory of Moral Agency
	Changing perceptions about whether outcomes are averse	Cognitive Dissonance Theory
		Social Cognitive Theory of Moral Agency
	Taking part in other activities of worth and integrity	Cognitive Dissonance Theory
	Selective processing	Motivated Reasoning
		Terror Management Theory
	Directionally and non-directionally motivated reasoning	Motivated Reasoning
	Mental representations and associations	Motivated Reasoning
	Accuracy goals	Motivated Reasoning
	Activation of empathy and self-referencing systems	Motivated Reasoning
	Self-serving attributions	Terror Management Theory
	Advantageous comparison	Social Cognitive Theory of Moral Agency
	Perceived False Consensus	Interpersonal and Social Identity Theories
Denial of issue relevance	Terror Management Theory	
Group Identification	Interpersonal and Social Identity Theories	
Maximisation of positive affect, including: <ul style="list-style-type: none"> • Enhanced coping 	Positive coping appraisal	Stress and Coping Models
	Selective processing	Motivated Reasoning
	Directionally motivated reasoning	Motivated Reasoning
	Implicit emotional associations	Motivated Reasoning

Now we have a broad theoretical framework of individual and social functions that responses to climate change might serve (Aim 3). The following chapters present results from three studies that test aspects of this framework, beginning with a synopsis of previous approaches to functional analyses and a methodological outline of my own approach.

CHAPTER 3. FUNCTIONAL ANALYSES AND METHODOLOGICAL OVERVIEW

The question of how to empirically test social and psychological functions has long plagued researchers, and has been proffered as a key reason for functional approaches falling out of fashion in psychology (Shavitt, 1989). There is arguably no real way of testing functions directly, not least because the mechanisms involved are often unconscious (and therefore inaccessible) to the individual (Kruglanski, 1999). A further hindrance is resources. Ideally, we might systematically test each function and mechanism in Table 2 independently through a series of carefully designed and strictly controlled tests – but this is beyond the scope of a single thesis or a short-term research program. What we can do though is *infer* what functions are at play by observing patterns in differential responses to climate change with other variables we theoretically suspect responses to relate to.

In this chapter I summarise previous approaches to functional analyses, and some of the strengths and limitations of these approaches. I then introduce the methodologies employed in this thesis to explore functional responses to climate change, and conclude with an overview of the measures incorporated therein.

A few points are worth clarifying before continuing. To date, a functional analysis of responses to climate change has not yet been undertaken, so the analysis here must be to some extent exploratory. Further, I am attempting to understand responses to a particular *issue* – climate change. I do not seek to understand the full range of social and psychological functions that exist in relation to *all* issues; nor do I (nor would I dare!) set out to reconceptualise social and psychological functions as a whole. Rather, I hope to use functions as a way of understanding what is driving responses to this particular issue. The results will then, I hope, direct future testing of a more systematic nature.

3.1 Previous Functional Analyses

A functional analysis can be defined as an analysis “concerned with the reasons and purposes, the needs and goals, the plans and motives that underlie and generate

psychological phenomena; that is, such an analysis is concerned with the psychological [and social] functions being served by people’s beliefs and their actions” (Snyder, 1993, p. 253).

The role of functions in psychology dates back to the turn of the 20th century and the works of James, Dewey, and Titchener, who were interested in purposive questions of human action. The modern functional approach in social psychology goes back at least to Smith, Bruner, and White (1956) and Katz (1960), who posited that attitudes were constructed and changed because of the specific psychological functions they served for the individual. Both Katz and Smith et al. conceived of attitudes (or in the latter’s case, ‘opinions’) as serving several broad functional areas (Table 3). The functions proposed by Katz in particular have similar properties to those derived from Motivated Social Cognition accounts (the five functional areas I proposed in Table 2).

Table 3. Functional areas identified by Smith et al. (1956) and Katz (1960).

	Functional Area	Description
Smith, Bruner & White	Object appraisal	The categorisation of an attitude object into a class of objects (or events) for which a predisposition for responses already exists
	Social Adjustment	The facilitation, disruption, or maintenance of relationships with other people
	Externalisation	The process of transforming an internal, unresolved conflict into an attitude toward an external analogous event
Katz	Utilitarian	Maximisation of rewards and minimisation of punishments, either intrinsic or material
	Ego defensive	The protection of the ego from acknowledging detrimental self-truths and threatening external realities
	Value Expressive	Satisfaction derived from expressing values symbolic of one’s self-identity
	Knowledge	Attitudes that give meaning to the universe and provide clarity and consistency for the individual

Smith, Bruner and White (1956) derived their functional areas from a series of in-depth psychological case-studies of Americans and their opinions about Russia and Russians. Their choice of topic was based on several criteria: first, the topic was one about which opinions were generally crystallised yet controversial (this was 1950s Cold War America); second, the topic generated a certain amount of affect and anxiety; finally, the topic was of chronic

rather than transitory social and political significance. Smith et al. conceived of people's opinions as an expression (or outcome) of three broad functional categories: object appraisal, social adjustment, and externalisation, satisfying reality needs, social needs, and psychological needs respectively. They found that for each individual a particular category would predominate, and within these categories the needs themselves would differ, dependent on the life history, social position, cultural context, and values and attitudes of the individual. They concluded that for attitude change to occur, successful communication campaigns would be contingent upon appealing to all three categories of needs and the different emphases for each individual therein, rather than through simply focusing on one category (e.g. how an individual appraises, or categorises, an object).

Katz's functional areas were derived from motivational accounts at the time (1960), especially theories of cognitive consistency, but also blended two competing accounts of attitude formation: one account where individuals were conceived of as rational decision-makers – a discriminating, reasoning, sense-making machine, seeking understanding; and the other account where the individual was conceived of as irrational, with a weak capacity to discriminate, and capable of only the most primitive self-insight.

More recent functional analyses have included work in the area of volunteerism (Clary et al., 1998; Snyder, 1993; Stukas, Worth, Clary, & Snyder, 2007). In their work, Snyder and colleagues concluded that people gravitate towards volunteerism when it is conducive to their own self-identity, but also when the activities fulfil their own personal motivations and psychological functions. Further, people's choices bolster, reinforce, and perpetuate these initial motivations. Other notable work includes Tetlock's research on the functions of attributions, where he found that people were motivated by self-presentational goals and to protect and enhance one's self-worth when making public attributions for their own behaviour (Tetlock, 1981). Functional approaches have also been used to investigate how moral judgements are made (Prehn & Heekeren, 2009), homophobia and mental illness (Herek, 1987), and the communication of emotions (Keltner & Haidt, 1999; van Dijk, van Kleef, Steinel, & van Beest, 2008).

3.2 Some Strengths and Limitations of Previous Approaches

When constructing his functional account, Katz synthesised the existing literature for support, including motivational accounts of the day. In the intervening 60 years, empirical research has built upon these motivational foundations, not least by incorporating social and cultural influences on attitude and belief formation and reasons for their perpetuation. These influences introduce a host of additional mechanisms through which underlying social and psychological needs and goals might be realised.

In contrast to Katz, Smith et al. based their account on a series of in-depth psychological case-studies using various methods drawn mainly from the psychoanalytic tradition. Their process was so intensive that only a small participant sample was feasible. Further, as the authors themselves acknowledge, the methodology necessitated that only participants with strong verbal skills were included. These restrictions resulted in 10 participants who, while differing on dimensions such as socio-economic background, were all married white males of above average intelligence. Ground-breaking as their study was, it is arguable that important functions might have remained unidentified due to the size and the non-representativeness of the sample.

Another method used to identify functions is discourse analysis. In this approach, functions are uncovered by detecting variability in people's *accounts* of their attitudes and opinions (Potter & Wetherell, 1987). The construction of accounts (occurring through speech or writing) are devices for the underlying function, evidenced by ambivalent and contradictory accounts people give about an issue. For discursive analysts, the key point of analytical interest is this intra-individual variation. Functions are revealed by analysing the pattern and organisation of accounts.

Shavitt (1989), who suggested interest in functional analyses waned due to the difficulties of operationalisation, developed a method for measuring attitude functions more directly: content analysis of people's thought-listings toward an attitude-object. Herek's homophobia studies also used content analysis on student essays about homosexuals, based on which metrics were designed to directly assess the reasons for holding homophobic attitudes. Herek employed an 'Attitudes Function Inventory' in a Likert

structured format to directly test functions, e.g. “My opinions on homosexuals mainly are based on concerns we safeguard civil liberties”.

There are several problems with the more direct assessment of functions, such as through content analysis of essays, and Attitude Function Inventories. First, coding procedures used in content analyses are time-consuming and complex (Shavitt, 1989). Another problem is transparency, especially when the issue under investigation is contentious. These techniques are doubtless excellent ways of uncovering rationalisations and justifications for thinking or acting in particular ways, and rationalisations are one mechanism (as we saw in the preceding chapter) for a number of functions. However it is improbable that such direct self-report measures tap into underlying functions like guilt and anxiety reductions. Consider the following hypothetical question: “I do not believe in the existence of climate change because the thought of it being true is too anxiety-provoking”. Not only would respondents be reticent to acknowledge such functions, in many cases they would be *unable* to acknowledge such functions were operating to begin with (Kruglanski, 1999).

An approach such as that used by Smith et al. (1956) arguably overcomes the issue of conscious accessibility of functions. But the intensive nature of such methods is too restrictive for exploratory purposes. We may assume as a starting point that the functions responses serve are as individual as the individuals themselves. Being a product of responses to social needs, cultural context, and individual psychological needs, the permutations of the exact functions being served by various opinions, behaviours, and so forth might be very large indeed. By extension, one might suggest that only a very large number of in-depth case studies could give us a proper grip on the range of functions responses to climate change serve. Even if the resources were available to attempt in-depth case studies en masse, the approach remains problematic for a couple of reasons. First, there is little hope of reaching parsimonious conclusions (by saying a lot we end up saying nothing). Second, an inferred finding that responses depend on the life-history of a particular individual gives little guidance for science communicators, educators, and policy-makers. Unlike Smith et al., who were not interested in responses to Russia and Russians, but in psychological functions, in this thesis I am attempting to understand *responses to an issue*, climate change, *not* the range of functions within individuals that relate to all issues (as Smith et al. were). It is reasonable to assume that responses to climate change serve

some particular functions more than others; that is, some functions will be more prevalent among a population than others.

As mentioned at the start of this chapter, a direct testing of functions is probably impossible, but functions might be *inferred* by identifying patterns in differential responses and their relationships with other variables. These patterns should reveal themselves if a) the sample size is large enough, and b) the sample is a reasonable representation of the general sample population (in this case, Australia). While the expression of functions *within* and *between* individuals may vary, there might be several characteristics of climate change that lead to the predominance of particular expressions (or opinions) for particular groups within the sample population. Further, categorising these opinions into groups will allow for the assessment of within-group fluctuations on other variables of interest (such as behaviour), and the investigation of whether third factors can account for any within-group variability.⁷ By identifying these broad patterns, implications for policy implementation at the community and national level can feasibly be drawn, while recognising that future in-depth individual-level research is an essential compliment to such an approach. For the reasons outlined above, I employed the following methods.

3.3 Method

3.3.1 National surveys

I conducted two online national surveys: one in July-August 2010 ($N = 5036$), the other in July-August 2011 ($N = 5030$). A total of 1355 respondents completed *both* surveys. The surveys were conducted and funded under the CSIRO's Climate Adaptation Flagship, whose goal it is to equip Australia with practical and effective options to adapt more effectively to climate change and variability. The Flagship's research activities include the Pathways to Adaptation theme, established to identify how different types of regions, sectors, and communities respond to climate change. The national surveys formed part of a longitudinal research program within this theme. I was tasked with the design, implementation, and analysis of these surveys under the supervision of Professor Iain Walker, who leads the Social & Behavioural Science Group of CSIRO.

⁷ These third factors may also reveal intra-individual inconsistencies in accounts (see below).

Participants were recruited using an online research-only internet panel.⁸ The online panel consists of a group of community members who have agreed to take part in web-based surveys occasionally. In return they are offered a small non-cash incentive for completing such tasks, such as points towards shopping credits.⁹ Online panels have several advantages over traditional recruitment techniques. First, managers of online panels can control for representative factors such as income and age more readily; second, social desirability bias is reduced if respondents have no direct contact with an interviewer; and third, selection bias (a particular concern for researchers working in environmental domains) is reduced, meaning that participant responses will be more representative of the wider society rather than over-representing those with a particular interest in environmental issues. Previous attitudinal research on climate change has often used undergraduate student populations, meaning interpretations are limited to relationships between variables, because conclusions about the distribution of responses in the community cannot be drawn.

Performing two surveys had several benefits also: it allowed me to refine measurement scales based on factor analyses of data from the first survey; to include further items in light of analyses from the first survey, and to discard items that did not appear fruitful; and to investigate changes over time for those participants who completed both surveys. This last point is important if people present different opinions (or accounts of opinions) over time according to the function the opinions (or accounts) serve. For the reasons stated above and for reasons of parsimony, the cross-sectional analyses reported in the remaining chapters are based on data drawn from the second survey, except where a question only appeared in the first survey (i.e. the 'self-descriptions' measure, as outlined below) and where time series data from both surveys were required to perform longitudinal analyses.

What follows is a brief outline of the measures contained in the surveys, and the reason for their inclusion. More detailed discussion about these measures and rationale for their inclusion are contained within the relevant data chapters. A table summarising these

⁸ The panel used is administered by ORU, an online fieldwork company with QSOAP 'Gold Standard' and Global ISO 26362 standard accreditation. The ORU has a database of over 300,000 individuals from across Australia (<http://www.theoru.com/>). A 'research-only' panel means that panel members complete only surveys intended for legitimate research purposes; this reduces the number of 'professional' survey respondents and increases the representativeness of respondents across behavioural, attitudinal, and lifestyle criteria.

⁹ Whether these shopping credits get used to purchase sustainably made essentials or frivolous carbon-intensive products is beyond the researcher's control.

measures, and the chapters in which they are employed, is included as Appendix A. Both surveys are included in their entirety as Appendix B.¹⁰

In Chapter 1 I mentioned that, when I refer to ‘responses’, I am referring to a collection of concepts, including beliefs, opinions, attitudes, behaviours, emotions, and associations toward climate change. These concepts have been differently conceptualised, amalgamated, and differentiated over many decades, so it is best to begin with a breakdown of how I conceptualise each of the terms with regards to climate change.

Belief. An important thing to establish is the amount of variation that exists in people’s ‘orientation’ toward climate change. This orientation should comprise a basic ontological belief: Does climate change exist?

Opinion. As I argue in the next chapter, it is not enough to merely assess people’s dichotomous belief about whether climate change exists or not, as discourse about the existence or otherwise of climate change as a concept has been reframed in such a way as to admit its existence, yet escape its attendant consequences. Therefore I must also determine *why* people think it exists, if they do at all. We can think of this as people’s basic ‘opinion’ about climate change: the overt manifestation of people’s underlying beliefs about the nature and causes of climate change. This ‘opinion-type’ will serve as one of the cornerstones of response variation under investigation. In addition to establishing participants’ own opinion-type, a measure assessing participants’ estimates of general community opinion is included (an **Opinion Consensus** measure). This latter measure is employed to establish whether social support and uncertainty reduction functions might be operating.

Attitudes. As climate change is by and large intangible, ‘attitudes’ to climate change do not refer to direct evaluations of the attitude object per se. Instead, I use attitudes to refer to a

¹⁰ Not all of the measures contained in the survey are included in the discussion here, nor do they appear in the thesis, as the survey was developed in part to satisfy the broader goals of the Climate Adaptation Flagship with regards to the monitoring and evaluation of Australian views on climate change. Two CSIRO reports have emerged as a result of the national surveys (Leviston & Walker, 2010, 2011). All of the measures included in this thesis were developed by myself, except where due acknowledgement to past research is given.

person's set of evaluations about the impacts of climate change and responding to climate change. Two types of attitudes are included: self-referent attitudes, and social attitudes. Self-referent attitudes make specific reference to the individual, and include felt moral and ethical responsibility to respond to climate change, the personal relevance of climate change, worry, anticipated harm, and certainty that climate change is (or is not) anthropogenic. Social attitudes are evaluations of societal-level impacts. These attitudes include the perceived efficacy and potential impacts on society of collectively responding to climate change. A measure of perceived **individual efficacy** of responding to climate change is also included. Together, these attitudes will help establish whether moral engagement is linked to other attitudes and opinions on climate change, how individual and collective efficacy relate to one another, and the antecedents and corollaries of the personal relevance of climate change.

Behaviours. Traditional functional analyses have focused almost exclusively on attitudes and/or opinions (despite the acknowledgement that *actions* also serve functions). But it is ultimately what people *do* that policy-makers and others are interested in. Without behaviour change, there can be no climate change mitigation or adaptation. Hence we need a list of behaviours that are relevant to climate change emissions, that most people will *know* are relevant to climate change emissions, and that encompass a range of difficulties. Individuals can engage in many behaviours that can reduce or increase greenhouse gas emissions, so the most efficient, valid, and reliable way of measuring pro-environmental behaviours is an ongoing point of discussion (Gifford et al., 2011; Roser-Renouf & Nisbet, 2008). Roser-Renouf and Nisbet (2008) suggest that any measure of pro-environmental behaviours include items targeting the following behavioural domains: home energy conservation, consumption, transportation choices, and activism.

By incorporating a behaviour score I can investigate whether climate change opinions and attitudes might serve the function of excusing one's engagement in effortful behaviours. But, as well as attitudes and opinions serving the avoidance of effortful behaviour, behaviours may in themselves serve important functions: for instance, pro-environmental behaviour may reinforce self-identity needs or group belongingness, or help us feel we are contributing to something that will outlast our own lifetimes. I can also assess the levels of variance of behaviour that occur *within* major opinion-types.

Another type of behaviour is **policy support**. This is currently of particular relevance in Australia given the announcement (which has subsequently been introduced) of a carbon pricing mechanism during the second national survey.

Ratings of **trust** in information about climate change are included, in part to establish whether authority referents and personal referents differ between opinion-types. Differential levels of trust in information sources such as scientific and government organisations might indicate important functions associated with social identity and self categorisation.

By including ratings of **responsibility** for causing and responding to climate change allows for the identification of contradictions in individual accounts of climate change causation, providing clues that certain functions may be driving expressed opinions. Contradictory accounts might also indicate ambivalence of beliefs with regards the existence and causes of climate change not captured by opinion-type alone.

Ideologies. The ideologies we are interested in concern social-system legitimising tendencies. These include Right-Wing Authoritarianism, Social Dominance Orientation, and Economic System Justification. Voting intentions and voting behaviour are also included. By contrasting these attributes with opinion-type, behaviour, and levels of income, we can investigate whether status-quo bolstering and system justification are in evidence.

Emotional responses. By testing negative and positive emotions associated with climate change we can pursue the idea that certain opinions and attitudes are functioning to reduce negative affect and/or maximise positive affect. Of particular interest here is the association between guilt (an important outcome factor of moral disengagement, attitude change, and system justification) and response variables.

Self-descriptions. Self-descriptions about what people base their responses to climate change on may reveal important self-presentational functions, particularly those contained

in the Self-Standards account of cognitive dissonance. This account suggests individuals are often concerned with appearing moral, intelligent, and in control, both to themselves and to others. Dunning (1999) states that people tend to emphasise those attributes that put them in a flattering light, and emphasise their lack of undesirable traits, therefore a blend of potentially positive, neutral, and negative descriptors are included.

Associations. Because of our tendency to reference pre-existing phenomena to make sense of something new, it is important to know what comes to mind for people when they think about climate change. Hence, associations with climate change were incorporated into the first national survey. The other advantage of investigating associations is that it avoids the problem that what people *express* might be different to what their initial (or actual) thoughts are. But because implicit, automatic associations are difficult to test in direct self-report surveys (where we have little control over how much time people take to respond), I also used another method for eliciting associations: implicit association workshops.

3.3.2 Image Association Workshops

To investigate people's implicit mental constructions of climate change, four workshops with 52 participants in all were conducted. Two workshops were held in December 2010 ($n = 11$; $n = 8$) and two in March 2011 ($n = 14$; $n = 19$). These workshops asked participants to rank images of climate change (derived from the first national survey) according to the extent to which the images accorded with their own associations with climate change. A further task required participants to rate the affective qualities of the images they personally associated with climate change. In addition to these exercises, an approximately half-hour discussion was held with each group in order to elicit meanings about their cognitive representations of climate change, to identify ambiguity and inconsistency in associations, to identify which subsets of beliefs and rules might be accessed preferentially, and to explore any functional value these associations might hold.

Ethics clearance was granted for the online national surveys and the implicit association workshops by both the CSIRO's Human Research Ethics Committee (reference numbers 026/10 and 079/10) and Curtin University's Human Research Ethics Committee (reference number HR53/2010).

Chapters 4 to 7 investigate the functions of responses to climate change using the data from the two national surveys. Chapter 8 investigates climate change image associations. Chapter 9 synthesises findings from these chapters and attempts to conceptually represent the functions of climate change responses by drawing on the results of the preceding chapters.

CHAPTER 4. CLIMATE CHANGE IN CONTEXT: AUSTRALIANS' GENERAL RESPONSES TO CLIMATE CHANGE

"The notion of global warming is a hoax. This is witchcraft. Commonsense will tell you it's rubbish"

Alan Jones

Radio Presenter, 2GB, Sydney

Anti-carbon tax rally, 2012

If you're an avid consumer of Australian media, and are particularly attuned to matters concerning climate change, chances are you will come across one or both of two themes today.¹¹ One theme might run along the following lines: *We must act NOW to address climate change, what we're doing is not enough, where's the urgency people? It's probably too late, but if it isn't, someone should really do something about it!* Another, just as vociferous theme might go like this: *That whole climate change thing is a sham, it's a left-wing conspiratorial beat-up, designed to redistribute wealth from the 'haves' to the 'have nots'.*

The above is of course a caricature of a complex debate surrounding a complex issue, but it reflects the antagonistic nature of current climate change discourse and coverage in Australia. The bulk of the social psychological research introduced in Chapter 1 concerns the responses of people in northern hemisphere countries to climate change.

Corresponding Australian research has been sparse. The gap is important, as many of the functional responses outlined in previous chapters depend on specific socio-political cultures and geographical contexts which may differ from country to country. From a functional perspective, the cultural context creates specific sets of normative and non-normative response patterns to which the individual must adjust. If those cultural cues change, individuals might also have to adjust their responses to ensure their needs and goals continue to be met.

In this chapter, I summarise the cultural context for climate change responses in Australia. Previous attempts at measuring Australian opinions about the causes of climate change are

¹¹ And assuming your media consumption passes a bare minimum of eclecticism!

examined, including an assessment of why these attempts have failed to provide a consistent picture of the prevalence of different opinions. I then use the national survey data to test the prevalence of different climate change responses, including opinions about its causes, personal and social attitudes, pro-environmental behaviours, and the patterns within and between each of these. We can then hunt for clues that responses to climate change are serving various underlying functions.

4.1.1 Climate Change in Australia

Chapter 1 opened with an observation that the overall response to climate change has been relatively sedate given the enormity of the threat it poses. The discordance between threat and response is especially evident in Australia. There is mounting evidence that Australia will be more adversely affected by climate change than most countries. Forecasted impacts include increased frequency of drought in prime agricultural regions, increased pressure due to declining rainfalls on already overstretched metropolitan potable water supplies, costly and severe impacts on infrastructure, biodiversity, ecosystems, and tourism, and an increase in the intensity and frequency of natural disasters such as floods, droughts, bushfires, and cyclones in populated areas (CSIRO, 2011; Garnaut, 2008). Strikingly, Australia is the highest per capita emitter of greenhouse gases of any OECD country, and the sixth highest emitter per capita in the world (Garnaut, 2008). Australia's emissions, in large part due to a heavy reliance on coal as a domestic power generator and key commodity export, are nearly twice the OECD average, and more than four times the world average (Garnaut, 2008).

One might expect that the anticipated local consequences of climate change, and Australia's role as a heavy emitter, would see the nation at the forefront of global efforts to mitigate climate change. In the scientific domain, there is evidence for this expectation. Australia has a long history of climate research, dating as far back as the late 1940s (Smith, Thomsen, & Keys, 2011). The last decade in particular has witnessed an increasing focus on adaptation policies and programs through national research programs such as the National Climate Change Adaptations Research Facility and the establishment of the Department of Climate Change and Energy Efficiency by the Australian Government. But in the same period, significant political controversy and pressure exerted by industry has stymied these advancements, notably with respect to policy development (Smith et al., 2011).

Toward the end of the 1980s, climate change policy initiatives became framed in economic terms, with targets to reduce greenhouse emissions contingent upon their neutral effect on the domestic economy (Smith et al., 2011). Throughout the 1990s, Australia was condemned internationally for refusing to ratify the Kyoto protocol (positioning it alone with the United States as the only abstaining countries). Continued pressure domestically and abroad to ratify the protocol made climate change a key policy platform and a critical point of differentiation between the two major Australian political parties in the 2007 Federal election.¹² The election result delivered a mandate to the incoming Labor Government to show active leadership on climate change, the first parliamentary act of which was to ratification the Kyoto protocol (Howarth & Foxall, 2010). The new Government also sought to bring forward a national Emissions Trading Scheme by two years, to 2010, and committed Australia to an emissions reduction target of 60% from 1990 levels by 2050 (Howarth & Foxall, 2010). The political landscape then changed once more, and reasonably abruptly. A proposed Emissions Trading Scheme was defeated by a hostile Senate in 2009, and in the aftermath key Federal Liberal opposition leadership positions were filled by politicians known for their scepticism of human-induced climate change (Howarth & Foxall, 2010; Suri & Lofgren, 2010). In June 2010 the then Labor leader and Prime Minister, Kevin Rudd, was also defeated in a party leadership spill, his failure to push through the Emissions Trading Scheme cited as a key failing. Finally, in 2011, Labor Prime Minister Julia Gillard passed weakened, yet still highly politically and publically contentious, carbon pricing legislation through Federal parliament. This legislation took effect on 1 July 2012.

Concurrent with the changing political landscape, arguments opposing the notion of human-induced climate change gained prominence in the Australian mainstream media. In fact, climate change garnered more media attention than any other topic in 2009 (Bacon, 2011). One line of thought began to attract significant attention: that any climate variation identified by climate scientists could be adequately explained by natural variations (e.g. Carter, 2007; Plimer, 2009; Spencer, 2010). Content analyses of Australian media reporting of climate change and associated policies concluded that the media showed substantial bias

¹² The incumbent Liberal/National coalition (centre right on the political spectrum) continued to voice opposition to the ratification of the Kyoto protocol, although a domestic emissions trading scheme was mooted. The then Labor opposition (centre left) favoured ratification of the protocol, as well as more stringent pro-environmental policies, including the regulation of carbon emissions.

in their reporting, with undue column inches devoted to perspectives casting doubt on the anthropogenic contribution to climate change (Bacon, 2011; Manne, 2011).

The reframing of the sceptical position of climate change from outright denial of its existence, to something accountable by natural variation, continues to enjoy significant air-time in public discourse (Phillips, 2012). The ramifications of widespread acceptance of such a position might have little bearing on adaptation behaviours; if the climate is changing one must adapt independent of its causes. But the position might undermine efforts to mitigate climate change if human activity is assumed to have no discernible influence over the climate. But as we shall see, the extent to which alternative notions of the causes of climate change have gained traction and are influencing, and influenced by, the Australian community is far from established.

4.1.2 Australians' Opinions on the Causes of Climate Change

There is strong scientific consensus that human activity contributes to climate change and observed global increases in temperature through the release of greenhouse gases. For instance, in response to the question "*Do you think human activity is a significant contributing factor in changing mean global temperatures?*", 97.4% of 79 actively publishing climatologists responded "*yes*" (Doran & Zimmerman, 2009; see also Bray, 2010 for an overview of similar studies). The exact amount that humans contribute to climate change (referred to as 'anthropogenic forcing') relative to the amount attributable to natural fluctuations in climate is subject to greater uncertainty, but not scientific controversy. The Intergovernmental Panel on Climate Change concluded in its Fourth Assessment Report that contributions from human activity accounted for the majority of the observed increase in global average temperatures since the mid-20th century (IPCC, 2007), with more recent analyses estimating this contribution to be in the order of 75% (Huber & Knutti, 2011).

These points, that climate change is *significantly* influenced by human activity, and that the *majority* of observed climate change is attributable to human activity, provide scientific normative and non-normative opinions to hold about climate change causation. That is, scientific consensus has led to a conventional, or 'correct', opinion to adopt from a

scientific standpoint: that the climate is changing and human activity is the major contributing factor. Conversely, the emerging competing claim that climate change can be entirely attributed to natural variation, or that climate change is not happening *at all*, are scientifically non-normative opinions, in that these latter categories do not accord with the scientifically accepted evidence.

Although there is scientific consensus regarding the anthropogenic causes of climate change, it does not necessarily follow that this is the normative opinion among the broader community. For instance, the links between support for science in general and attitudes towards specific areas of scientific research (including climate change) is poor, regardless of scientific knowledge (Evans & Durant, 1995; Kahan et al., 2012). Further, despite the technical complexities of climate change, people might not even look to science and scientists for our information. People may reference a range of other sources to help guide our opinions; so what might seem a normative opinion for one person might be diametrically opposed to what seems the normative opinion for another person, dependent on the predominant view held by their respective reference groups. Whether normative scientific opinions surrounding climate change are, on aggregate, also normative in the Australian community is currently a point of contention (see Leviston, Leitch, Greenhill, Leonard, & Walker, 2011 for an overview of recent Australian research).

To date, most large surveys of Australians' responses to climate change have taken the form of telephone opinion polling rather than in-depth theoretically-driven research, with a few recent exceptions (e.g. Reser, Bradley, Glendon, Ellul, & Callaghan, 2012). A useful attribute of opinion polls is their relatively representative large scale datasets, but it is beyond the scope of such polls to include the possible drivers of opinions, beyond the identification of basic socio-demographic differences. Irrespective, these polls provide a base from which we may discern general public sentiment. Table 4 provides a summary of recent research in Australia investigating the prevalence of different opinions about the causes of climate change. The table demonstrates why it is difficult to reach definitive conclusions about absolute levels of different opinions. Responses vary at least in part due to differences in response formats, modes of data collection (e.g. whether it was a telephone survey or an online survey), and different sample populations (e.g. whether the respondents were based in the city or in rural locations).

Table 4: Percentage of people who think climate change is human induced*

Study	2010	2009	2008
Griffith/Cardiff Universities (Australian sample)	77%	-	-
UQ Political Leaders and Climate Change	-	55%	-
ARCCANSI survey	58%	-	-
Australian Gallup Poll	44%	-	52%
Essential Media survey	45%	53%	-
Ipsos survey	77%	-	-
Newspoll	94%	-	96%
Thermometer surveys	-	73%	73%
Department of Agriculture, Fisheries and Forestry	-	58% (urban) 27% (rural)	-

* Reproduced from the original table in Leviston et al., 2011.

The issue of response format is a particularly thorny one. Appendix C contains the variety of response formats from recent climate change surveys in Australia. Looking at Table 46 one understands why research has produced inconsistent conclusions about the prevalence of different opinions. Some use Likert scale options to measure agreement that humans are contributing to climate change, while others are categorical measures of opinions. And *all* formats differ in their introductory statements. Response options might fail to provide an adequate range of options (such as those that fail to account for those who do *not* have an opinion one way or the other). Conversely, options might provide *too much* choice, so that post hoc decisions about aggregating response options have to be made by the researcher(s) if digestible conclusions are to be drawn; such aggregation can needlessly compound the validity issues involved in quantitative categorisation of people's opinions. Perhaps most importantly, if the response options given to participants do not reflect the current discourse on climate change, the validity of the measurement might be compromised. In short, any measure assessing opinions should try to reflect the language

with which climate change is presently discussed in public spheres, yet retain parsimony for psychometric utility (De Vaus, 2002).

4.1.3 Research Questions

In addition to identifying basic patterns in Australians' responses to climate change, the following research questions will be explored, drawn from considerations in the preceding discussion:

RQ1: To what extent are scientifically normative and scientifically non-normative opinions held by the broader Australian community?

RQ2: Can a measure of opinion-type about the causes of climate change meaningfully predict engagement in a range of pro-environmental behaviours?

RQ3: Are individual opinions about the causes of climate change stable over time, or are they malleable?

RQ4: How do other responses to climate change (including emotional responses, attitudes, self-descriptions, and political preferences), relate to opinions about the causes of climate change and pro-environmental behaviour?

RQ5: How may each of the above indicate the operation of social and psychological functions?

4.2 Method

4.2.1 Surveys and Participants

Two online surveys were conducted: one in July and August 2010 ($N = 5036$), the other in July and August 2011 ($N = 5030$). A total of 1355 respondents completed *both* surveys. The Time 1 (T1) survey was conducted in the six weeks immediately prior to the 2010 Australian federal election, and the Time 2 (T2) survey straddled the Federal Government announcement of its plan to put a price on high carbon-emitting industries. Therefore it is assumed that, during both surveys, climate change was a salient issue for many people due to extensive coverage both in the political sphere and the media.

The demographic profile of respondents (see Table 5) for the two surveys corresponds closely with the known population characteristics of Australians (ABS, 2010). For both the T1 and T2 samples, those in lower income brackets were marginally under-represented, while those in higher age brackets were marginally over-represented. Males and those in higher age brackets were marginally over-represented among the repeat respondents.

Table 5. Basic demographics of survey respondents.

		T1 (2010; N = 5036)	T2 (2011; N = 2011)	T1/T2 Repeat Respondents (N = 1355)
Age Bracket (years)	< 24	5.2%	4.5%	0.4%
	25-34	14.0%	12.7%	4.8%
	35-44	16.6%	14.7%	12.3%
	45-54	20.7%	22.6%	18.9%
	55-64	22.1%	21.0%	28.3%
	65-74	17.4%	19.1%	26.6%
	75-84	3.8%	5.0%	8.0%
	> 85	0.3%	0.4%	0.7%
Gender	Female	48.8%	53.6%	43.5%
	Male	51.2%	46.4%	56.5%
Individual Income Bracket (per week)	Negative/Nil	4.0%	4.5%	3.2%†
	\$1 - \$149	3.3%	3.4%	2.9%
	\$150 - \$249	6.4%	6.2%	6.6%
	\$250 - \$399	14.3%	15.2%	17.0%
	\$400 - \$599	13.8%	15.4%	16.6%
	\$600 - \$799	11.6%	11.1%	9.8%
	\$800 - \$999	11.3%	11.1%	9.8%
	\$1000 - \$1299	12.0%	11.8%	11.5%
	\$1300 - \$1599	9.5%	8.5%	6.9%
	\$1600 - \$1999	6.3%	6.3%	7.3%
\$2000 or more	7.6%	6.5%	8.4%	
Location	Capital City	56%	55%	57%
	Regional Town	30%	29%	28%
	Rural Area	14%	14%	14%

† Based on income recorded at T2

4.2.2 Measures

The following section details those measures relevant to the current chapter. The surveys in their entirety are included as Appendix B.

Beliefs and opinions about the causes of climate change. To establish people's basic belief concerning the existence of climate change, respondents answered either *yes* or *no* to the question *Is climate change happening?*

Opinion about the causes of climate change was assessed with the question *Which of the following statements best describes your thoughts on climate change?* Respondents selected one of the following four statements: *I don't think that climate change is happening; I have no idea whether climate change is happening or not; I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures; I think that climate change is happening, and I think that humans are largely causing it.* These last two statements were designed to distinguish between different perceived causes of climate change: 'natural' (or non-human-induced) climate change, and anthropogenic (or human-induced) climate change. These statement categories are referred to as ***deny***, ***don't know***, ***natural***, and ***human-induced*** for the remainder of the thesis and comprise the four major opinion-types of interest.¹³

To investigate stability and changes in opinion over time, respondents were also asked *Over the past year, have you become more or less sure that climate change is happening?* Responses were recorded on a scale from '1 = Much less sure' to '5 = Much more sure'.

¹³ There is ongoing discussion and research concerning the best way to measure opinions concerning the nature of climate change. The measure employed here is a (deliberately) forced-choice measure and therefore is not an exhaustive list of the range of more nuanced perspectives it is possible to have on climate change (see Reser et al., 2012 for an alternative perspective on measurement). A recent experiment assessing the effects of question wording on apparent levels of climate change opinion showed this question-framing to have better predictive validity than other measures of opinion in relation to five criterion variables commonly used in the climate change literature, including pro-environmental behaviour (Greenhill, Leviston, Leonard, & Walker, in press). The results of this experiment also suggested that allowing an option for an equal mix of natural and anthropogenic causation results in a discrete group of respondents, although the extent to which this represents a 'middling tendency' response is unclear.

Pro-environmental Behaviour Scale. Sixteen items measured pro-environmental behaviour. These items were selected to encompass the following domains: home energy conservation, consumption, transportation choices, and activism (e.g., *I switch off lights around the house whenever possible; I have taken part in a political campaign about an environmental issue*; see Table 6 for a full list of items).¹⁴ Research suggests that if a behaviour, such as reducing energy consumption, is motivated primarily for environmental reasons, it is more stable over time and is more likely to lead to further pro-environmental behaviours than if that same behaviour is motivated by factors like financial self-interest (Thøgersen & Crompton, 2009). With this in mind, participants were asked whether their engagement was mainly for environmental reasons or mainly for other reasons (e.g. for convenience or cost-saving). Those behaviours nominated as ‘mainly for environmental reasons’ received a score of ‘2’, those engaged in for other reasons a score of ‘1’, and no score was assigned if a behaviour was not performed at all.

One debate concerning the measurement of pro-environmental behaviour is whether all behaviours should be aggregated into a single index or whether different factors should be extracted and tested separately (Roser-Renouf & Nisbet, 2008). Some researchers favour a single index, as long as the index has sufficient validity and reliability (Kaiser & Fuhrer, 2003). Others (e.g. Stern, Dietz, & Abel, 1999) warn that a single index approach may overlook important relationships between dependent variables and different domains of behaviour (such as individual consumption and activism). Therefore, a factor analysis was performed to identify underlying constructs. In Table 6 there are suggestions of three main underlying constructs (based on Eigenvalues and scree plot) in the T2 data: individual consumption reduction behaviours, purchasing behaviours, and public behaviours (see Table 7 for the factor correlation matrix). However, the single-index aggregated behaviour score was retained to identify relationships with other variables, as the alpha for a single-index aggregated behaviour score was both reliable (alpha = .84) and valid; that is, it covered the suggested behavioural domains (Roser-Renouf & Nisbet, 2008), whereas the factor solution drops the transport domain in addition to other climate-relevant behaviours. Further, the inter-correlations between factors were moderate to strong, and

¹⁴ The measure was amended from the T1 measure (where 17 items were used) by introducing five additional items measuring public-sphere behaviours to provide a better balance of behavioural domains. To keep the length of the measure reasonable for respondents, the six items that had the least amount of variance (i.e. those that were either nominated by a vast majority of respondents or a small minority of respondents) at T1 were deleted (see Appendix D for T1 behaviours).

responses to an aggregated single-index were distributed normally, enhancing its suitability for predictive analyses (see Figure 3). Accordingly, a pro-environmental behaviour score was calculated by aggregating the scores for each of the 16 behaviours, the highest possible score being 32, and the lowest 0.

Table 6. Pattern matrix loadings for pro-environmental behaviour items using Maximum Likelihood with Direct Oblimin Rotation¹⁵ on T2 data (N = 5030).

Pro-environmental behaviour item	FACTOR 1 Individual Consumption Reduction	FACTOR 2 Purchasing Behaviour	FACTOR 3 Public Behaviour	Communi- nalities
I switch lights off around the house whenever possible	.96† (.91) ‡	.04 (-.52)	-.08 (.39)	.38
I have reduced the amount of gas and/or electricity I use around the house	.78 (.80)	.01 (-.50)	.03 (.42)	.29
I have reduced the amount of water I use around the house and garden	.77 (.79)	.03 (-.53)	.01 (.38)	.18
I will usually try to fix things rather than replace them	.76 (.76)	-.08 (-.45)	-.03 (.39)	.11
I am on Green Power electricity	.29 (.43)	-.07 (-.33)	.21 (.38)	.27
I usually walk/cycle/carpool/take public transport	.21 (.34)	-.04 (-.26)	.21 (.33)	.15
I have switched to products that are more environmentally friendly	.00 (.54)	-.91 (-.91)	-.02 (.36)	.74
Most of my cleaning products are environmentally friendly	-.04 (.50)	-.88 (-.86)	.00 (.35)	.82
Where possible, I buy products that are made locally	.29 (.53)	-.36 (-.55)	.05 (.34)	.36
I have taken part in a political campaign about an environmental issue	-.03 (.32)	.08 (-.23)	.78 (.74)	.32
I have been a member of an environmental group or movement	-.08 (.22)	.05 (-.18)	.67 (.61)	.63
I have contacted a government member about climate change	.05 (.29)	.07 (-.20)	.55 (.56)	.55
I have given money to a group that aims to protect the environment	.06 (.34)	-.10 (-.32)	.45 (.52)	.63
I have voted in a government election on the basis of an environmental issue	.12 (.38)	-.12 (-.35)	.37 (.48)	.82
I have taken part in a conservation activity (e.g. Landcare, bush regeneration)	-.03 (.34)	-.08 (-.34)	.30 (.35)	.58
I have taken part in an environmental event (e.g. Earth Hour)	.13 (.19)	-.17 (-.20)	.21 (.32)	.22
Eigenvalue	5.53	1.70	1.15	
Variance explained after rotation	34.59%	10.6%	7.12%	

† Pattern coefficients; ‡ Structure coefficients
Coefficients > .40 appear in bold

¹⁵ Direct oblimin rotation was chosen as the factors were theoretically intercorrelated.

Table 7. Factor correlation matrix for pro-environmental behaviour factors.

FACTOR	1.	2.	3.
1. Consumption Reduction	1	-.60	.50
2. Purchasing	-.60	1	-.42
3. Public Behaviours	.50	-.42	1

Self-referent attitudes to climate change. Ten items measured respondents' self-referent attitudes toward climate change; that is, attitudes framed with reference to the individual respondent. Six attitudinal items and their scales were adapted from the Yale Project on Climate Change, a large longitudinal analysis of the American public's attitude toward climate change (Leiserowitz, Maibach, & Roser-Renouf, 2010). One item was taken from Whitmarsh (2009), and an additional three items were newly constructed for the questionnaire s (Table 8).

Social attitudes to climate change. Eight statements were developed to measure respondents' social attitudes to climate change; that is, attitudes framed as evaluations of societal-level impacts and responses. These statements were developed by drawing on the results of recent discursive analyses of how climate change is discussed in community and political spheres in Australia (Glasson, 2011; Kurz, Augoustinos, & Crabb, 2010). Four statements concerned potential positive outcomes associated with responding to climate change (e.g. *Climate change will foster greater community spirit and connectedness*), and four statements concerned potential negative outcomes associated with responding to climate change (e.g. *Responding to climate change will cost Australia a lot of money*). Responses were measured on 5-point Likert scales.

Emotional responses. Emotional responses to climate change were measured by the item *How does the issue of climate change make you feel?*, followed by twelve descriptors: *angry, ashamed, guilty, fearful, despairing, joyful, excited, irritated, hopeful, confused, bored, and powerless*. Responses were measured on 5-point Likert scales.

Table 8. Items measuring self-referent attitudes to climate change.

Items	Scale	Source
<i>How important is the issue of climate change to you personally?*</i>	1 = Extremely important' to '5 = Not at all important'	
<i>How worried are you about climate change?*</i>	'1 = Very worried' to '4 = Not at all worried'.	
<i>How much have you personally experienced the effects of climate change?*</i>	'1 = A great deal' to '4 = Not at all'	Yale Project on Climate Change
<i>How much do you think climate change will harm you personally?*</i>	'1 = A great deal' to '4 = Not at all'	(Leiserowitz et al., 2010) †
<i>Over the past year, have you become more or less sure that climate change is happening?*</i>	'1 = Much more sure' to '5 = Much less sure'	
<i>How sure are you that climate change is happening?*</i>	'1 = Extremely sure' to '4 = Not at all sure'	
<i>I feel a moral duty to act on climate change</i>	5-point Likert scale	Whitmarsh (2009)
<i>I feel it is my ethical responsibility to change my individual behaviour to combat climate change</i>	5-point Likert scale	
<i>How personally relevant is climate change to you?*</i>	'1 = Extremely personally relevant' to '5 = Not at all personally relevant'	New items
<i>Move the cursor to the place on the slide which best represents how sure you are that humans contribute to climate change</i>	Sliding scale labelled '1 = Sure that humans don't' to '100 = Sure that human do'.	

* Items with an asterisk were reverse-coded prior to analysis

† In the original study, the words 'global warming' appeared for 'climate change'

Political preference. Political preference was measured with the statement *Which political party did you vote for in the last federal election?* A list of the major political parties was given, as well as the options *other*, *nobody*, and *prefer not to say*.

Self descriptions. To investigate self descriptions, respondents were asked to describe their opinions on climate change using various trait descriptors. Respondents read the following: *Using the scale below, rate how much each word reflects your view on climate change* followed by 16 descriptors (*uninterested, cautious, considerate, uninformed, undecided, passionate, an activist, informed, gullible, I don't believe everything I hear, moral, sceptical, denying, immoral, selfish, and powerless*). Responses were recorded on a scale from '-5 = not at all like my view' to '+5 = exactly like my point of view'.

4.3 Results

The results in this section are taken from the T2 survey, except for Section 4.3.2 where only the cohort of 1355 participants who took part in both surveys is used to assess changes over time, and Section 4.3.9, as the self-attribution measure was only included at T1. An analysis of the main results from the T1 survey data is included as Appendix E, and are reported in Leviston and Walker (2010). Because of the high level of consistency of results between the two surveys, it was deemed preferable to present T2 data for cross-sectional purposes. There were two further considerations guiding this decision: first, T2 responses represent the most current data; second, several additional variables were included in the T2 survey on the basis of initial T1 findings and to test specific hypotheses derived from the literature described in Chapter 2.

4.3.1 Beliefs and Opinions about Climate Change

Roughly three-quarters of respondents (77.3%) thought that climate change was happening, while 22.7% thought it was not happening. Women (78.5%) were more likely than men (75.8%) to agree that climate change was happening, but the association was small ($\chi^2[1, n = 5030] = 16.48, p = .01, \text{Cramer's } V = .06$). Those who lived in regional towns were *less* likely to agree that climate change was happening than those in capital cities or rural areas, but this association was very small ($\eta^2 = .005$).¹⁶ Younger people were marginally more likely to agree climate change was happening, but again the association was very small ('Yes' mean date of birth = 1960, SD = 15.68; 'No' mean date of birth = 1956.5, SD = 14.64, $t(5028) = 6.82, p < .001, r = -.096$). Personal income levels were unrelated to belief ($\chi^2[11, n = 4306] = 15.64, p = .16, \text{Cramer's } V = .06$).¹⁷ Those from higher household income brackets were slightly more likely to believe climate change was happening, but the association was small ($\chi^2[4, n = 3887] = 15.76, p = .003, \text{Cramer's } V = .06$). Those with higher levels of education were slightly more likely to believe climate change was happening, but again the association was small ($\chi^2[9, n = 5030] = 99.98, p < .001, \text{Cramer's } V = .14$).

¹⁶ This contrasts with findings from the T1 survey where those in rural areas were slightly less likely to think climate change was happening than those in capital cities or regional towns (see Appendix E).

¹⁷ The sample sizes for personal and household income are reduced as respondents electing the option *Prefer not to say* were excluded from these analyses.

Table 9 provides a breakdown of levels of agreement with statements regarding the causes of climate change.

Table 9. Prevalence of opinion-type for climate change causation.

Which of the following statements best describes your thoughts on climate change?	Percentage	N = 5030
I don't think that climate change is happening ('Deny')	7.2	364
I have no idea whether climate change is happening or not ('Don't know')	4.4	220
I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures ('Natural')	43.8	2201
I think that climate change is happening, and I think that humans are largely causing it ('Human-induced')	44.6	2245

There was a small effect for gender ($\chi^2 [1, n = 5030] = 36.28, p < .001$, Cramer's $V = .06$), with women more likely to select *don't know* (women comprised 58.2% of this group) and *human-induced* (women comprised 57.9% of this group). There was also a small effect for age, with the mean age of those selecting the *deny* (mean date of birth = 1957) and *natural* (mean date of birth = 1957) statements slightly older than the mean age of those selecting the *don't know* (mean date of birth = 1964) or *human-induced* (mean date of birth = 1961) statements: $F (3, 5026) = 31.97, p < .001, \eta^2 = .02$.

Table 10 provides a breakdown of belief in the existence of climate change with opinions about its causation. Almost three-quarters (72.2%) of those who considered climate change a solely natural phenomenon selected "yes" to the initial question of whether it was happening at all. Nearly two-thirds (64.5%) of people who didn't know whether climate change was happening selected the "no" option when forced to choose a dichotomous response. A very small percentage of respondents (3.7%) selected contradictory statements (i.e. said "yes" to the dichotomous question and selected the 'deny' statement, or selected "no" to the dichotomous questions and selected the 'human-induced' statement).

Table 10. Breakdown of agreement that climate change is happening by opinion-type (N = 5030).

Opinion-type	Is climate change happening?		
	No	Yes	Total
Deny (7.2%)	356 (97.8%)	8 (2.2%)	364 (100%)
Don't know (4.4%)	142 (64.5%)	78 (35.5%)	220 (100%)
Natural (43.8%)	612 (27.8%)	1589 (72.2%)	2201 (100%)
Human-Induced (44.6%)	33 (1.5%)	2212 (98.5%)	2245 (100%)

4.3.2 Stability of Opinion-Type

To assess stability of opinions, responses from the 1355 respondents who completed both the T1 and T2 surveys were used. Table 11 illustrates the number of people who agreed with each opinion statement at both T1 and T2. Boxes shaded in grey represent the number of respondents who selected the same statement in both surveys ($n = 993$; 73.3% of all respondents). Boxes shaded in pink represent respondents who agreed in T1 that climate change was human-induced, but moved away from that view in T2 ($n = 134$; 10.6% of all respondents). Boxes shaded in green represent respondents who did not agree in T1 that climate change was human-induced, but moved towards this view in T2 ($n = 92$; 6.8% of all respondents).

Table 12 displays stability of opinion by original opinion-type ('consistent' referring to the percentage of people who selected the same opinion in both surveys). Those initially selecting *deny* and *don't know* statements showed much lower stability in their opinion when compared with those who originally selected the *natural* or *human-induced* statements. The third row shows the dominant trend of shifting opinion was toward the *natural* opinion, particularly for those who initially denied climate change.

Table 11. Repeat respondents' opinion-type at T1 and T2 (N = 1355).

		T1 Survey				
T2 Survey	Opinion type	Deny	Don't know	Natural	Human-induced	Total
	Deny	39 (2.9%)	4 (0.3%)	53 (3.9%)	13 (1.0%)	109 (8.0%)
	Don't know	5 (0.4%)	20 (1.5%)	16 (1.2%)	6 (0.4%)	47 (3.5%)
	Natural	41 (3.0%)	17 (1.3%)	441 (32.5%)	115 (8.5%)	614 (45.3%)
	Human-induced	3 (0.2%)	8 (0.6%)	81 (6.0%)	493 (43.2%)	585 (43.2%)
	Total	88 (6.5%)	49 (3.6%)	591 (43.6%)	627 (46.3%)	1355 (100%)

Legend: Pink-shaded boxes represent those who moved away from the human-induced opinion at T2. Green-shaded boxes moved toward the human-induced opinion at T2. Grey-shaded boxes represent consistent opinions at T1 and T2.

Table 12. Stability of opinion over time and most common directional shift, by original opinion-type (N = 1355)

	Deny	Don't know	Natural	Human-induced	Total
Consistent	44.3%	40.8%	74.6%	78.6%	73.3%
Inconsistent	55.7%	59.2%	25.4%	21.4%	26.7%
Opinion most commonly shifted to	-> Natural (83.7%)	-> Natural (58.6%)	-> Human (54.0%)	-> Natural (85.8%)	-> Natural (47.8%)

Repeat respondents were asked at T2 whether they had become more sure or less sure over the last year that climate change was happening. Table 13 shows responses to this question broken down by the groups shaded pink, green, and grey in Table 11. Despite moving *away* from the human-induced opinion, about 25% of the pink group indicated *more* certainty that climate change was happening. A further 59% of these respondents said they were *neither more nor less sure*. Only 15% of this group suggested they were *less* certain climate change was happening. Further, 40% of people who shifted their opinion to the *human-induced* statement said they were *neither more nor less sure*.

Table 13. Ratings of certainty that climate change is happening, grouped by direction of opinion-change between the T1 and T2 surveys (N = 1355).

<i>Over the past year, have you become more or less sure that climate change is happening? (T2 response)</i>	Moved <i>away</i> from human-induced opinion (n = 134)	Moved <i>toward</i> human-induced opinion (n = 92)	Had a consistent opinion (n = 993)
Much less sure	8 (6.0%)	1 (1.1%)	74 (7.5%)
Somewhat less sure	13 (9.7%)	2 (2.2%)	57 (5.7%)
Neither more nor less sure	79 (59.0%)	37 (40.2%)	471 (47.4%)
Somewhat more sure	30 (22.4%)	34 (37%)	224 (22.6%)
Much more sure	4 (3.0%)	18 (19.6%)	167 (16.8%)

4.3.3 Pro-environmental Behaviours

The mean for the aggregated single-index pro-environmental score was 11.91 ($SD = 6.07$). This result suggests that, on average, respondents reported engaging in five or six behaviours predominantly for environmental reasons (alternatively, engaging in, four behaviours for environmental reasons and a further four for mainly non-environmental reasons would also yield an average score). Figure 2 displays the breakdown of engagement in pro-environmental behaviours, and the reasons reported for engaging in them. The

figure suggests some behaviours are performed by very few people, while other behaviours are performed by nearly everybody. It also suggests that a considerable number of behaviours are motivated by reasons other than environmental considerations.

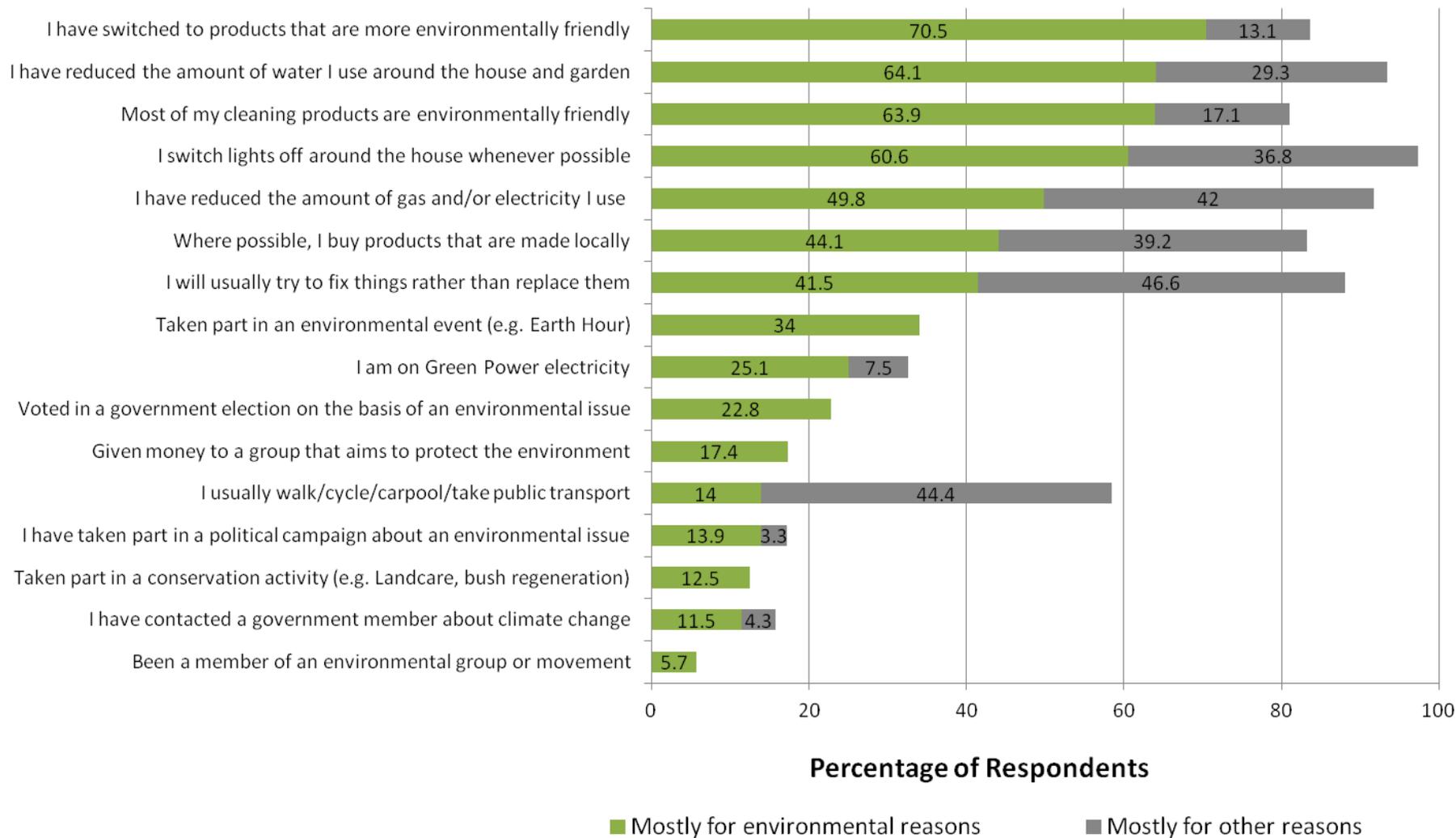


Figure 2. Percentage of respondents engaging in pro-environmental behaviours.

The distribution of pro-environmental behaviour scores is shown in Figure 3, and the distribution of pro-environmental behaviour scores for each opinion-type is shown in Figure 4. The distribution of behaviour scores is relatively normal, with a slight positive skew. When we look at the breakdown of the distribution by opinion-type (Figure 4), the patterns suggest that this skew is imparted by the *deny*, *don't know*, and *natural* respondents. It is also of interest that the behaviour scores of the *human-induced* opinion-type are normally distributed, and that every opinion-type displays considerable variability in behaviour scores.

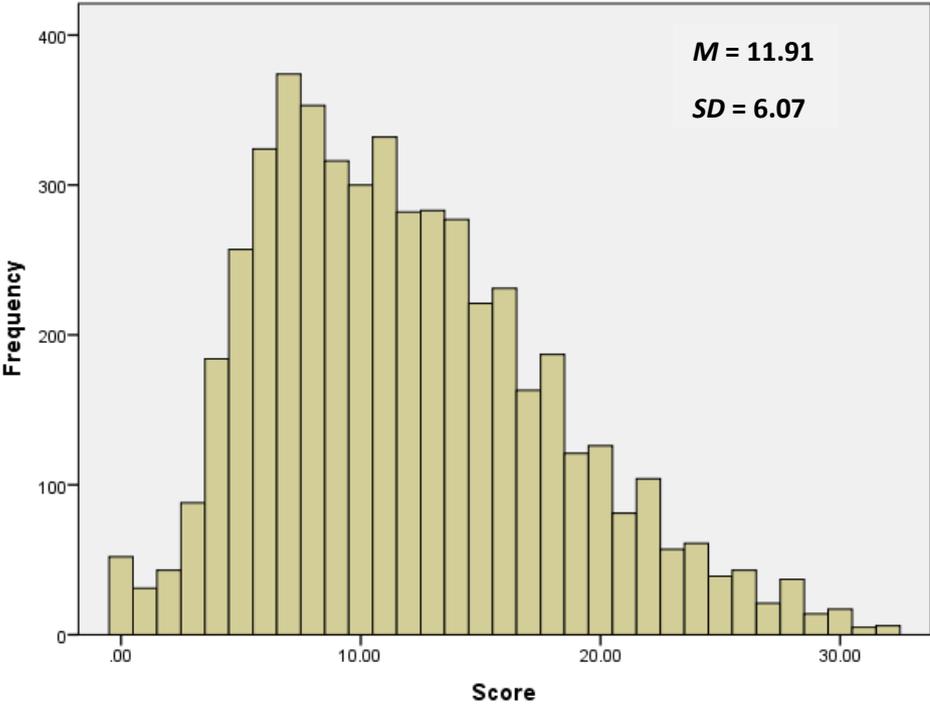


Figure 3. Histogram showing the distribution of single-index aggregated pro-environmental behaviour scores (N = 5030; min = 0, max = 32; skewness = .61, kurtosis = .02).

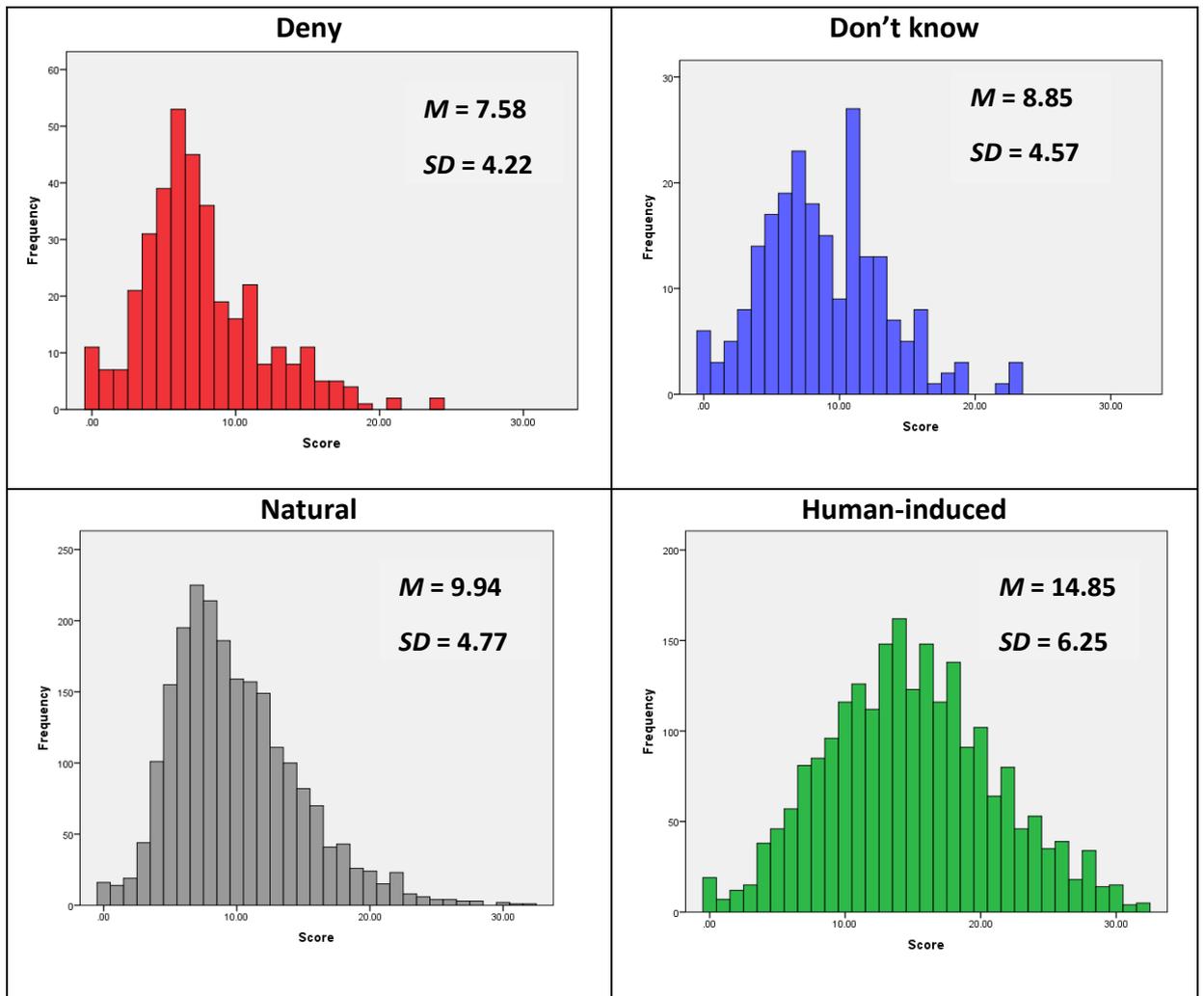
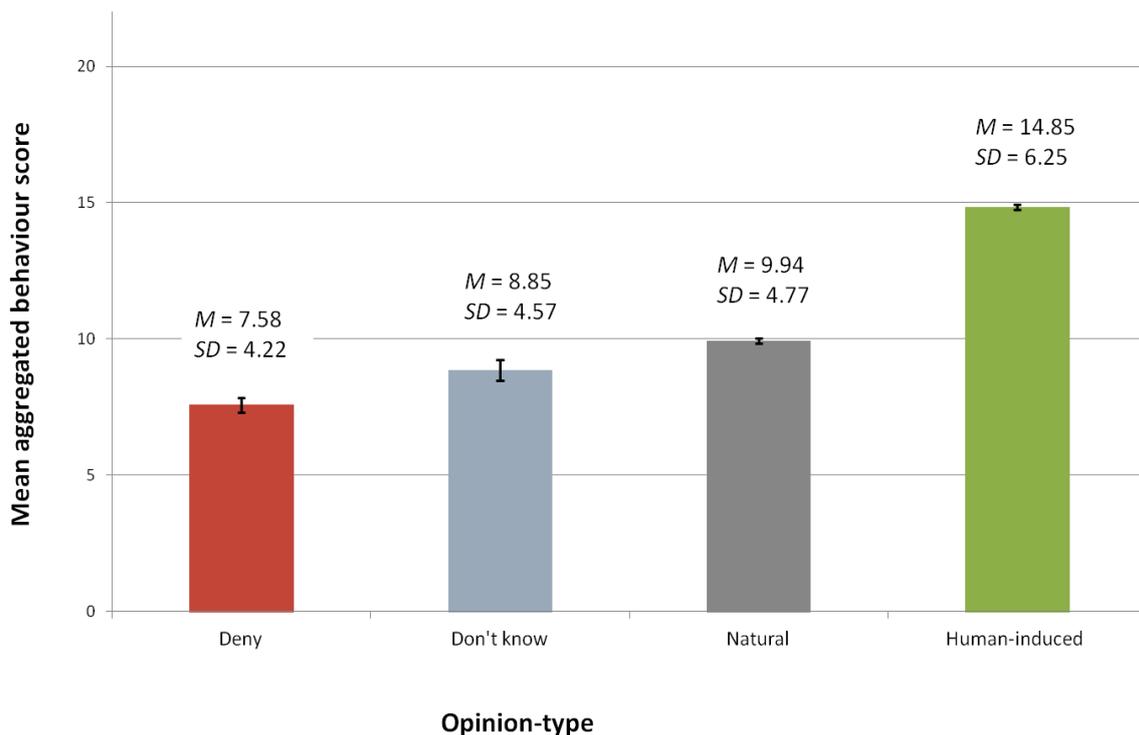


Figure 4. Distribution of pro-environmental behaviour scores for each opinion-type.

4.3.4 Opinions and Pro-environmental Behaviours

A one-way analysis of variance was conducted to test for differences in pro-environmental behaviour scores based on opinion-type: Welch (3, 5030) = 414.0, $p < .001$ (Figure 5).¹⁸ The effect size was large ($\eta^2 = .20$). Post-hoc comparisons using the Tukey HSD test indicated that all four groups differed significantly; those who thought climate change was human-induced had higher pro-environmental behaviour scores on average than all other groups, while those who denied had a lower score on average than all other groups.



* Error bars are standard errors based on 95% CI

Figure 5. Mean pro-environmental behaviour scores based on opinion about climate change causation (N = 5030).

4.3.5 Self-referent Attitudes to Climate Change

A simultaneous multiple regression was used to assess whether items that measured self-referent attitudes to climate change predicted engagement in pro-environmental behaviour. Table 14 displays the contribution of each item in order of strongest contribution to weakest. Together these attitudinal variables predicted 42% of the variance in pro-environmental behaviour scores.

¹⁸ The Welch test statistic is reported, as the Levene's test indicated that the assumption of homogeneity of variance was violated. The Welch value differed only marginally from $F = 414.6$.

Table 14. Simultaneous multiple regression analysis for attitudinal variables predicting pro-environmental behaviour scores (N = 5030).

Item	<i>M</i>	<i>SD</i>	<i>r</i>	<i>b</i>	<i>SE b</i>	β
Constant				-.27	.26	
I feel it is my ethical responsibility to change my individual behaviour to combat climate change	3.33 [†]	1.13	.56**	1.05	.10	.20**
How important is the issue of climate change to you personally?	2.91 [†]	1.21	.58**	.97	.11	.19**
I feel a moral duty to act on climate change	3.20 [†]	1.07	.54**	.77	.10	.14**
How personally relevant is climate change to you?	2.58 [†]	1.14	.55**	.67	.11	.13**
How worried are you about climate change?	2.49 [†]	0.94	.53**	.36	.13	.06**
How much have you personally experienced the effects of global warming?	1.82 [†]	0.83	.41**	.34	.11	.05**
How much do you think climate change will harm you personally?	2.21 [†]	0.93	.44**	-.35	.11	-.05**
How sure are you that climate change is happening?	2.50 [†]	1.06	.40**	.30	.08	.05**
Move the cursor to the place on the slide which best represents how sure you are that humans contribute to climate change	57.68 ^{††}	31.08	.40**	.01	.00	.03
Over the past year, have you become more or less sure that climate change is happening?	3.30 [†]	1.07	.46**	-.03	.09	-.01
<i>F</i> (10, 5020) = 363.91, <i>p</i> < .001				<i>R</i> ² = .42		

[†] Minimum = 1, maximum = 5; ^{††} Minimum = 0, maximum = 100
* *p* < .05, ** *p* < .001

4.3.6 Political Preference and Climate Change Opinions and Behaviours

A chi-square test for independence indicated a significant medium strength relationship between opinion-type and which political party people voted for in the federal election $\chi^2(12, n = 4130^{19}) = 774.33, p < .001, Cramer's V = .25$ (Figure 6). Those who voted for Labor or the Greens (politically left-wing parties) were more likely to consider climate change as human-induced, while those voting Liberal and National (politically right-wing parties) were more likely to consider climate change a product of natural variation.

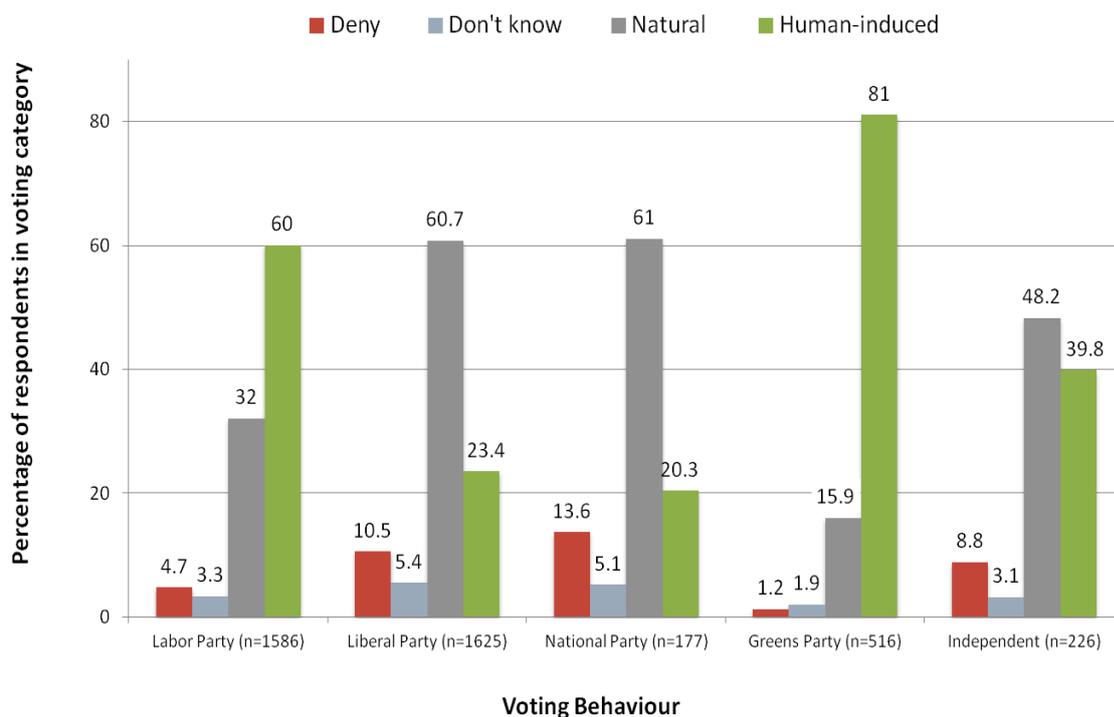
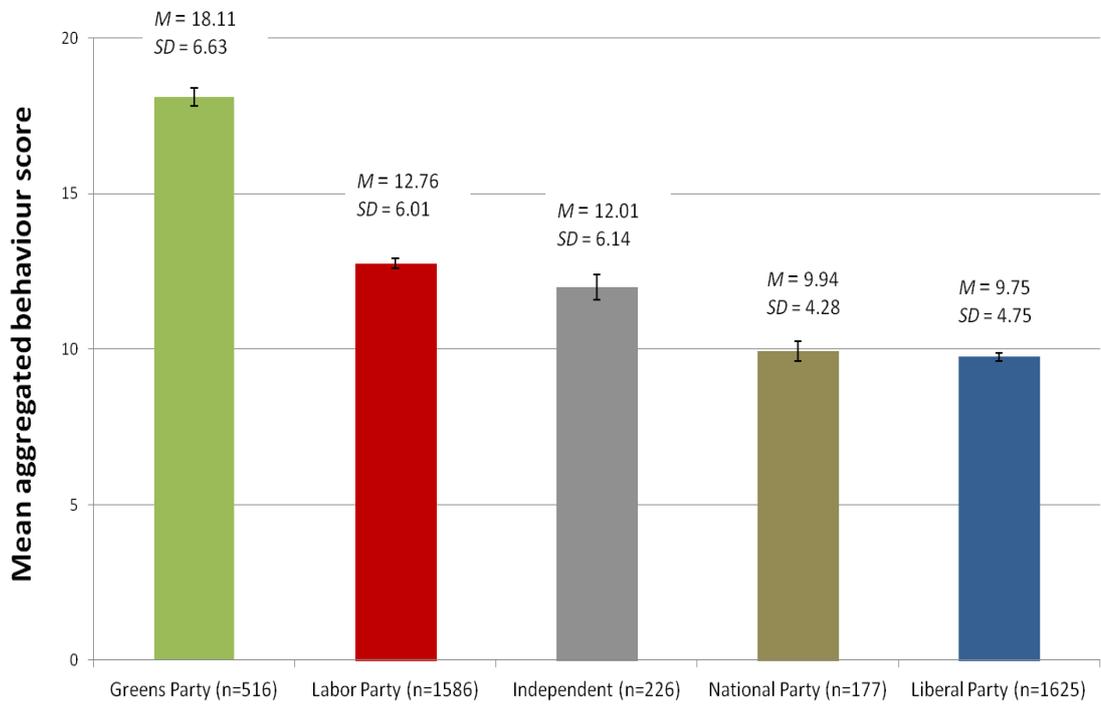


Figure 6. Opinion-type by voting behaviour (n = 4130).

A one-way analysis of variance was conducted to test for differences in pro-environmental behaviour scores based on voting behaviour (Figure 7). There were significant differences between voting groups: $F(4, 4130) = 234.2, p < .001$. The effect size was large ($\eta^2 = .19$). Post-hoc comparisons using the Tukey HSD test indicated that those who voted for the Greens had significantly higher pro-environmental behaviour scores than those who voted

¹⁹ A total of 900 respondents recorded a response of *Other, Nobody, or Prefer not to answer*. For these respondents, opinion-type was as follows: Deny = 7.7%; Don't know = 6.0%; Natural = 45.3%; Human-induced = 41.0%

for Labor or for an independent. Those who voted Liberal or National had the lowest behaviour scores on average.



* Error bars are standard errors based on 95% CI

Figure 7. Pro-environmental behaviour scores by voting behaviour ($n = 4180$).

4.3.7 Emotional Responses

Average ratings of emotional descriptors are provided in Table 15. The most strongly rated emotions were negative (*irritated*, *angry*, and *confused*), but the overall ratings suggest these emotions were not strongly felt.

Table 15. Mean ratings of felt emotions prompted by climate change (*N* = 5030).

Emotion Descriptor	Mean[†]	SD
Irritated	3.09	1.12
Angry	3.07	1.06
Confused	3.00	1.09
Powerless	2.93	1.03
Hopeful	2.83	0.97
Fearful	2.80	1.09
Bored	2.78	1.16
Ashamed	2.63	1.06
Despairing	2.61	.99
Guilty	2.55	1.03
Excited	2.22	1.16
Joyful	2.17	.86

[†] **Minimum = 1, maximum = 5**

An exploratory factor analysis on the emotion descriptors revealed four factors (based on those factors with Eigenvalues greater than 1) (Table 16). These factors can be described as: negative arousal, positive arousal, depressed, and annoyed.

Table 16. Rotated Factor Matrix of Emotion items using maximum likelihood extraction and Varimax rotation ($N = 5030$).²⁰

	Factor			
	1 Negative Arousal	2 Positive Arousal	3 Depressed	4 Annoyed
Ashamed	0.87	0.19	0.17	-0.08
Guilty	0.80	0.21	0.25	-0.16
Fearful	0.62	0.08	0.51	-0.20
Angry	0.41	-0.05	0.12	0.30
Excited	0.10	0.83	0.06	0.07
Joyful	0.03	0.83	0.11	0.13
Hopeful	0.22	0.49	0.16	-0.15
Powerless	0.16	0.05	0.60	0.07
Despairing	0.45	0.16	0.58	0.04
Confused	0.10	0.13	0.56	0.12
Irritated	0.06	-0.06	0.10	0.85
Bored	-0.21	0.16	0.05	0.66
<i>Eigenvalue</i>	3.86	1.95	1.67	1.10
<i>Variance</i>	32.17	16.21	13.91	9.13
<i>Scale</i>	$M = 2.76;$ $SD = 0.84;$ $\alpha = .80$	$M = 2.40;$ $SD = 0.75;$ $\alpha = .76$	$M = 2.85;$ $SD = 0.80;$ $\alpha = .66$	$M = 2.93;$ $SD = 1.00;$ $\alpha = .71$

Figure 8 displays the difference in mean emotion factor scores based on opinion-type. There was a large effect size for negative arousal ($F[3, 5027] = 338.81, p < .001, \eta^2 = .17$): those who thought climate change was human-induced gave the highest ratings for negative arousal. There was a medium effect size for annoyance ($F[3, 5027] = 255.56, p < .001, \eta^2 = .13$): those who denied climate change was happening gave the highest ratings for annoyance, followed by those who didn't know or thought it was natural. There were

²⁰ Varimax rotation was selected because it was not theoretically expected the factors be correlated.

small effect sizes for positive arousal ($F[3, 5027] = 21.26, p < .001, \eta^2 = .01$), and the depressed factor ($F[3, 5027] = 45.34, p < .001, \eta^2 = .03$).

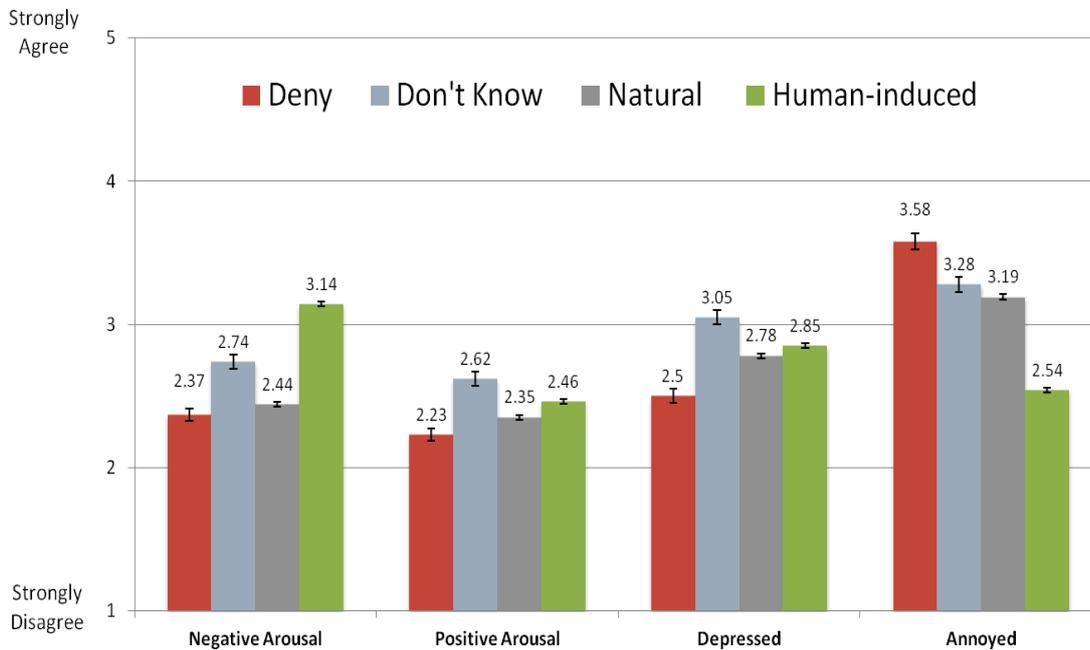


Figure 8. Ratings on emotion factors by opinion-type ($N = 5030$).

A simultaneous multiple regression was used to assess whether these emotion factors could predict engagement in pro-environmental behaviour (Table 17). All factors made a significant contribution to the prediction of behaviour, with high levels of negative arousal and low levels of annoyance having the largest influence. Together these factors predicted 23% of the variance in behaviour scores.

Table 17. Simultaneous multiple regression analysis for emotion factors predicting pro-environmental behaviour scores ($N = 5030$).

Emotion factor	M^{\dagger}	SD	r	b	$SE\ b$	β
Constant				9.65	.40	
Negative Arousal	2.76	0.84	.38**	2.77	.11	.38**
Positive Arousal	2.41	0.75	.14**	.50	.11	.06**
Depressed	2.84	0.80	.09**	-.66	.11	-.09**
Annoyed	2.93	1.00	-.31**	-.16	.08	-.27**
$F(4, 5026) = 369.46, p < .001$						$R^2 = .23$

[†] Minimum = 1, maximum = 5

* $p < .05$, ** $p < .001$

4.3.8 Social Attitudes to Climate Change

A simultaneous multiple regression was run to assess the influence of social attitude items on levels of engagement in pro-environmental behaviour. Table 18 displays the means and standard deviations for each social attitude item, as well as the contribution each item made in predicting pro-environmental behaviour, in order of strongest contribution to weakest. Items concerning a sense of purpose, and a chance to be part of something bigger, most strongly predicted high levels of pro-environmental behaviour, while a perceived lack of efficacy most strongly predicted low levels of pro-environmental behaviour. Together these factors were able to predict 31% of the variance in behaviour scores.

Table 18. Simultaneous multiple regression analysis for social attitude items predicting pro-environmental behaviour scores ($N = 5030$).

Social Attitude item	M^{\dagger}	SD	r	b	$SE\ b$	β
Constant				8.38	0.55	
Doing something about climate change is an opportunity to be part of something bigger than ourselves	3.33	1.12	.49**	1.14	.10	.21*
There's nothing Australia can do about climate change that will make a meaningful difference	2.95	1.35	-.46**	-.74	.08	-.16**
The challenge of climate change will provide people with a sense of purpose	3.08	1.01	.44**	.88	.10	.15**
Trying to do something about climate change will mean a lot of people lose their jobs	3.11	1.13	-.39**	-.53	.09	-.10**
Climate change will foster greater community spirit and connectedness	2.72	0.97	.36**	.46	.10	.07*
Climate change may mean that wealth and resources end up being distributed more fairly	2.42	0.98	.17**	-.20	.08	-.03*
Climate change will result in financial hardship for many people	3.46	1.03	.09**	.15	.08	.03
Responding to climate change will cost Australia a lot of money	3.81	1.00	-.24**	-.13	.09	-.02
$F(8, 5021) = 278.96, p < .001$				$R^2 = .31$		

\dagger Minimum = 1, maximum = 5

* $p < .05$, ** $p < .001$

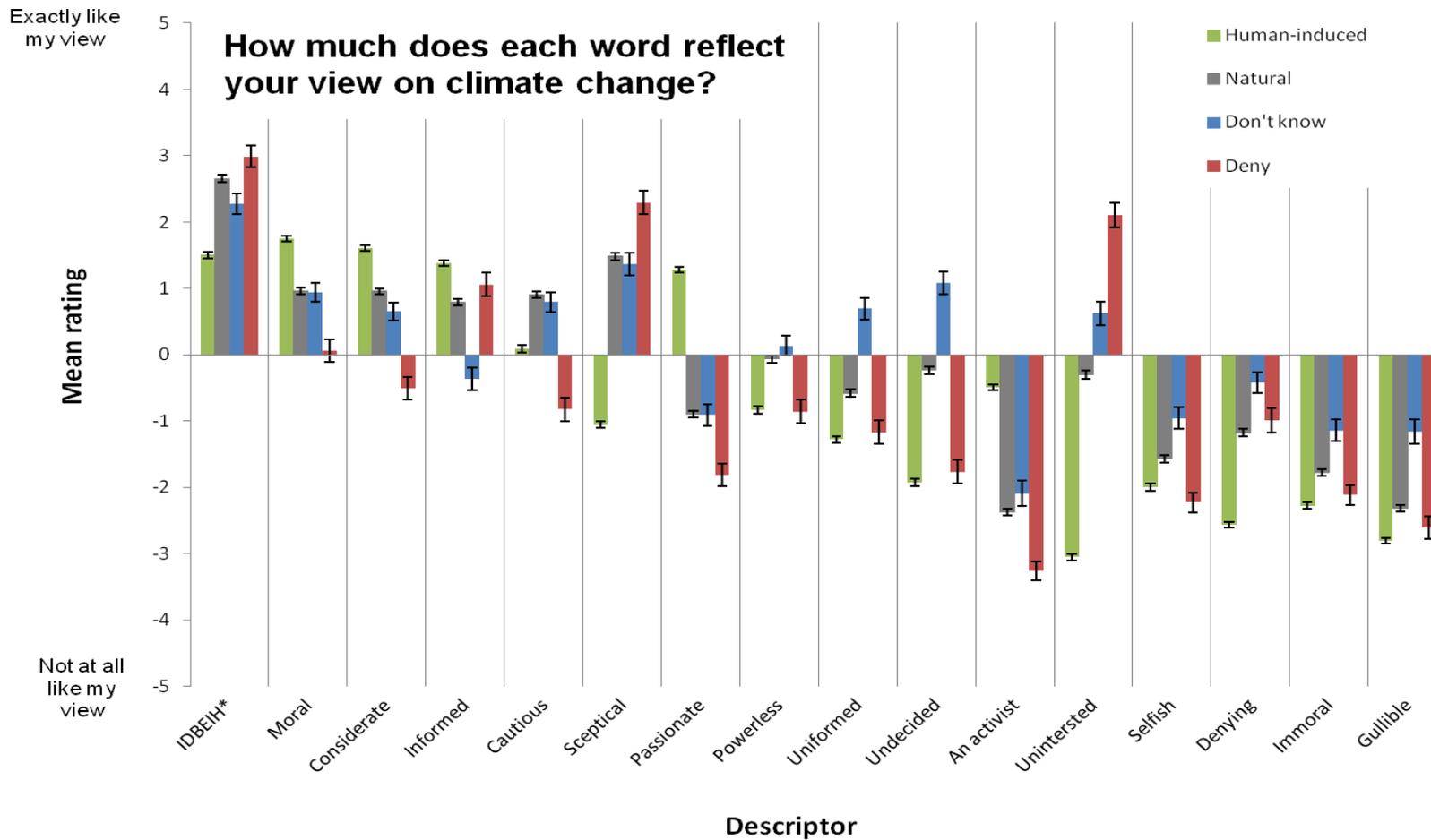
4.3.9 Self Descriptions

Respondents were presented with several trait descriptors and asked to assess the suitability of each for describing their own views on climate change. Table 19 displays the mean ratings for each descriptor. Ratings for each descriptor based on opinion-type are displayed in Figure 9.

Table 19. Mean ratings of descriptors' as reflections of views on climate change (T1 data, N = 5036).

Descriptor	<i>M</i>[†]	<i>SD</i>
I don't believe everything I hear	2.08	2.43
Moral	1.31	2.17
Considerate	1.19	1.96
Informed	1.06	2.31
Cautious	0.40	2.23
Sceptical	0.24	2.49
Passionate	0.15	2.39
Powerless	-0.49	2.56
Uniformed	-0.92	2.50
Undecided	-1.13	2.56
An activist	-1.46	2.44
Uninterested	-1.52	2.87
Selfish	-1.80	2.38
Denying	-1.84	2.33
Immoral	-2.02	2.30
Gullible	-2.54	2.49

[†] Minimum = -5, maximum = +5



* "I don't believe everything I hear"

Figure 9. Mean ratings of descriptors based on opinion about the causes of climate change (T1 data, $N = 5036$).

4.4 Discussion

Several key points have emerged in this exploratory phase of responses to climate change. First, there appears to be a lack of consensus regarding the causes of climate change, with only about half of the respondents reporting the opinion that climate change is largely driven by human activity. This result is in sharp contrast to the overwhelming consensus of climate scientists that human activity is the main driver (Doran & Zimmerman, 2009; Oreskes, 2004). Differences in opinion appear to be only weakly related to socio-demographic factors. Second, there appears to be large *within-group* variability surrounding what people are personally doing to mitigate climate change, although there are significant associations between opinions and actions. Third, moral and ethical duty seems to be linked to pro-environmental behaviour, to a greater extent than levels of certainty that humans are causing climate change. Fourth, political affiliation is strongly linked to opinions and pro-environmental behaviour, suggesting that opinion may be shaped in ways other than the accumulation of, or deference to, scientific knowledge. Finally, for a significant proportion of people (more than a quarter of repeat respondents), opinions about the causes of climate change are not static, but fluid and malleable. But what implications do all these results have for a functional understanding of climate change responses?

One of the findings that stands out to me is that only a very small proportion of respondents (less than 5%) selected the statement *I have no idea whether climate change is happening or not* as best reflecting their opinion on the causes of climate change. Of course, aside from specialists who spend decades working in the climate science domain, it is beyond the realms of practicality for us to directly know about the causes of climate change and have a handle on the sophisticated and complex area of anthropogenic forcing. This makes us reliant on external sources for opinion generation. It is reasonable to assume that only a small proportion of the population have encountered and digested comprehensive scientific accounts of climate change, meaning our opinions are further removed from the 'attitude object'. But over 90% of respondents selected an opinion statement other than 'I don't know'. Perhaps climate change is something we feel we *need* to have an opinion about; for instance, social pressures might require us to adopt a view on something discussed contentiously, or alternatively, the very state of forming a definitive

opinion about an issue we are fundamentally uncertain about may enhance feelings of coping and sense of control (Hogg, 2007).

The analysis of opinion stability suggests opinions about climate change are malleable for a significant proportion of people, and that shifts in opinion do not necessarily align with directional shifts in certainty. For instance, only 15% of people who at first thought climate change was human-induced, but nominated something else in the second survey, said they had become *less* certain climate change was happening. That opinions fluctuate so emphasises the need to look at what functions these opinions (and shifts in opinion) are serving. Is it because climate change is such a salient issue that we feel obligated to participate in society through formulating and expressing an opinion, even if we are uncertain about it? From a motivated cognition perspective, the contradiction in accounts between fluctuations in opinion and certainty of opinion suggests that climate change is an issue about which people are directionally motivated, rather than motivated by accuracy needs.²¹

So where are we getting our opinions from? The link between opinion-type and political preference is one clue for what our information sources might be, but it doesn't tell us much about functions, other than opinion might serve to reinforce one's voting choice. Political preferences are associated with a whole range of phenomena, including dispositional variables, values, worldviews, and the status-quo biases outlined in Chapter 2. Hence it would be premature at this point to conclude that political affiliations are the key driver of opinions. This area will be pursued in greater depth in Chapters 5 and 7.

Around 40% of respondents selected the statement *I think climate change is happening, but it's just a natural fluctuation in Earth's temperatures* as best reflecting their opinion. This represents a significant proportion of public opinion, and contrasts with other recent estimates about levels of acceptance of human-induced climate change (Leviston, Leitch, et al., 2011). Further, shifts in opinion from the first to the second survey were predominantly toward this opinion, a trend that was particularly marked for those who had denied climate change in the first survey. The prevalence of this opinion-type, and the pattern of shifts

²¹ By argument it is directionally motivated as much for those who consider climate change human-induced as it is for the 'sceptical' opinion-types.

toward it, indicates that the repositioning of climate change ‘scepticism’ in public discourse from ontological denial, to an acknowledgment with a caveat, has gained traction with a significant proportion of the community.²² From a functional perspective this is important, as the reframing provides a way to admit the existence of climate change, yet (arguably) escape the moral and behavioural imperatives that flow from such an admission. The relationship between this opinion-type and lower stated levels of pro-environmental behaviour suggests that this repositioning might function to excuse failing to perform behaviours that are difficult (indeed the relationship between opinion-type and behaviours suggests that this group, although distinct from deniers, has more in common with deniers than with those who accept that climate change is human-induced). The repositioning might also function to ward off an unwanted attribution; as ‘climate change denialist’ has become a pejorative term in public discourse, the reinterpretation can be used as a ‘disclaimer’ to tee up something otherwise socially unacceptable. This opinion is a way of maintaining a positive self-presentation by saying, “I’m not a climate change denier, but...” (Chiang, 2010). In the next chapter I explore whether this opinion also functions to reduce individual responsibility, and associated levels of negative affect.

The self attributions people made regarding the basis for their opinions further support the idea that self-presentational functions are at work. Specifically, the centrality of attributing opinions to one’s morality and non-gullibility²³ are consistent with Stone and Cooper’s (2001) notion that people need to present themselves as intelligent and moral individuals. The breakdown of attributions by opinion-type showed people of the *deny* opinion rating strongly on *disinterested*, but these people also had some of the strongest negative ratings for attributions of selfishness, immorality, and gullibility, relative to the other opinion-types. This slight incongruence could be interpreted as a form of self-presentation bolstering, possibly a reaction to negative media portrayals of ‘denialists’, and/or to reduce internal discomfort. Also of interest here, is that the rating with *the strongest valence of all* was from the *deny* group: a negative rating for *an activist*. This hints at an identity function: in this case, those who deny climate change decidedly separate themselves from this social reference group.

²² Note also that nearly two-thirds of people with this opinion indicated they thought climate change existed when asked the initial belief question, suggesting that a dichotomous response format might lead to distorted interpretations of public sentiment.

²³ As measured here by the phrase “I don’t believe everything I hear”.

When compared with other self-referent attitudes, feeling ethical responsibility and a moral duty to act were among the biggest predictors of pro-environmental behaviour, and these attitudes predicted pro-environmental behaviour to a greater extent than perceived threat, concern, and certainty. This result suggests that the mechanisms of how people become morally engaged, and morally *disengaged*, are particularly important to understand. Social attitudes were also clearly linked to behaviour, suggesting that perceptions about efficacy (or denial of efficacy) are important, and that positive coping appraisals can be made at a group level as well as at the individual level. The finding that providing a sense of purpose, and being part of something bigger than ourselves, were two of the top three predictors of behaviour is useful for understanding how barriers to climate change action might be overcome. These statement ratings have particular relevance to Terror Management Theory, which posits that existential anxiety (notionally induced by the mortality salience associated with climate change threat) is buffered by striving for meaning and purpose in life (Solomon et al., 1991). Meaning-striving does not necessarily take the form of environmentally harmful worldview bolstering responses (such as increasing one's consumption), but may also take forms that are beneficial to both communities and the environment.²⁴

The emotional response ratings to climate change suggest that negative arousal responses differ significantly according to opinion-type, supporting the notion that opinion might function both to regulate negative affect and to reduce feelings of guilt, shame, and anxiety. Negative arousal ratings were also associated with higher levels of pro-environmental behaviour, suggesting that these emotions have utility (at least at the level these emotions can be consciously accessed and accurately reported on) for behaviour change. Alternatively, the associations might suggest that *anticipated* arousal shapes opinions about climate change, which in turn influence the likelihood of engaging in pro-environmental behaviour. The other set of emotions most strongly predicting pro-environmental behaviour (this time negatively) were irritation and boredom, which were particularly highly rated by those of the *deny* opinion-type. These high ratings could represent a response to media saturation of an issue they view as having little basis in reality and therefore little legitimacy. Another, more speculative, possibility is that irritation in particular represents a *misattribution of an arousal cue* (Kunda, 1990). That is, people of the *deny* opinion-type do not consciously see their behaviours (or lack thereof) as

²⁴ Although beneficial actions could be due to similar worldview bolstering mechanisms.

responsible for something that is threatening to the self, hence they misattribute the negative arousal induced by exposure to external threat to something else: in this case irritation and/or boredom. It is difficult to conclude anything about the causality of relationships between negative affect, behaviour, and other variables based on this sort of self-report measure though, which relies on cognitively processing accessible information about how one *feels* about climate change. For these reasons we will return to the subject of emotions and affect in Chapter 8, where indirect techniques are used to elicit more implicit affective responses.

4.5 Conclusion

We now know that normative opinions in the community about the causes of climate change substantially differ from scientific norms. These opinions appear to be tied to political preferences, suggesting that norms are different for different segments of society. But the high levels of behaviour fluctuation *within* opinion-types also point to high levels of heterogeneity within these groups. The fluctuation also suggests that opinions about the causes of climate change do not overwhelmingly drive behavioural responses.²⁵ This last point is critical for climate science communicators. The traditional (and still dominant) deficit model approach argues that, if only people understood the climate science better, they would understand human activity is driving the majority of climate change. When people understand that, so the deficit model goes, people's behaviours will change. The between-group link between behaviours and opinion-group was large ($\eta^2 = .20$), but it still leaves a lot of variation unaccounted for, and suggests that the functional needs of individuals within each opinion-type also vary.

To further uncover what the different needs and goals of the individual are, both within and between groups, the factors that relate to opinions and behaviour need to be examined in depth. The next chapter focuses on one factor in particular: moral responses to climate change.

²⁵ It is acknowledged though that this variation may be partly attributable to some ambiguity in the question-wording, or ambivalence within the respondents themselves

CHAPTER 5. MORAL RESPONSES TO CLIMATE CHANGE

“Climate change is... the great moral challenge of our generation. To delay any longer would be reckless and irresponsible for the economy and for our environment”

Kevin Rudd on an Emissions Trading Scheme, 2007

“This is not a political issue. This is a moral issue, one that affects the survival of human civilization. It is not a question of left versus right; it is a question of right versus wrong”

Al Gore, September 2006

In the initial exploration of the data, a sense of moral duty and ethical responsibility to act on climate change were among the top predictors of people’s engagement in pro-environmental behaviour. In this chapter I look more closely at people’s moral responses. How might moral responses function to reduce negative affect and guilt, bolster self-image, and legitimise the avoidance of behaviours that require effort? Throughout the introduction of this chapter I will present several hypotheses, which I then test with the national survey data.

5.1.1 Climate Change as a Moral Issue

The challenge of responding to climate change is often framed in moral terms (Seabright, 2010). When the former Prime Minister of Australia, Kevin Rudd, failed to pass an Emissions Trading Scheme (ETS) in 2009, mainstream conservative media and online blogs latched on to his statement above to illustrate what to them was an act of intolerable hypocrisy (“The incredible shrinking man,” 2010; Uhlmann, 2010). The federal opposition, which had blocked the ETS’s passage, used Rudd’s words and subsequent (and apparently incongruent) act of shelving the ETS to its own political advantage (Howarth & Foxall, 2010). Political commentators have attributed Rudd’s 2010 ousting from the Prime Ministership by his party colleagues in large part to his apparent moral ‘transgression’ in failing to pass climate change legislation (Howarth & Foxall, 2010; Suri & Lofgren, 2010).

In a similar vein, a groundswell of negative press beset Al Gore not long after his release of *An Inconvenient Truth* and his statements about the moral nature of responding to climate change. Critics pointed out his relatively lavish lifestyle, juxtaposing it with his ‘moralising’ on climate change (Schweizer, 2006).

These two examples of ostensibly environmental (in Gore's case) and political (in Rudd's case) shortcomings share an important characteristic: the most scathing reactions did not come from green groups or environmental lobbyists, but from quarters known for their scepticism of anthropogenic climate change (e.g. Real World Libertarian, 2009; Wake up 2 the lies, 2012).

The moral corollaries of anthropogenic climate change might appear obvious to many, yet the reactions to Rudd and Gore exemplify how appealing to the moral imperative can backfire. One explanation for the intensity of response from climate change sceptics is that it serves a rhetorical purpose (e.g., 'they can't *really* believe in climate change if they act so'). Another explanation is that the reaction gains political mileage (e.g., the federal opposition's rejection of the ETS in the Senate meant a double dissolution of parliament and subsequent election was mooted). Similarly, pointing out hypocrisy might counteract any perceived political mileage gained by Gore and Rudd from moralising on climate change. But there appears to be something about appeals to the moral imperative that produce strong defensive reactions in people, beyond cold political considerations. What might underlie such reactions?

5.1.2 The Functions of Morality, Self-identity, and Self-esteem

Morality is a central component of most people's self-concept (Allison, Messick, & Goethals, 1989). A sense of 'being moral' functions in part at an intra-individual level to maintain self-esteem, but there is a social component to it as well; people are keenly aware of the social stigma that accompanies having one's morality questioned (Ybarra, Chan, & Park, 2001). Hence we are always on the look-out to maintain at least the appearance of being moral. Rudd's and Gore's comments challenge people's morality; if one isn't acting with the utmost urgency to mitigate climate change, the challenge goes, one's morality is questionable. Such implicit reproaches of people's morality have been demonstrated to threaten people's positive self-images (Monin, Sawyer, & Marquez, 2008).

The charge frequently levelled at Rudd and Gore was guilt by 'moral hypocrisy'. Paradoxically, the accusation might extend from our own tendency to judge others more

harshly than we judge ourselves (Valdesolo & DeSteno, 2007). That is, we ourselves are guilty of moral hypocrisy: the same immoral behaviours are deemed more acceptable when performed by the actor than when performed by another. Moral hypocrisy, it is argued, arises because we are motivated to protect our own feelings of self-worth and preserve the integrity of the self.

Moral hypocrisy is most often operationalised as the discrepancy between what individuals perceive as normative and what they actually do, or by the discrepancy between the perceived acceptability of one's own moral transgressions and the acceptability of those committed by others (Polman & Ruttan, 2012). Regarding climate change (which is the quintessential collective problem), moral hypocrisy may be operationalised as a gap, or 'disparity', between the perceived responsibility of different groups. Moral hypocrisy also occurs at the group level; people judge unfair or immoral actions of people associated with their in-group as less severe than when performed by a member of an out-group (Valdesolo & DeSteno, 2007). In the case of climate change, we might think of individuals as a collective (i.e. members of the public) as an in-group, and out-groups as external agencies like governments, corporations, and global organisations. To defend the immorality of inaction, we should expect that ratings of individual as a collective for acting is lower than responsibility assigned to *other* entities for acting (e.g. people will place a higher standard on external agencies to act than on people like oneself).

Such disparity in ratings of responsibility for action need not be limited to those who consider climate change human-induced. From a purely logical position, those who deny the existence of climate change should consider *nobody* responsible for responding to it (why respond to something that isn't there?). But if denial or scepticism serves a motivational function, this might be captured by observing disparity between ratings of individual-level responsibility versus others' responsibility for acting on climate change. For those who think climate change is happening, but due solely to natural causes, feeling a responsibility to respond to climate change might be a logical position to take, as one still needs to adapt to the impacts of natural phenomena. For these people then, we might capture functional responses through disparities in ratings of responsibility for *causing* climate change (because if it is solely natural, *nobody* should be more responsible than anyone else for causing it, Mother Earth aside) (*Hypothesis 1*).

Another possible explanation for the response to the ‘moral transgressions’ of Rudd and Gore involves emotions. In the last chapter I suggested that high levels of annoyance experienced by those of the *deny* opinion-type could be due to misattribution of arousal, whereby negative arousal induced by exposure to an external threat is attributed to something else (irritation and/or boredom), because these people do not consciously see their (lack of) behaviours as contributing to the threat. To support this explanation, we would expect, for people of the *deny* opinion, levels of individual responsibility to decrease as annoyance increases (*Hypothesis 2*).

5.1.3 Moral Disengagement

Bandura’s moral disengagement framework has been applied to numerous social phenomena, including decisions to support military action and political violence, organisational corruption, and drug addiction (Aquino, Reedii, Thau, & Freeman, 2007; Moore, 2007; Newton, Havard, & Teesson, 2012; Paciello, Fida, Tramontano, Lupinetti, & Caprara, 2008). It has also recently been applied to ecological sustainability, albeit at the conceptual and not the empirical level (Bandura, 2007). But most research to date has concentrated on the *outcomes* of moral disengagement rather than the activation of the mechanisms underlying it (Detert, Treviño, & Sweitzer, 2008).

From Chapter 2, moral disengagement can be accomplished through the minimisation or disputation of harm. This operates by distorting the consequences of one’s behaviour. One such distortion is to proclaim disbelief in detrimental effects. While we are motivated to appear moral, *when this comes at a personal cost* the tendency to give in to self-interest increases (Polman & Ruttan, 2012). I argue that we are more likely to discount moral and ethical imperatives in situations where the behavioural corollaries are difficult to perform. Many pro-environmental behaviours (such as opting for the bicycle instead of taking the car to work) require effort, and are counter to everyday self-interest; yet our desire to appear moral means we must negotiate a sort of ‘moral gateway’ before we act either way. Our opinions might function either to bypass or to distort this gateway, by predicating moral disengagement. If you are of the opinion that climate change does not exist, there is no moral imperative for you to respond, and no reason to perform behaviours that come at a cost to your own self-interest (and no reason to feel guilty about taking the car!). Hence, we

should expect moral and ethical duty to *mediate* the relationship between people's opinions about climate change and their pro-environmental behaviour. This would support the argument that opinions function to bypass the (universal) motivation to appear moral (*Hypothesis 3*).

Another way the harm of one's actions can be disputed is by discounting the cumulative impact of one's own individual actions; a kind of 'denial of agency' (e.g. 'Sure I take my car to work, but so do millions of others; if you can't beat 'em join 'em'). To this end we might expect pro-environmental behaviour to be associated with a professed lack of efficacy of individual action, again mediated by moral disengagement (*Hypothesis 4*).

According to moral disengagement theory, there is a more direct way to misconstrue detrimental behaviour: we can *morally justify* it. Here, our behaviour is made justifiable and even righteous, through the act of cognitive reconstrual. This makes our behaviour and attitudes personally and socially acceptable and justifiable. But how could such cognitive gymnastics work regarding our decision to take the car over taking the bike? Embedded within the sceptics' criticisms of Rudd and Gore were arguments about the consequences of acting under false assumptions. If anthropogenic climate change is a hoax, we risk job-losses, huge outlays in expenditure, and financial hardships. In the previous chapter we saw that attitudes concerning these potentially negative societal-level impacts were moderately linked to individuals' pro-environmental behaviours (although not as strongly as the potential positive impacts). We should also expect though, that these social-level attitudes are associated with reduced moral and ethical feelings to act. Moreover, if they are employed as moral justifications, the association should hold *within* opinion-types (*Hypothesis 5*).

For those who accept the existence of climate change (whether as natural or human-induced), a few other mechanisms may help construct the moral bypass: attributions of blame, and displacement and diffusion of responsibility. People tend to act more harshly when responsibility for acting is attributed to the collective level than when people hold themselves personally accountable for the outcomes of their actions (Bandura, 2007). The tendency to diffuse responsibility is more likely when the problem is a collective one, like climate change. Further, the more detrimental collectively shared acts are, the less

personally responsible people feel for them (Bandura, 1990). Therefore, we might expect disavowal of individual-level responsibility to be linked to low levels of pro-environmental behaviour, and for this relationship to be mediated by a reduction in felt moral duty to act, *regardless* of one's views about climate change (because acceptance of human-induced climate change presumably means that the impacts are perceived as more detrimental) (*Hypothesis 6*).

We might also expect that, as those perceived to be responsible for responding to climate change (e.g. governments, groups, and organisations) become more psychologically distant, the association between ratings of others' responsibility to act and moral disengagement will increase (because responsibility is displaced: a mechanism for moral disengagement) (*Hypothesis 7*). This should be particularly so for those who think climate change is natural, or deny it altogether.

It is slightly problematic to test Bandura's theory of moral disengagement using cross-sectional data alone. If various strategies (e.g., denying personal responsibility and efficacy) *result* in becoming morally disengaged, then we need to see how changes in opinions relate to changes in moral disengagement, and in turn, how changes in moral disengagement relate to any of its theorised corollaries. For Bandura, the ultimate function of moral disengagement is the reduction of guilt arising from breaches of one's internal moral standards; therefore, we would expect moral disengagement to *precede* reductions in guilt. Of course, the delay between moral disengagement and guilt reduction is unknown, and presumably varies from individual to individual. It may be an almost instantaneous process for some, whereas for others the change might be slow and incremental. It is reasonable to assume that moral disengagement with climate change is a gradual process, with some lag in the reduction of guilt, as the breach of moral standards involves the daily behaviours one performs (or fails to perform) that are relevant to climate change. Some self-observation and reflection is presumably necessary before consistent moral transgression (and attendant guilt) is noted by the individual, particularly because of the indirect link of many of these behaviours to greenhouse gas emissions. If this is correct, we would expect to witness this lag by observing that, over two time periods, initial moral disengagement drives subsequent guilt reduction to a greater extent than initial guilt drives subsequent moral disengagement (*Hypothesis 8*).

With time series data, the impact of changes in opinion-type can also be investigated. A change in opinion about the *causes* of climate change is the equivalent of Bandura's 'cognitive reconstrual'. Theoretically, cognitive reconstruals are another mechanism through which moral disengagement occurs. So we should expect to see those who shift toward a sceptical opinion become more morally disengaged from climate change, whereas those who shift toward an opinion of anthropogenic acceptance should, presumably, start to (re)engage with climate change as a moral issue. Again, to test the causality, we would expect opinion-change to affect subsequent levels of guilt, but to a lesser extent than moral disengagement (*Hypothesis 9*).

5.1.4 Hypotheses

The following hypotheses will be tested, drawn from the preceding discussion.

H1: People will rate individuals' responsibility for causing and acting on climate change as lower than other groups' and organisations' responsibility for acting.

H2: Within the *deny* and *natural* opinion-types, higher levels of annoyance will be associated with lower levels of individual-level responsibility.

H3: Those who deny climate change will report lower levels of moral engagement than those of other opinions. Further, moral engagement will mediate the link between opinion-type and pro-environmental behaviour.

H4: Disavowal of efficacy will be associated with lower levels of pro-environmental behaviour. This will be mediated by reduced moral engagement.

H5: Higher agreement with negative social-level impacts of responding to climate change will be associated with reduced moral and ethical feelings to act, irrespective of opinion-type.

H6: Disavowal of individual-level responsibility will be linked to low levels of pro-environmental behaviour, and this relationship will be mediated by reduced moral engagement, irrespective of one's views about climate change.

H7: The association between ratings of others' responsibility to act and moral disengagement will increase as the group being rated as responsible for responding becomes more removed from the individual.

H8: Changes in moral engagement will drive changes in guilt.

H9: Changes in opinion-type will drive changes in moral engagement and, to a lesser extent, changes in guilt over time.

5.2 Method

Data were drawn from the T2 survey to test the hypotheses listed above, except for H8 and H9, which required time-series data. H8 and H9 were tested with data from both T1 and T2, using the 1355 respondents who completed both surveys.

5.2.1 Measures

In addition to the measures described in the previous chapter, the following measures were used.

Ratings of responsibility for causing and responding to climate change. Ratings of responsibility for causing climate change were measured by the item *Using the scale below, how much do you think each of the following groups are responsible for causing about climate change?* Ratings of responsibility for responding to climate change was measured by the item: *Using the scale below, how much do you think each of the following groups are responsible for doing something about climate change?* The following eight groups were listed after each item: *Multi-National Corporations, State Governments, Local Governments, Federal Governments, Big Polluting Countries, Global organisations (such as the UN), Wealthy Countries, and Normal individuals*. Responses were recorded on a scale from '1 = Not at all responsible' to '5 = Highly responsible', with '3 = Partly responsible' at the midpoint.

Disparity. Disparity scores (one for causing, one for responding) were calculated by combining responsibility ratings for all but *Normal individuals*. This aggregate was divided by seven and subtracted from ratings of responsibility for *Normal individuals*.

Moral (Dis)engagement. Moral (Dis)engagement was measured by combining and averaging two items: *I feel a moral duty to do something about climate change* and *I feel it is my ethical responsibility to change my individual behaviour to combat climate change* ($\alpha = .77$). Responses were measured on 5-point Likert scales. For ease of reading, the results section refers to ‘Moral Engagement’: higher scores indicate moral engagement, and lower scores indicate moral disengagement.

Individual Efficacy. Individual Efficacy was measured by combining and averaging two items: *There are meaningful things I can do to reduce the impact of climate change* and *Individuals can make a difference to climate change* ($\alpha = .74$). Responses were measured on 5-point Likert scales.

Negative Social Attitudes to Climate Change Response. Three statements were used to measure negative societal-level impacts of responding to climate change: *Responding to climate change will cost Australia a lot of money*; *Trying to do something about climate change will mean a lot of people lose their jobs*, and; *Climate change will result in financial hardship for many people*. Responses were measured on 5-point Likert scales.

Certainty. Certainty that climate change is happening was measured by a sliding scale with the instruction *Move the cursor to the place on the slide which best represents how sure you are that humans contribute to climate change*. The scale was labelled ‘1 = Sure that humans don’t’ to ‘100 = Sure that humans do’. A reference to the mid-point of this scale was also included: ‘Unsure either way’.

Changes in opinion-type. Changes in opinion-type groups were constructed using the 1355 participants who completed both the T1 and T2 surveys. Those who selected the *human-induced* opinion statement at T1, but selected a different opinion statement at T2, were categorised as changing *Away from acceptance* ($n = 134$; 9.9%). Those who selected the *human-induced* opinion statement at T2, but selected a different opinion statement at T1, were categorised as changing *Toward acceptance* ($n = 92$; 6.8%). The *human-induced* opinion was selected as a benchmarking statement because it reflects the scientifically normative position (see Chapter 4).

5.3 Results

5.3.1 Ratings of Responsibility

H1: People will rate individuals' responsibility for causing and acting on climate change as lower than other groups' and organisations' responsibility for acting.

Ratings of responsibility for different groups for both causing and responding to climate change are presented in Figure 10. In both cases, the rating of responsibility placed on normal individuals was significantly lower than ratings of responsibility placed on all other groups.



Figure 10. Mean ratings of responsibility for causing and responding to climate change (N = 5030).

Response ratings for all but *normal individuals* were combined to form average responsibility ratings given to 'groups and organisations'. For all opinion-types, responsibility ratings for both causing and responding to climate change were higher when rating groups and organisations than when rating individuals (Figure 11). Of interest, and apparently revealing a contradiction within people's sets of responses, the mean responsibility rating for groups and organisations for responding to climate change for both the *deny* and *natural* opinion-type were around the mid-point of the scale (i.e. 'Partly

responsible'). Ratings of groups and organisations' responsibility for *causing* climate change also approached the mid-point for the *deny* group.

A series of paired-samples *t*-tests tested for significant differences in rating groups and organisations versus individuals' responsibility for the whole sample, and for each opinion-type (Table 20). In each case the effect size between ratings of individuals' responsibility and groups and organisations' responsibility was large. The greatest disparity in ratings for causing climate change was found for the *natural* opinion-type, while the biggest disparity in ratings for *responding* to climate change was for the *human-induced* opinion-type.



Figure 11. Ratings of responsibility for causing and responding to climate change by opinion-type (N = 5030).

Table 20. *t*-tests for disparity between group and individual responsibility by opinion-type (*N* = 5030).

Responsibility for Causing Climate Change	All respondents	$t(5029) = 52.67, p < .005, \eta^2 = .36$
	Deny	$t(363) = 11.94, p < .005, \eta^2 = .28$
	Don't know	$t(219) = 9.29, p < .005, \eta^2 = .28$
	Natural	$t(2200) = 37.92, p < .005, \eta^2 = .40$
	Human-induced	$t(2244) = 33.99, p < .005, \eta^2 = .34$
Responsibility for Responding to Climate Change	All respondents	$t(5029) = 39.20, p < .005, \eta^2 = .23$
	Deny	$t(363) = 8.09, p < .005, \eta^2 = .15$
	Don't know	$t(219) = 8.04, p < .005, \eta^2 = .23$
	Natural	$t(2200) = 23.91, p < .005, \eta^2 = .21$
	Human-induced	$t(2244) = 29.71, p < .005, \eta^2 = .28$

H2: Within the 'deny' and 'natural' opinion-types, higher levels of annoyance will be associated with lower levels of individual-level responsibility.

Table 21 shows the bivariate correlations between annoyance levels and individual-level responsibility ratings. Higher levels of annoyance were weakly to moderately associated with lower ratings of individual responsibility *within* opinion-type, lending moderate support to Hypothesis 2.

Table 21. Correlation matrix for annoyance levels and ratings of individual responsibility (*N* = 5030).

		Individual responsibility ratings		
		Causing	Responding	Fisher z_{obs} value
All respondents		-.32**	-.32**	0
Deny		-.21**	-.17**	0.62
Annoyance	Don't know	-.10	-.06	-
Natural		-.20**	-.20**	0
Human-induced		-.11**	-.18**	2.21 [†]

[†]Correlations significantly different

5.3.2 Opinion-Types, Moral Disengagement, and Pro-environmental Behaviour

H3: Those who deny climate change will feel lower levels of moral engagement than those of other opinions. Further, moral engagement will mediate the link between opinion-type and pro-environmental behaviour.

There were significant differences in moral engagement ratings based on opinion-type: $F(3, 5026) = 812.34, p < .001, \eta^2 = .33$. Post-hoc comparisons using the Tukey HSD test indicated that those who thought climate change was human-induced rated moral engagement items higher than did all other opinion-types. Those of the *deny* opinion-type rated the items lower than did all other opinion-types. There was no statistically significant difference between those of the *don't know* and *natural* opinion-types (Figure 12).

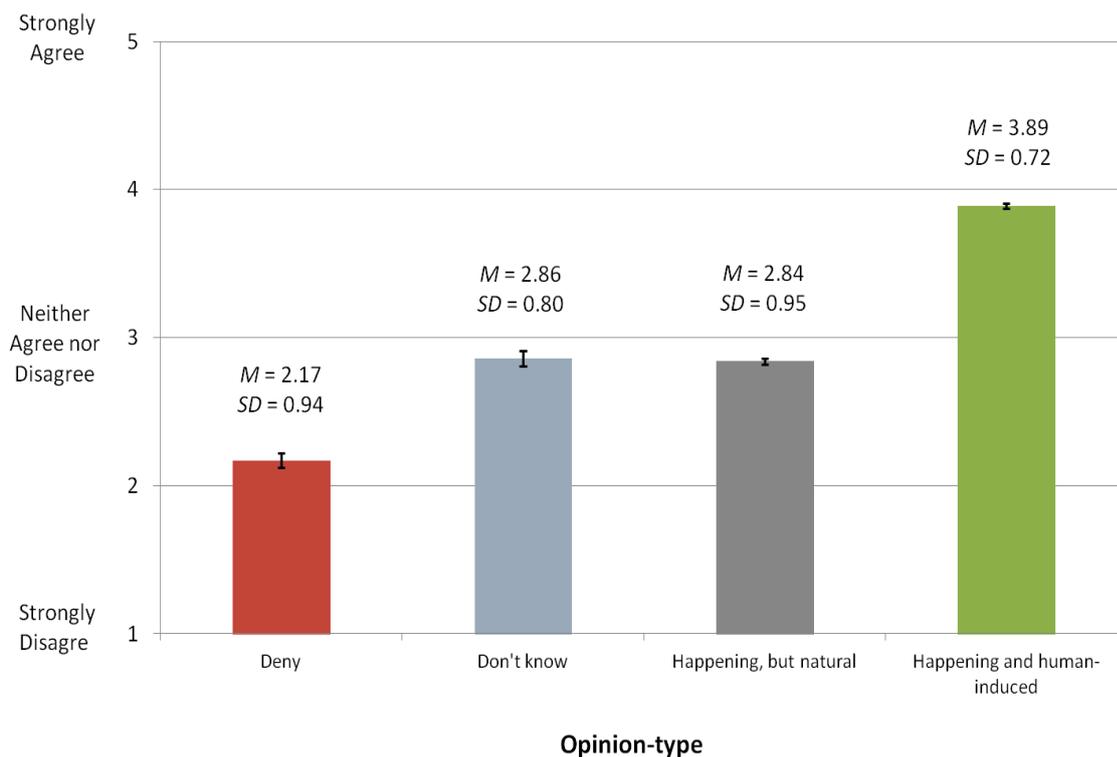


Figure 12. Levels of Moral Engagement by opinion-type (N = 5030).

To test the mediating influence of moral engagement on opinion-type and pro-environmental behaviour, it was necessary to substitute a continuous variable for the categorical opinion-type measure. Therefore a scale measuring certainty in anthropogenic

climate change was used as a proxy for opinion-type. To test the measure's validity as a proxy, a one-way ANOVA was performed to test the association between certainty in anthropogenic climate change and opinion-type. There was a large significant difference based on opinion-type: $F(3, 5026) = 1701.94, p < .001, \eta^2 = .50$. Post-hoc comparisons showed that all four groups differed, with the *human-induced* opinion-type having the highest certainty ($M = 81.60; SD = 15.47$), followed by the *don't know* opinion-type ($M = 45.06; SD = 23.42$), *natural* ($M = 40.58; SD = 26.27$), and *deny* ($M = 21.17; SD = 25.39$).

The steps suggested by Baron and Kenny (1986) to establish mediation were taken. Firstly, the initial variable (certainty) was significantly correlated with the outcome variable (pro-environmental behaviour) ($r = .49, p < .001$), establishing that there is an effect that may be mediated. Secondly, the initial variable (certainty) was significantly correlated with the mediator (moral engagement) ($r = .67, p < .001$). A stepwise regression was then performed to test the effect of moral engagement on pro-environmental behaviours when holding certainty in anthropogenic climate change constant. Table 22 shows that the addition of moral engagement led to a significant increase in R^2 , explaining an additional 12% of the variance in pro-environmental behaviour scores. The path coefficient for certainty was significantly reduced, though remained significant. This suggests the link between opinions about climate change and pro-environmental behaviour is partially mediated by levels of moral engagement.

Table 22. Stepwise regression of the effect of Moral Engagement on Pro-environmental behaviour (N = 5030).

Model		<i>r</i>	<i>b</i>	<i>SE b</i>	β	<i>t</i>
Step 1	Constant		6.43	.16		40.74**
	Certainty		.10	.00	.49	39.49**
						$R^2 = .24$
Step 2	Constant		.97	.23		4.28**
	Certainty	.49**	.04	.00	.18	12.12**
	Moral Engagement	.58**	2.73	.09	.47	31.05**
						$R^2 = .36$
R^2 Change = .12, Sig F Change < .0005						

** $p < .001$

H4: Disavowal of efficacy will be associated with lower levels of pro-environmental behaviour. This will be mediated by reduced moral engagement.

Table 23 shows the bivariate correlations between individual efficacy of responding to climate change and moral engagement. Of note is the strong association between the two variables, not just for respondents as a whole, but also *within* opinion-type, supporting the notion that a reduction in professed efficacy of individual responses is associated with moral disengagement.

Table 23. Correlations for Moral Engagement and professed Efficacy of Individual Responses (N = 5030).

	Opinion-type	Individual Efficacy
Moral Engagement	All respondents	.84**
	Deny	.77**
	Don't know	.69**
	Natural	.80**
	Human-induced	.71**

** $p < .001$

To test the mediating influence of moral disengagement on the relationship between efficacy and pro-environmental behaviour, the following steps were taken. First, the initial efficacy ratings significantly correlated with pro-environmental behaviour ($r = .53, p < .001$). Second, individual efficacy ratings were correlated significantly with moral engagement ($r = .84, p < .001$). A stepwise regression was then performed to test the effect of moral engagement on pro-environmental behaviours when holding individual efficacy ratings constant. Table 24 shows the addition of the moral engagement led to a significant increase in R^2 , with ratings of individual efficacy explaining an additional 7% of variance in pro-environmental behaviour when moral engagement was included. Further, there was a significant reduction of the path coefficient for efficacy. This suggests that the link between individual efficacy of responding to climate change and pro-environmental behaviour is partially mediated by moral disengagement.

Table 24. Stepwise regression of the effect of moral engagement on pro-environmental behaviour.

Individual Efficacy		<i>r</i>	<i>b</i>	SE <i>b</i>	β	<i>t</i>
Step 1	Constant		1.25	.25		4.92**
	Efficacy		3.18	.07	.53	43.78**
						$R^2 = .28$
Step 2	Constant		.20	.25		.82**
	Efficacy	.53	.78	.13	.13	6.02**
	Moral Engagement	.58	2.81	.12	.48	23.13**
						$R^2 = .35$
R^2 Change = .07, Sig F Change < .0005						

** $p < .001$

H5: Higher agreement with negative social-level impacts of responding to climate change will be associated with reduced moral and ethical feelings to act, irrespective of opinion-type.

Table 25 shows the correlation between levels of moral engagement and agreement with statements regarding the negative impacts of responding to climate change. The statement relating to job-losses was most strongly associated with a lack of engagement. The financial cost to Australia was more moderately associated with a lack of engagement. By contrast, and counter to expectations, the statement regarding financial hardship was *positively* related with moral engagement.

Table 25. Correlations for Moral Engagement to act on climate change with evaluations of negative societal consequences (N = 5030).

	All respondents	Deny	Don't know	Natural	Human- induced
* Responding to climate change will cost Australia a lot of money	-.27**	-.10	-.16**	-.23**	-.12**
* Trying to do something about climate change will mean a lot of people lose their jobs	-.48**	-.26**	-.29**	-.35**	-.29**
* Climate change will result in financial hardship for many people	.23**	.28**	.24**	.25**	.09**

** $p < .001$

5.3.3 Moral Engagement as Mediator between Responsibility and Behaviour

H6: Disavowal of individual-level responsibility will be linked to low levels of pro-environmental behaviour, and this relationship will be mediated by reduced moral engagement, irrespective of one's views about climate change.

Responsibility ratings of individuals for causing climate change and responding to climate change were significantly related to levels of pro-environmental behaviour ($r = .42, p < .001$ and $r = .44, p < .001$, respectively). Higher ratings of responsibility accorded to individuals were associated with higher behaviour scores.

To test the mediating influence of moral disengagement on reduced levels of responsibility and pro-environmental behaviour, the following steps were taken. First, the initial responsibility ratings significantly correlated with pro-environmental behaviour (as above). Second, responsibility ratings were correlated significantly with moral engagement (for causing climate change, $r = .63, p < .001$; for responding to climate change, $r = .63, p < .001$). A stepwise regression was then performed to test the effect of moral engagement on pro-environmental behaviours, when holding responsibility ratings constant. Table 25 shows the addition of the moral engagement led to a significant increase in R^2 , with ratings of individual responsibility explaining an additional 17% and 15% of variance in pro-environmental behaviour when moral engagement was included. Further, the path

coefficients for individual responsibility dropped significantly with the inclusion. This suggests the link between ratings of individual responsibility of causing and responding to climate change and pro-environmental behaviour is mediated by moral engagement.

Table 26. Stepwise regression of the effect of moral engagement on pro-environmental behaviour (N = 5030).

Model 1: Individual Responsibility for causing		<i>r</i>	b	SE b	β	<i>t</i>
Step 1	Constant		5.51	.21		25.96**
	Individual Responsibility		2.37	.07	.42	32.40**
R² = .17						
Step 2	Constant		.48	.23		2.06**
	Individual Responsibility	.42	.44	.08	.08	5.27**
	Moral Engagement	.58	3.14	.09	.54	36.29**
R² = .34						
R² Change = .17, Sig F Change < .0005						
Model 2: Individual Responsibility for responding		<i>r</i>	b	SE b	β	<i>t</i>
Step 1	Constant		4.35	.23		18.98**
	Individual Responsibility		2.41	.07	.44	35.04**
R² = .19						
Step 2	Constant		.09	.24		.37
	Individual Responsibility	.44	.70	.08	.13	8.78**
	Moral Engagement	.58	2.96	.09	.50	34.57**
R² = .35						
R² Change = .15, Sig F Change < .0005						

** $p < .001$

H7: The association between ratings of others' responsibility to act and moral disengagement will increase as the group being rated as responsible for responding becomes more removed from the individual.

Table 27 presents the bivariate correlations between moral engagement and the rated responsibilities for different groups to respond to climate change, in order of strongest to weakest. The ordering is generally consistent with the notion that the association between moral disengagement and responsibility to act increases as responsibility ratings for responding moves away from the individual-level and towards groups more removed from the individual.

Table 27. Correlations for Moral Engagement to act on climate change with responsibility ratings of different groups to respond to climate change ($N = 5030$).

	Moral Engagement
Normal individuals	.63** _a
Local Governments	.59** _b
State Governments	.58** _{b, c}
Federal Governments	.56** _{c, d}
Wealthy Countries	.55** _{d, e}
Global organisations	.53** _e
Multi-National Corporations	.49** _f
Big Polluting Countries	.43** _g

** $p < .001$

Subscript letters denote significant differences between correlations based on z_{obs} values (see Appendix F)

5.3.4 Longitudinal Changes

H8: Changes in moral engagement will drive changes in guilt.

To test whether changes in moral engagement drove changes in guilt from T1 to T2, a cross-lagged panel analysis was undertaken in MPlus on the repeat participants from the T1 and T2 surveys (Kenny, 2005). Figure 13 suggests that initial levels of guilt significantly influenced subsequent levels of moral engagement (Estimate = .16; $SE = .02$). To a slightly greater extent ($p = .05$), initial levels of moral engagement significantly influenced subsequent levels of guilt (with higher initial levels of moral engagement associated with higher levels of guilt at T2) (Estimate = .21; $SE = .03$). This result lends tentative support to the notion that moral *disengagement* functions to reduce levels of guilt.

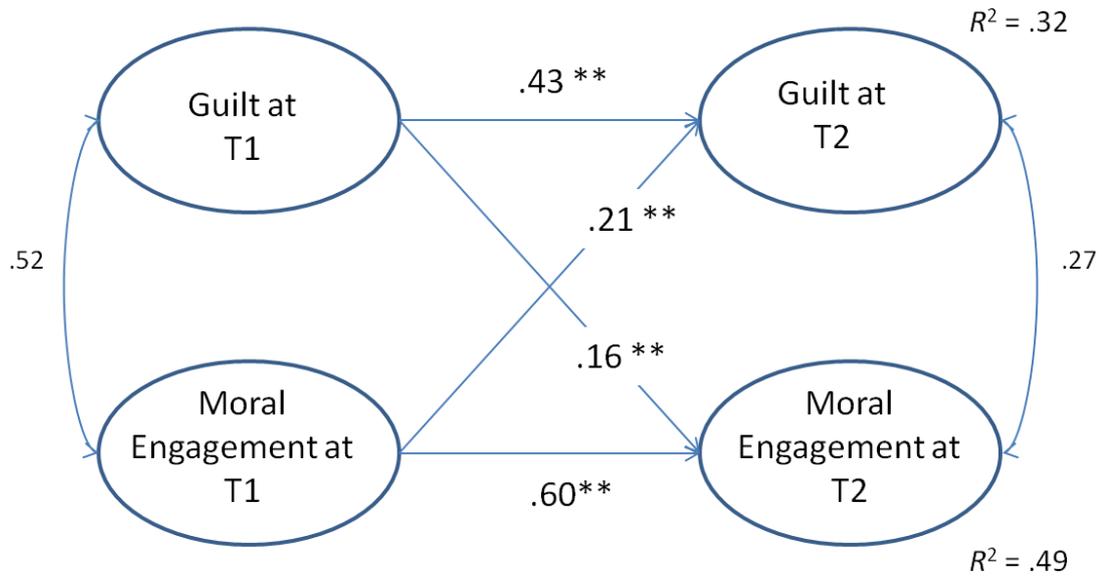


Figure 13. Cross-lagged panel analysis of guilt and moral engagement at T1 and T2 (N = 1355).

H9: Changes in opinion-type will drive changes in moral engagement and, to a lesser extent, changes in guilt.

To analyse change in moral engagement as a function of change in acceptance of anthropogenic climate change over time, a mixed between-within subjects analysis of variance was conducted. The interaction between changes in moral engagement and changes in opinion-type was tested as it was expected that a move away from acceptance would result in a subsequent decrease in moral engagement, whereas a move towards acceptance would result in a subsequent increase in moral engagement. There was a significant moderate interaction effect for time and change in opinion, Wilk's Lambda = .88, $F(1, 224) = 30.38, p < .001, \eta^2_p = .12$.²⁶ The nature of the relationship between moral engagement and change in opinion is shown in Figure 14. The red line, indicating those who moved away from acceptance between the two surveys, slopes significantly downwards, indicating that those who moved away from an accepting position decreased their ratings of moral engagement. By contrast, the green line, indicating those who moved towards acceptance of human-induced climate change, has a slight (but not significant) upwards

²⁶ There was a significant moderate main effect for time, Wilk's Lambda = .93, $F(1, 224) = 15.95, p < .001, \eta^2_p = .07$, with those who shifted their opinion away from acceptance having significantly reduced moral engagement scores at T2. The main effect comparing the two opinion change groups was not significant, $F(1, 224) = .37, p > .05, \eta^2_p = .002$. However, due to the significant interaction effect, the use of main effects to explore relationships was not appropriate.

slope, indicating that these people’s ratings of moral engagement remained stable.²⁷ Together, the results support the notion that moral (dis)engagement varies as a function of changes in opinion about climate change.

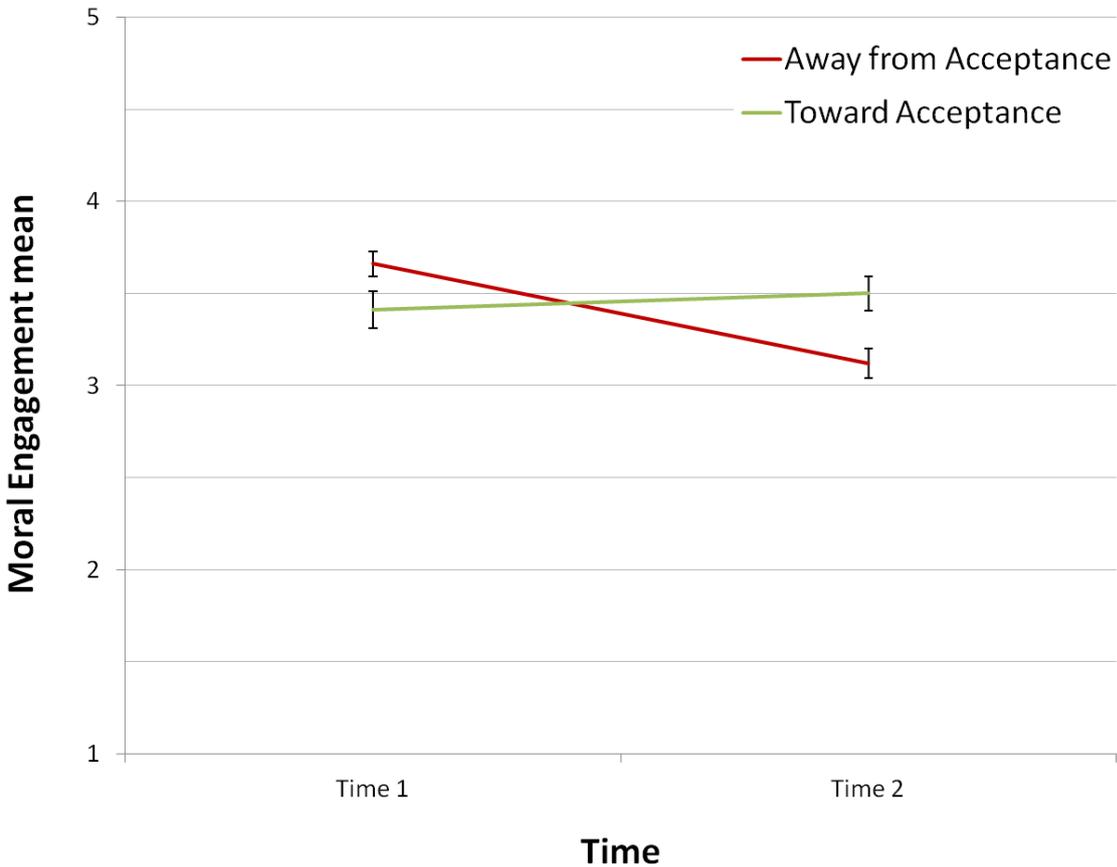


Figure 14. Estimated marginal means for moral engagement by change in opinion-type over time (n = 226).

To analyse change in levels of guilt as a function of change in opinion-type, another mixed between-within subjects analysis of variance was conducted. There was a significant moderate interaction between opinion-type and guilt levels, Wilk’s Lambda = .92, $F(2, 224) = 18.40, p < .001, \eta^2_p = .08$.²⁸ In Figure 15, the red line, indicating those who moved away from acceptance between the two surveys, slopes significantly downwards, signifying that

²⁷ Respondents who had a consistent opinion over time are removed for ease of reading, however this group of respondents also demonstrated a significant downward shift in moral engagement, but to a lesser extent than those who moved away from acceptance.

²⁸ There was a significant, small effect for time, Wilk’s Lambda = .97, $F(1, 224) = 7.28, p = .01, \eta^2_p = .03$. The main effect comparing the two opinion-change groups was not significant, $F(1, 224) = .14, p > .05, \eta^2_p = .001$.

these people's ratings of guilt reduced over time. By contrast, the green line, indicating those who moved towards acceptance of human-induced climate change, slopes slightly (but not significantly) upwards, indicating that these people's sense of guilt remained relatively stable over time. As with moral (dis)engagement, the results support the notion that guilt varies as a function of changes in opinion about climate change. The effect size was larger for changes in moral engagement than for changes in guilt.

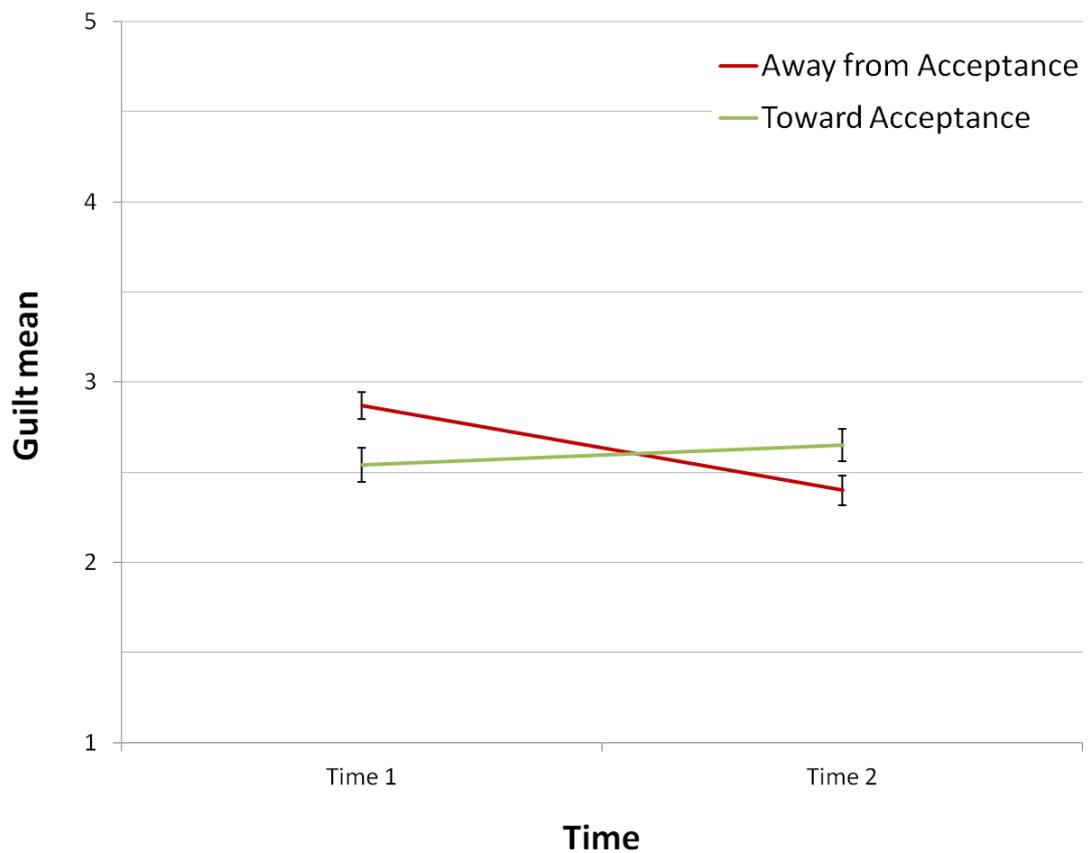


Figure 15. Estimated marginal means for Guilt by change in opinion-type over time ($n = 226$).

5.4 Discussion

People tend to place more responsibility on groups and organisations than on individuals like themselves for both causing and responding to climate change. Further, the results suggest that levels of engagement with climate change as a moral issue decrease as responsibility becomes more displaced from the individual. Moral disengagement seems to play an important mediating role both between opinions about the causes of climate change and pro-environmental behaviours, and between perceived individual efficacy and behaviours. There was tentative evidence that moral disengagement functions to reduce guilt arising from not engaging in effortful pro-environmental behaviours.

The tendency to place greater responsibility on groups and organisations than on individuals was evident for *all* opinion-types, suggesting this group-level version of moral hypocrisy is a general tendency for everyone and not limited to sceptical perspectives. In fact, the biggest differential rating observed for *responding* to climate change was for the *human-induced* opinion-type: they accorded greater responsibility to others to respond relative to the responsibility accorded to individuals. Why should this discrepancy occur for those who hold the scientifically 'correct' attitudes to climate change causation? According to lay theories of moral judgements, an acknowledgement of both intentionality of one's actions, and recognition of the harmful outcomes of one's actions, are necessary preconditions for moral judgements to occur (Guglielmo, Monroe & Malle, 2009). During this deliberation, justifications may be employed to decrease levels of blame toward the self. If no intentionality is recognised, justifications are not necessary. We are unlikely to search as hard for justifications to legitimise the actions of groups and organisations as we are for ourselves.

In a similar vein, if we cast our minds back to the discussion on motivated reasoning in Chapter 2, Bersoff argued that people redefine and reconstrue unethical behaviours (a process he termed 'neutralisation'), and that this process often precedes and fosters decisions to act in ways counter to one's attitudes. Reconstructal, a directional form of motivated reasoning, allows people to feel committed to pro-social norms, values, and actions, while concurrently engaging in behaviour that violates these standards. So it would seem that subtle reconstructions occur not just for sceptical people, but for people who accept anthropogenic climate change. This might account for some of the substantial variation in

pro-environmental behaviour scores *within* this opinion that we observed in the previous chapter.

Cognitive reconstruals are also central to Bandura's moral disengagement framework, but arguably in a less subtle form than Bersoff's. For Bandura, cognitive reconstruals can take the form of an opinion-shift, including outright denial of the harmful consequences of actions. Harmful actions (or in this case, a lack of mitigating actions) are thus made socially acceptable. The time-series data lend support to the argument that shifts in opinions about the causes of climate change function to reduce (i) the need to engage in effortful behaviours (or censure against valued behaviours, like driving a car), and (ii) feelings of guilt, through the mechanism of moral disengagement. If sceptical opinions are malleable and function to reduce guilt, we can think of these opinions as being in a state of tension. Stimuli that are unpleasant, disturbing, and result in moral imperatives to act in a way not in accordance with our immediate interests, can, in psychoanalytic parlance, result in a state of 'knowing and not knowing' (Cohen, 2001). Such 'motivated denial', as Cohen coins it, perhaps explains the paradox of sceptics loudly decrying moral hypocrisy in people calling for strong action on climate change. It niggles, especially those who are (either consciously or unconsciously) ambivalent towards climate change, because it threatens their 'moral and adaptive adequacy' (Monin et al., 2008). Arguably, unconscious processes manifest through intense levels of irritation and annoyance: we saw how this was associated with a lack of individual-level responsibility for acting *within* the sceptical opinion-types.

For some, cognitive reconstrual can be a little more subtle than a shift in opinion, as evidenced in the ratings given to other groups for causing and responding to climate change. For the *natural* and the *deny* groups, surprisingly high ratings of causal responsibility were given to some of these other groups (such as big-polluting countries) – suggesting logical inconsistencies. In effect it is a way of saying "it is not *my* responsibility, so I'm in the clear, but it *is* the fault (and hence the responsibility) of others". This intra-individual contradiction of accounts is further evidence that particular functions underlie climate change responses. The oddly high levels of rated responsibility of groups and organisations from the *natural* opinion-type in particular, combined with their disparate ratings of responsibility at the level of the individual, support the notion that this opinion is

a form of euphemistic labelling that serves to legitimise inaction. That others, far removed from oneself, are responsible for culpable acts, in combination with natural forces, relieves people of personal agency, responsibility, and any attendant guilt. Exaggerating the influence other groups have over one's own goals is also thought to compensate for perceptions of reduced control over the environment; for example, research suggests that people are more likely to attribute influence to a perceived 'enemy' when reminded of the risk posed by natural disasters (Sullivan, Landau & Rothschild, 2010).

But what of cognitive reconstruals that act as *conscious* offence mechanisms? When I examined arguments that may be used as moral justifications – the negative social impacts of responding to climate change – two of three statements (potential loss of jobs, and the financial cost to Australia) were consistently negatively related to moral engagement. But the other statement: *Climate change will result in financial hardship for many people*, was positively related to moral engagement for all opinion-types. I suspect the arguments embedded in the first two statements have rhetorical purposes, and are used, consciously, as moral justifications. And I think the issue embedded in the last statement, financial hardship, is a genuine moral issue for people, regardless of their opinion on the causes of climate change. It is also possible that the differences observed between the first two items and the last item was caused by the difference in question-framing: the financial hardship question, unlike the other two statements, does not specifically refer to the impacts of climate change responses, but to impacts of climate change itself. We will return to this line of thinking in Chapter 7.

The findings in this chapter complement previous work on climate change and morality. For instance, Thøgersen (2004) found that consistency in performing pro-environmental behaviours depended on the moral importance placed on each of those behaviours. Ferguson and Branscombe (2010) found that inducing a sense of *collective* guilt mediated beliefs and willingness to act. Contradictions in reasoning and subsequent attitudes about climate change have also been found (Serman & Sweeney, 2007). In summarising why appealing to the moral imperative is not always effective when motivating people to act to mitigate climate change, Seabright (2010) argues that for a dilemma to be treated as a moral one, it must have personal relevance. Any moral dilemmas perceived as impersonal will fail to be treated morally, and hence cognitive rather than emotive processes are used

for decision-making and opinion-formation (and these cognitive processes, as we know, are subject to distortions, reconstruals, and biased searching practices). Therefore, Seabright argues, resistance to moral appeals about climate change occur because climate change is construed as impersonal. This argument is supported by the current finding that climate change is above all somebody *else's* responsibility, and the more remote from the individual, the more responsible that somebody (or group) becomes. How the personal relevance of climate change construals interacts with emotion will be further investigated in Chapter 8.

There is one mechanism of moral disengagement that was not touched upon in this chapter: the notion of advantageous comparison. This notion suggests that, by exploiting the contrast principle (juxtaposing one's own actions with other people's worse actions), detrimental viewpoints and behaviours appear more righteous (Bandura, 2007). For example, Aquino, Reed II, Thau and Freeman (2007) found that the extent to which people experienced negative emotions in relation to abuses of Iraqi detainees after the September 11 attacks was reduced by moral disengagement, as measured by exonerative comparisons to the actions of Iraqis under Saddam Hussein (e.g. "Compared to the atrocious things Saddam Hussein would have done to our troops, the treatment of Iraqi prisoners was very mild"). Advantageous comparisons become exonerative comparisons.

Perhaps an exonerative comparison underlies some of the reactions to Rudd and Gore; if sceptics are accused of inaction, then at least, they hasten to point out, it is not as bad as people who purport to believe in climate change and are *still* guilty of bad behaviour. Such an argument frames the sceptic in not only *a* better light, but *the* better light, as the sceptic is behaving consistently with their attitudes. After all, there is nothing so important as (the appearance of) consistency (Dunning, 1999; Scher & Cooper, 1989). Consistency allows us to retain a positive self-concept as competent, stable, and, in this case paradoxically, *agentic* social citizens.

Finally, the displacement of responsibility, so key to moral disengagement, is easier in situations where one perceives a high level of social consensus with one's own view (Bandura, 1990). High levels of perceived social consensus also aid in the relinquishment of personal control (Bandura, 2007). In the next chapter I explore the role of consensus

estimates of climate change opinion to investigate whether perceptions of the prevalence of one's own opinion in the broader community are linked to the displacement of responsibility, fulfil the need for social support, and function to legitimise inaction on climate change.

CHAPTER 6. CLIMATE CHANGE AND CONSENSUS ESTIMATES

"I will not allow our country to be held to ransom by a few people with extreme views that will never be changed".

Julia Gillard

Prime Minister of Australia, March 2010

"The government is trying to frighten the nation into accepting the need for [a price on carbon], but the Australian people are saying 'no', they don't want it".

Bronwyn Bishop

Liberal Party MP, July 2012

Political and media debate on the existence and causes of climate change often rests on claims and counter-claims about what the majority of citizens really think. There are several well-established phenomena regarding how people perceive the prevalence of different opinions. These phenomena include biases such as false consensus (Ross, Greene, & House, 1977) and pluralistic ignorance (Prentice & Miller, 1996).

The last chapter concluded with the observation that avoiding responsibility for something, and the moral disengagement that follows, is easier for people when they perceive high levels of social consensus with their opinions (Bandura, 2007). Are people's opinions about climate change related to estimates of social consensus? In this chapter I investigate consensus biases and consider why they might be important for understanding people's responses to climate change. I suggest that these biases reduce personal agency and responsibility, and function to bolster social support and legitimise inaction on climate change. Several hypotheses are formulated during the initial discussion, which are then tested using the national survey data.

6.1.1 The False Consensus Effect

The false consensus effect describes a tendency to over-estimate the prevalence of one's own opinion (Ross et al., 1977). In practice, a false consensus effect operates when estimates of consensus with one's own opinion exceed the estimates of that same opinion from those holding an opposing position. As such, it is a 'relative' measure of overestimation, rather than an 'absolute' measure of overestimation (Gross & Miller, 1997).

Meta-analyses have shown the effect to be highly reliable and of moderate magnitude (Mullen, 1985). The effect is evident across a range of domains, including environmental issues (Gunther, Christen, Liebhart, & Chih-tun Cha, 2001), the death penalty and gun regulation (Wojcieszak & Price, 2009), and water conservation (Monin & Norton, 2003). Recent research suggests the false consensus effect also occurs in online communities, such as within politically radical discussion forums (Wojcieszak, 2011).

Several theoretical perspectives can account for false consensus effects. The psychological mechanisms proposed in these perspectives are not necessarily mutually exclusive, and some are thought more likely to be activated under different conditions, or in relation to different issues (Marks & Miller, 1987). Two common accounts focus on cognitive availability and motivated social cognition.

From a cognitive availability perspective, we are more likely to recall instances of similarity than dissimilarity because we more frequently associate with people who share our opinions and attitudes. Friendship groups typically display high rates of internal similarity, and friends' opinions and attitudes are more readily accessed from memory than instances of dissimilarity or disagreement (Marks & Miller, 1987). Availability heuristics are thought to be activated when one is asked about the viewpoints of non-specific groups – such as the student body of a college campus or an entire country. When asked about vague target groups like these, we make the abstract more concrete by thinking of immediate friends and family (Perloff & Fetzer, 1986; Tversky & Kahneman, 1973). We also draw on experience from groups, communities and organisations with whom we have the most interaction (Wojcieszak & Price, 2009). In this respect, social identity, and authority referents are particularly influential in shaping our estimates of plurality sentiment.

An alternative, though related, explanation is that false consensus functions to bolster perceptions of social support, to maintain or restore self-esteem or cognitive balance, or to reduce tension aroused by dissonant attitudes and behaviours. Such motivated social cognition is thought most likely to occur in circumstances where one is less certain about the correctness of one's own position, or when one's position deviates from a suspected norm (Marks & Miller, 1987). Under such conditions, it may be functional to exaggerate similarity with others to augment one's likeability or acceptance. Similarly, in conditions

where the viewpoint is highly evaluative or involves a perceived threat to self, false consensus may function to maintain self-esteem and increase feelings of social belonging (Morrison & Matthes, 2011; Mullen, 1985; Suls, Wan, & Sanders, 1988).

Directional Accuracy. The false consensus paradigm relies on *relative* estimates rather than the *accuracy* of one's estimate, but *perceived* levels of consensus have an interesting association with the *actual* prevalence of attitudes. Sanders and Muller (1983) found that when respondents held a minority position (i.e., when fewer than 50% of all other respondents held the same viewpoint on a dichotomous view), strong false consensus effects emerged. That is, respondents holding a minority position strongly overestimated levels of peer-support. However, when respondents held a *majority* position (i.e., more than 50% agreed with the respondents' own viewpoint), consensus was actually *underestimated*. Importantly, *overestimation on the part of the minority was stronger than the underestimation by the majority*, supporting the motivational perspective that false consensus functions to increase social support for unpopular points of view (Marks & Miller, 1987). The strength of overestimation relative to underestimation also suggests that observed false consensus effects are not merely a statistical by-product of a 'middling tendency' in people's prevalence estimates.

False Consensus and Climate Change. In Chapter 1 I discussed how the debate about climate change has become increasingly politically divisive. The current salience of the topic, alongside the contested nature of community sentiment, makes consensus estimates regarding the causes of climate change particularly relevant. In Chapter 4 I argued that there is a scientifically normative opinion to adopt: that the climate is changing and human activity is contributing to it. By extension the scientifically non-normative approach to take is that climate change is not happening. The results in Chapter 4 suggest that the variation on this second stance, that climate change is happening, but it is simply a product of natural processes, seems to have gained significant support in the Australian community, despite its being at odds with the scientific consensus. As climate change poses a threat to self, we might expect false consensus levels for scientifically non-normative positions – those that deny and those who consider climate change natural – to be related to a number of discounting arguments. These arguments might include discounting the individual efficacy of acting ("I can't make a difference anyway"), and refuting personal responsibility to act

("it's somebody else's problem"). These arguments may function to assuage discomfort (such as guilt) arising from failure to engage in pro-environmental behaviours.

The false consensus effect has also been found to influence actual and intended behaviour (Botvin, Botvin, Baker, Dusenbury, & Goldberg, 1992). Our opinions about the existence and drivers of climate change are related to what we actually do; we know this from both Chapter 4 and from other research (e.g. Gifford, Kormos, & McIntyre, 2011; Roser-Renouf & Nisbet, 2008). How consensus estimates relate to opinions about climate change and pro-environmental behaviour should therefore be explored. Further, if views about the causes of climate change are an important driver of pro-environmental behaviour, it is important to assess how, if, and why these views fluctuate over time. High levels of false consensus may mean that views are more resistant to change.

6.1.2 Pluralistic Ignorance

Pluralistic ignorance describes a situation where a majority of group members privately reject an opinion, but assume incorrectly that most others accept it. This, in turn, provides support for an opinion or a norm that may be actually disliked or disavowed by most people. In short, each individual makes an error in judging the sentiments of the plurality (Prentice & Miller, 1996). As with false consensus, pluralistic ignorance is about the *misperception* of the modal opinion, and not with the overall accuracy of people's estimates. But the focus of pluralistic ignorance as a concept is on how privately unpopular (or unpalatable) opinions are perpetuated as being popular in society. Empirical studies of pluralistic ignorance have typically been limited to cases where a minority position is misperceived as being the majority position, or vice-versa – a form of 'absolute pluralistic ignorance'. A more subtle form, 'relative pluralistic ignorance', exists where there is a marked and significant misperception of opinion distribution, though not to the point of misconstruing the mode (Shamir & Shamir, 1997).

An important element of pluralistic ignorance is the notion of shared false ideas: generally socially accepted but erroneous propositions about the world (O'Gorman, 1986). So, in contrast to false consensus, we would expect erroneous opinions about what other people think to act relatively independently of one's own opinion. As with false consensus,

pluralistic ignorance can be understood as arising from individual biases in information-processing, but social and cultural processes are also critical. Error-prone messages in the environment provide misleading or false information cues, serving as invalid indicators on which to base estimates of public sentiment (Shamir & Shamir, 1997). For instance, systematic biases in media reporting can lead to collective distortions about the popularity of certain opinions (Noelle-Nuemann, 1993).

Pluralistic ignorance and climate change. A key reason to investigate consensus estimates is the central role the media has played in the reporting of climate change. As mentioned in Chapter 4, much has been made of a perceived bias in media reporting of climate change. Some claim the traditions of journalism dictating ‘both sides of a story’ be given equal weight, and therefore equal coverage, has led to a false impression among the community regarding the number of people who deny climate change, or that it has helped promote the notion that the scientific evidence surrounding climate change is unclear at best (Boykoff, 2007; Corbett & Durfee, 2004). Indeed, research has demonstrated that media bias predicts community attitudes towards prejudice-related issues, and that this in turn enhances consensus effects for undesirable viewpoints (Watt & Larkin, 2010). If such an effect operates in the case of climate change, we would expect to see estimated percentages of people who deny that climate change is happening exceed actual percentages. Further, we would expect this overestimation to apply across *all* opinions (pluralistic ignorance), but for the overestimation to be most marked for those who themselves deny climate change is happening (false consensus).

6.1.3 Hypotheses

This chapter tests the following hypotheses, drawn from the preceding discussion:

H1: People will estimate their own opinions regarding the causes of climate change to be more common than will people holding different opinions (false consensus).

H2: Same-opinion consensus will be overestimated by minority positions and underestimated by majority positions (directional accuracy).

H3: Levels of climate change denial will be overestimated by all groups (pluralistic ignorance).

H4: Levels of false consensus will be higher for those who place greater levels of trust in friends and family for information on climate change (availability heuristic).

H5: For those with scientifically non-normative opinions, higher levels of false consensus will be associated with less engagement in pro-environmental behaviour, lower perceived individual efficacy and responsibility for responding to climate change, moral disengagement, and lower levels of guilt.

H6: People with high levels of false consensus will be less likely to *change* their opinions about climate change.

6.2 Method

6.2.1 National Surveys

Data were drawn from the T2 survey to test the hypotheses listed above, except for H6, which required time-series data. H6 was tested with data from both T1 and T2, using the 1355 respondents who completed both surveys

6.2.2 Measures

Opinion-type about the causes of climate change. As previously, opinion-type about the causation of climate change was assessed with the question *Which of the following statements best describes your thoughts on climate change?* Respondents selected one of the following four statements: *I don't think that climate change is happening; I have no idea whether climate change is happening or not; I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures; I think that climate change is happening, and I think that humans are largely causing it.* These statements are referred to as *deny, don't know, natural, and human-induced*.²⁹

²⁹ It is conventional practice to measure consensus effects dichotomously: whether it is a behaviour (engage vs not engage), or an attitude or opinion (pro - capital punishment vs anti- capital punishment). Unfortunately the case of opinions about climate change is not so straight forward. Simply asking whether one believes in climate change or not fails to capture an important argument in the 'debate' – that climate change is happening, but due solely to natural fluctuations. By failing to capture this argument the predictive capacity of views on climate change is compromised – hence, I deemed it necessary to examine consensus on a categorical measure. The trade-off for validity is a slightly more complex reading of results.

In addition to the measures described in previous chapters, the following measures were used.

False consensus levels and actual opinions. Directly after selecting an opinion statement, respondents were asked to estimate the percentage of Australians they thought would agree with each of the opinion-types. Response estimates to the four statements were required to total 100% before respondents were able to proceed to the next section of the survey.³⁰ False consensus was measured by the percentage of community consensus estimated for the respondent's *own* opinion-type. In accordance with the method prescribed by de la Haye (2000), the response set to the initial opinion-type question was used as a proxy for the 'actual' opinion level of the Australian community.

Trust in friends and family. Trust in friends and family was measured by the question *How much do you trust the following to provide you truthful information on climate change? Friends and family* measured on a scale from '1 = Distrust a lot' to '5 = Trust a lot'. Four other information groups were included for comparative purposes: *environmental organisations, university scientists, government scientists, and the community.*

6.3 Results

6.3.1 Climate Change Opinion-Type and False Consensus Effects

Figure 16 reveals that actual climate change opinions differ markedly from estimated percentages. On average, people overestimated the proportion of people who were of the opinion that climate change was not happening (*deny*) or *didn't know*, and underestimated the proportion of people who believed climate change was either *natural* or *human-induced*.

³⁰ Where estimates did not total exactly 100%, the screen was refreshed with the following prompt added: "Please ensure that your estimates add up to 100%".

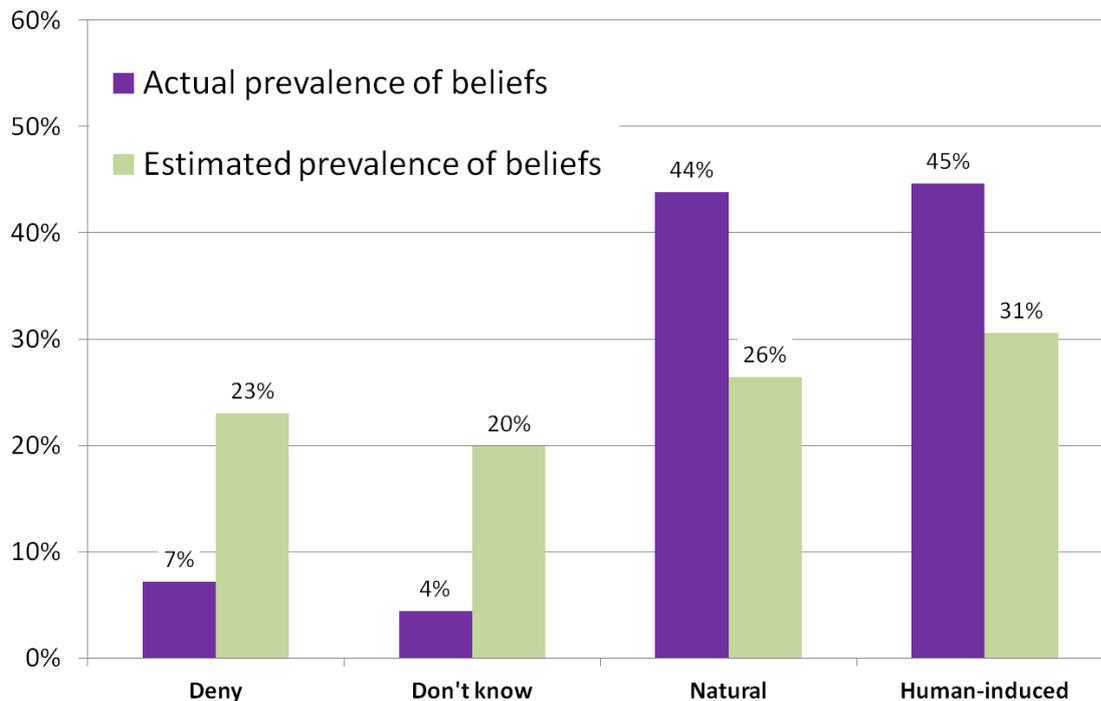


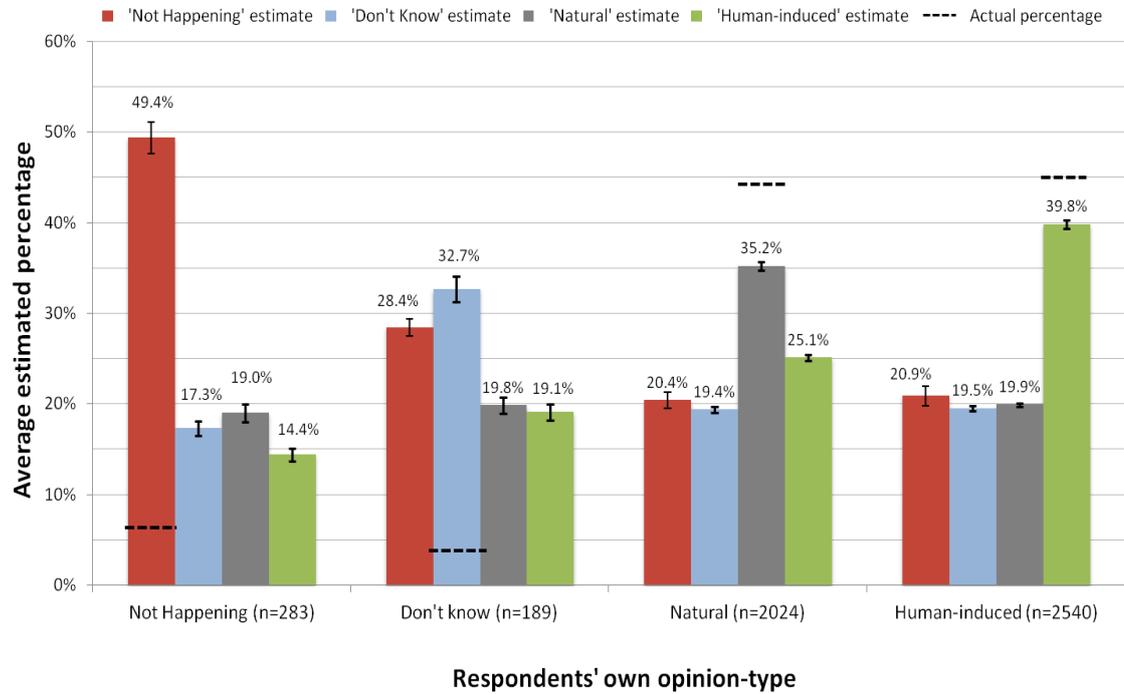
Figure 16. Actual versus estimated percentages of climate change opinion-type for all respondents (N = 5030).

H1: People will estimate their own opinion regarding the causes of climate change to be more common than will people holding different opinions (false consensus).

Actual and estimated levels of opinion were analysed by each opinion-type. These are displayed in Figure 17. Here, the horizontal axis is ordered by the actual opinion-type of the respondents. The bars indicate the average in-group estimates of how prevalent they thought each opinion would be. The dotted lines indicate the actual prevalence. For example, the *deny* group estimated (on average) that 49% of the rest of the community would agree with their opinion, while they estimated only 14% of the community would agree that climate change was *human-induced*. Every group displayed the false consensus effect. That is, each group's average estimation of their own opinion-type *exceeded the estimation made by other groups*. Further, each group estimated their own opinion-type as *the most common* opinion in the community. Table 28 presents an analysis of variance for each prevalence estimate by opinion-type.³¹ There were large effects for own opinion on

³¹ It was deemed inappropriate to group opinion-type into own opinion versus all other opinions as this implies the resulting groups are in diametric opposition. As the relative positioning of all four opinions was unclear, they were kept separate for the analysis of variance.

estimating general levels of *denial*, *natural*, and *human-induced* opinions. There was a small effect of own opinion on estimating levels of people who would reply *don't know*.



* error bars denote within-opinion-type standard errors

Figure 17. Estimated percentages of climate change causation for each opinion-type (N = 5030).

Table 28. Mean (standard deviation) estimated prevalence of each opinion by respondents' own opinion-type (N = 5030).

	Respondents' own Opinion-Type				F(3, 5026)
	Deny	Don't Know	Natural	Human-induced	
1 Estimates of 'deny'	49.36% (28.48) ^a †	28.44% (19.80) ^b	20.38% (15.20) ^c	20.87% (15.53) ^c	334.20, p < .001, $\eta^2 = .17$
2 Estimates of 'don't know'	17.27% (15.26) ^a	32.65% (20.92) ^b	19.38% (14.32) ^c	19.49% (13.54) ^c	63.09, p < .001, $\eta^2 = .04$
3 Estimates of 'natural'	19.03% (18.33) ^a	19.82% (13.41) ^a	35.15% (21.25) ^b	19.88% (10.77) ^a	347.32, p < .001, $\eta^2 = .17$
4 Estimates of 'human induced'	14.35% (13.92) ^a	19.09% (13.20) ^b	25.09% (15.44) ^c	39.76% (21.17) ^d	389.03, p < .001, $\eta^2 = .19$

† Mean scores with different subscripts are significantly different on the basis of Tukey's HSD test

H2: Same-opinion consensus will be overestimated by minority positions and underestimated by majority positions (directional accuracy).

H3: Levels of climate change denial will be overestimated by all groups (pluralistic ignorance).

A one-way analysis of variance was performed to test the accuracy and direction of estimated consensus for each opinion-type. The first line in Table 29 shows a strong effect for directional accuracy based on respondents' own opinion-type. Those in minority positions (*deny* and *don't know*) overestimated the amount of actual agreement with their own opinion, while those in majority positions underestimated agreement with their own opinion (but still gave a higher estimate of their own opinion than other groups did). The overestimation of minority opinions was greater than the underestimation of majority opinions. The second line in Table 29 indicates that *all* groups overestimated the levels of people denying climate change is happening; and that the amount of overestimation of denial differed according to opinion-type. Those who themselves denied climate change had the greatest level of overestimation of denial, followed by those who didn't know.

Those who thought climate change *natural* or *human-induced* had similar overestimations of denial to each other.

Table 29. Mean (standard deviation) directional accuracy and pluralistic ignorance effects of estimates of climate change opinion (N = 5030).

	Respondents' own Opinion-Type				F(3, 5026)
	Deny	Don't Know	Natural	Human-induced	
1. Deviation of own-viewpoint consensus from actual levels	+ 42.16% (28.48) [†] _a	+ 28.25% (20.92) _b	- 8.65% (21.25) _c	- 4.83% (21.17) _d	719.48, p < .001, $\eta^2 = .30$
2. Deviation of estimated levels of denial from actual levels	+ 42.16% (28.48) _a	+ 21.24% (19.81) _b	+ 13.18% (15.15) _c	+ 13.37% (15.53) _c	334.20, p < .001, $\eta^2 = .17$

[†] Across rows, mean scores with different subscripts are significantly different on the basis of Tukey's HSD test

6.3.2 False Consensus and Trust

H4: Levels of false consensus will be higher for those who place greater levels of trust in friends and family for information on climate change (availability heuristic).

Overall, trust in friends and family to provide accurate information on climate change had the highest correlation with levels of false consensus: higher levels of trust were associated with higher perceived consensus (Table 30). The relationships were weak however, and were non-existent for the *deny* and *don't know* opinion-types. The breakdown of opinion-type indicates that the strongest relationships occurred for the scientifically non-normative opinion-types (*deny* and *natural*), where lower levels of trust in information from university scientists were associated with higher false consensus. For the *happening, but natural* opinion-type, lower levels of trust in government scientists and environmental organisations were also associated with higher levels of false consensus.

Table 30. Correlations between trust in information sources and levels of false consensus (N = 5030).

Information Source	Mean (SD)	Respondents' own Opinion-Type				
		All respondents	Deny	Don't Know	Natural	Human-induced
Environmental organisations	2.89 (1.23)	-.02	-.09	.08	-.12**	.04
University scientists	3.37 (1.15)	-.07**	-.17**	.09	-.14**	-.03
Government scientists	2.83 (1.22)	-.05**	-.09	.08	-.15**	-.01
The community	2.74 (0.91)	.05**	-.03	.09	.03	.09**
Friends & Family	3.12 (0.96)	.09**	-.01	.11	.10**	.09**

** $p < .001$

6.3.3 False Consensus Effects and Motivated Social Cognition

H5: For those with scientifically non-normative opinions, higher levels of false consensus will be associated with less engagement in pro-environmental behaviour, lower perceived individual efficacy and responsibility for responding to climate change, moral disengagement, and lower levels of guilt.

Bivariate correlations were calculated for all respondents and for each of the opinion-types. Table 31 shows that, for the *deny* and *natural* groups, high false consensus was significantly but weakly associated with lower ratings of individual efficacy and responsibility for responding to climate change. There were no significant correlations between consensus estimates and responsibility for the other two opinion-types. For the *natural* group, there were also significant, though weak, associations between high false consensus and low levels of moral engagement and guilt. The only significant association between high false consensus and pro-environmental behaviour was for the *natural* opinion-type, although the relationship was weak.

Table 31. Correlations for false consensus, behaviour, efficacy and responsibility by opinion-type (N = 5030).

	Respondents' own Opinion-Type				
	All respondents	Deny	Don't Know	Natural	Human-induced
Responsibility for responding	-.06**	-.15**	.02	-.13**	.01
Individual Efficacy	-.05**	-.10*	.04	-.14**	.02
Moral Engagement	-.05**	-.09	-.01	-.15**	.01
Guilt	-.00	-.02	.06	-.10**	.06**
Pro-environmental Behaviour	-.01	-.02	.08	-.06**	.00

* $p < .01$

** $p < .001$

6.3.4 False Consensus Effects and Stability of Opinions

For this section, the responses of the 1355 people who participated in both surveys were used. Figure 18 shows that differences in the overestimation of *deny* and underestimation of *natural* were relatively stable between the two time periods, with slight changes in actual opinion mostly mirrored by slight changes in estimated opinion.

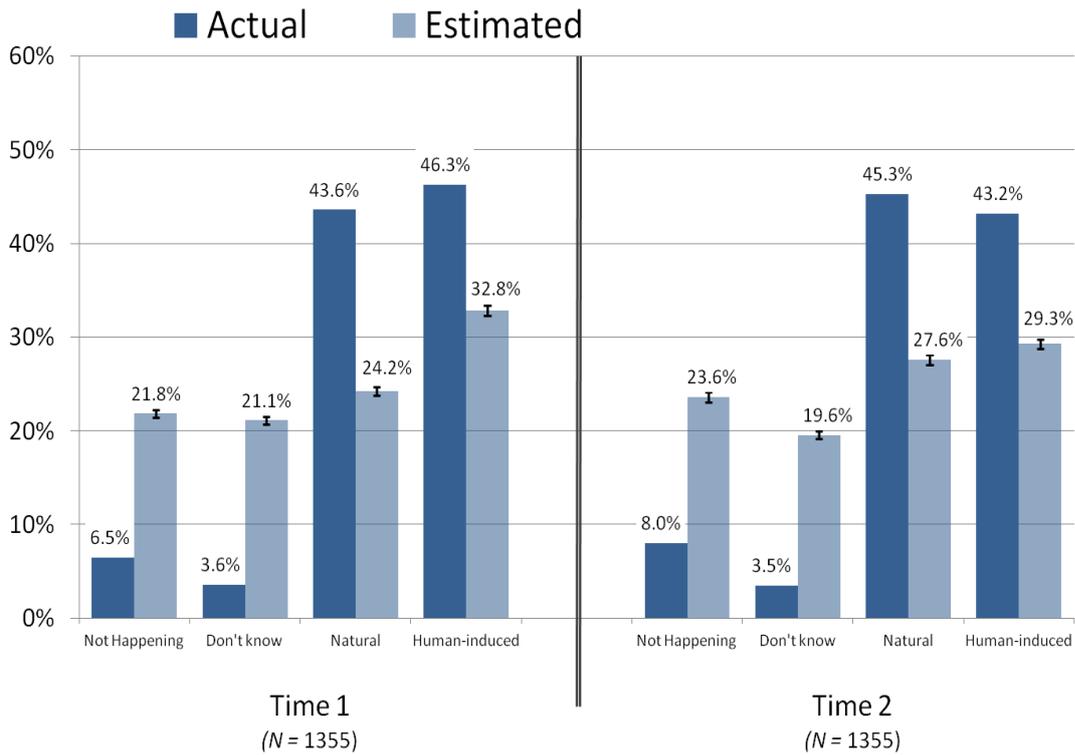


Figure 18. Actual and estimated levels of agreement with each opinion-type, grouped by respondents' own opinion-type (N = 1355).

Changes in estimated levels of community *denial* over time were further explored by grouping T1 and T2 denial estimates by opinion-type at T2. While Figure 18 suggests consensus estimates were relatively stable, Figure 19 suggests that there was a sharp increase in estimated levels of denial by those who themselves chose the *deny* opinion-type at T2.

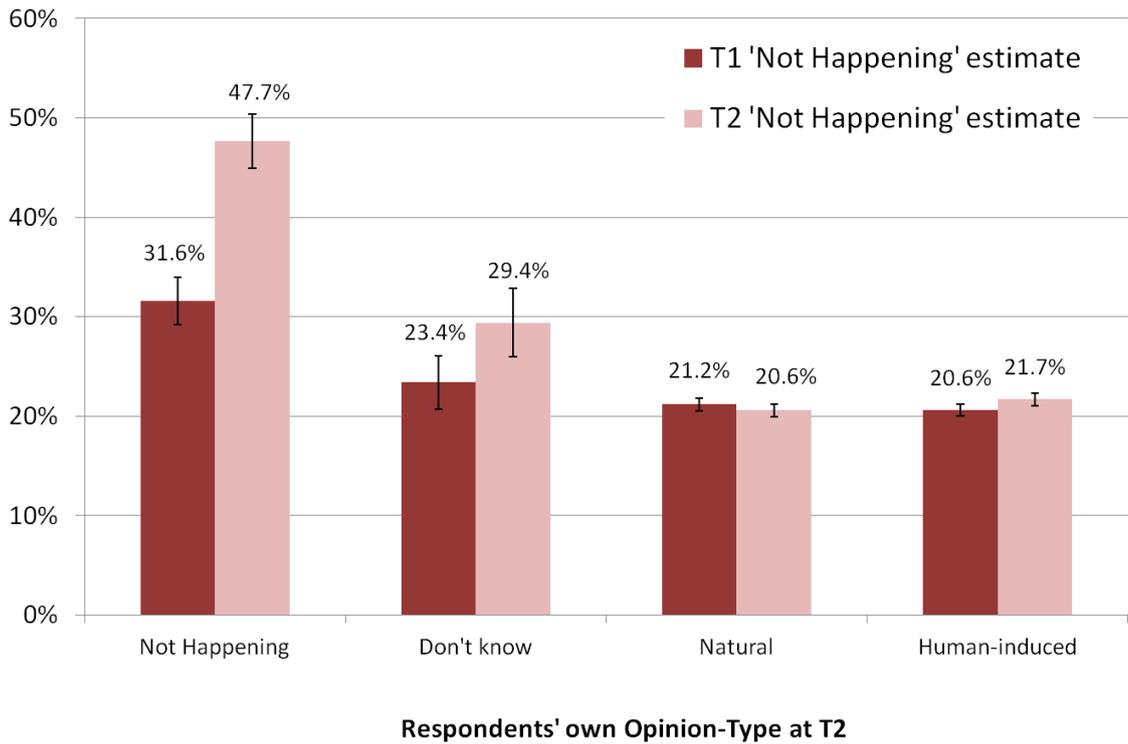


Figure 19. Estimated levels of community ‘denial’ at T1 and T2 based on respondents’ own opinion-type at T2 (N = 1355).

H6: People with high levels of false consensus will be less inclined to change their opinions about climate change.

To test for stability of individual opinions, a quartile split was performed to identify two groups: respondents with high levels of initial false consensus (in-group estimate of greater than 50% for the T1 survey, $n = 374$), and respondents with low levels of initial false consensus (in-group estimate of less than 20% for the T1 survey, $n = 421$); group sizes differed due to a difference in the number of respondents with values on the quartile cut-off boundaries.³² A chi-square comparison showed that high false consensus respondents were significantly more likely to select the same opinion statement in the T2 survey than were low consensus respondents $\chi^2(1, n = 795) = 16.2, p < .001, phi = -.14$ (Table 32). The analysis was repeated using false consensus as a continuous variable. On average, the initial same-opinion estimate of those who did not change their opinion ($M = 36.77; SD = 20.94$)

³² The two middle quartile groups were excluded from the analysis. A quartile split was deemed ideal as it meant those in the high false consensus group estimated the amount of in-group consensus as 50% or higher. In this respect this group represents something not captured by a continuous measure: respondents who think an *absolute majority* of the community agree with their own opinion.

was higher than those who shifted their opinion ($M = 33.27$; $SD = 21.80$; $t(1353) = 2.69$; $p < .01$).

The same analysis was conducted for only those respondents who initially denied that climate change was happening. A chi-square comparison suggests that those who denied climate change and had high false consensus scores were less likely to change their opinion in the T2 survey than were those who denied climate change with initially low false consensus scores, though the significance was marginal: $\chi^2(1, n = 68) = 3.47$, $p = .05$, $\phi = -.23$ (Table 32). In other words, those who initially denied were less likely to change their opinion if they perceived high consensus with their own opinion.

Table 32. False consensus and stability of opinions for all respondents ($N = 1355$), and for those who initially thought climate change was not happening ($n = 68$).

	All respondents		'Deny' Opinion-type	
	Low False Consensus	High False Consensus	Low False Consensus	High False Consensus
Consistent Opinion	n = 278	n = 295	n = 9	n = 22
	48.5%*	51.5%	29.0%	71.0%
	66.0%**	78.9%	32.1%	55.0%
Inconsistent Opinion	n = 143	n = 79	n = 19	n = 18
	64.4%	35.6%	51.4%	48.6%
	34.0%	21.1%	67.9%	45.0%

* Within consistency type

** Within consensus type

6.4 Discussion

The results presented in this chapter demonstrate that *estimates* about what the Australian community thinks about climate change differ markedly from *actual* opinions. People tend to believe their *own* opinion about climate change is more common than people holding other opinions believe it is. Climate change denial is generally overestimated, regardless of people's own opinions. This faulty estimation of community attitudes appears to be stable across time, with slight increases in false consensus for those think climate change is not happening. Further, those who displayed high initial levels of false consensus were more resistant to changing their opinions about the causes of climate change than those exhibiting low false consensus.

People from the two 'majority positions' – *natural* and *human-induced* – generally underestimated the prevalence of their own opinion. Those in the two minority positions – *deny*, and those who *don't know* – tended to overestimate the prevalence of their own view. That the projected consensus of people who denied climate change or didn't know deviated *so far* from actual estimates is consistent with a motivational account of false consensus functioning as a social support mechanism for minority views. Under this perspective, need for social support increases when one's position deviates negatively from the actual consensus, and when people are uncertain about their own opinions. Further, the overestimation by those in minority positions outweighed the underestimation by those in majority positions, suggesting that erroneous estimations for those of the *deny* opinion in particular cannot be attributed to a conservatism bias (or the tendency to decrease judgement error by distributing allocations in a roughly equal manner) alone.

The notion that 'equal weight to each side' media broadcasting may have given rise to a national level 'pluralistic ignorance' was supported by the observation that, while privately most people held the view that the climate is changing, all groups overestimated the prevalence of outright climate change denial.³³ The overestimation of levels of denial persisted over time, suggesting that the role of the media in the intervening 12 months, prominently featuring climate change sceptics and public anti-carbon tax campaigns,

³³ Note that what was observed was relative rather than absolute pluralistic ignorance – for the latter to occur estimates of denial would have to exceed 50% (Shamir & Shamir, 1997).

seemingly counteracted coverage touting the existence of majority community support for action on climate change (Gillard, 2011).

Interestingly, the *increase* in denial estimates over time was limited to those who themselves denied climate change. I suggest two interpretations: First, deniers selectively process information that accords with their opinion, now that there is more of the information to be processed. And second, as the 'debate' has become more salient and more value-laden in the Australian media (and therefore in the minds of many Australians), those who deny climate change feel a greater need to legitimise their viewpoint, a greater need for social support, or a greater need to maintain self-esteem (Mullen, 1985).

Whatever the reason, previous research indicates that people who believe there is more support for their own opinion are more likely to express that opinion (Noelle-Nuemann, 1993; Watt & Larkin, 2010). This might provide another clue to why those on the 'denial' side of the debate have gained a disproportionate share of media coverage. Further research, including experiments where people's privately held opinions differ from their publicly expressed sentiments in the face of perceived group pressure, would lend greater support to these inferences.

For the scientifically non-normative groups, high levels of false consensus were significantly associated with lower individual responsibility to act and low levels of response efficacy. For the *natural* group, moral disengagement, high false consensus was also associated with lower levels of guilt, and slightly lower levels of pro-environmental behaviour. This again supports the notion that the expressed opinion that climate change is occurring but due solely to natural processes represents a reinterpretation of climate change that functions partly to divest personal responsibility and legitimise inaction in the face of conclusive scientific evidence. Such a mental manipulation brings about a need to legitimise such a reinterpretation by bolstering perceived levels of support.

The case for family and friends bolstering false consensus was not convincing, although more targeted measures might shed more light on this issue. Of interest here were the stronger relationships between high levels of false consensus and distrust in scientific sources of information and environmental organisations for those holding scientifically non-normative opinions. These trust agents can be considered (high-consensus) proponents of

climate change, and thus represent those holding an opposing opinion to the *deny* and *natural* groups. But the same associations were not found for high trust in scientific sources and high levels of false consensus for the *human-induced* group. Overestimation of consensus for the *human-induced* group appears instead to be linked to ‘people like them’ (friends and family, and the community), suggesting that these people make more use of the availability heuristic to make estimates than those in scientifically non-normative groups, while a process of motivated social cognition (discounting scientific and environmental sources of information) might underlie non-normative estimates to a greater extent.

In Chapter 2 I introduced Uncertainty-Identity Theory (UIT; Hogg, 2007), which posits that a central role of social identification is to reduce uncertainty. By identifying with social groups, uncertainty is reduced because we are able to draw on the attitudes, feelings, and behaviours of that group to infer what our own position should be. The results here suggest that uncertainty also occurs for people holding scientifically normative positions, and when this uncertainty is present we tend to draw on close others to guide our thinking. Meanwhile, negative authority referents (‘those who we do *not* wish to identify ourselves with’, in this case scientific and academic sources) seem more important in shaping, informing, and bolstering the opinions of those sceptical about climate change.

Another avenue for future investigations relates to the different media outlets through which climate change information is disseminated. There is evidence from communications research suggesting exposure to heterogeneous social networks aids in accurate perceptions of community opinion (O’Gorman 1979, cited in Wojcieszak & Price, 2009). Wojcieszak and Price (2009) found that exposure to dissimilar opinions mitigated the link between individual opinion and perceived public opinion on contentious socio-political issues. They concluded that both offline and online communities served as a filter that exposed or isolated people from broader opinion-climates. There is also evidence that the way we project views onto the public is influenced by perceived media bias (Gunther et al., 2001). Given the rise in usage and influence of social media around contentious issues like climate change, the role of media in shaping and disseminating climate change opinion should be explored. Experimentally manipulating exposure to similar and dissimilar

opinions and assessing the influence on consensus estimates while accounting for climate change knowledge might shed further light still.

The results presented in this chapter highlight the importance of presenting people with accurate information about actual levels of consensus, not just with regards to the scientific community but throughout the community itself. Leaving estimates of levels of climate change denial unchallenged risks allowing the notion of widespread denial to effectively self-perpetuate, with ramifications for individual behaviours, policy-makers, and those seeking to communicate factual information about the science of climate change.

Social and cultural processes are critical to the perpetuation of pluralistic ignorance (Shamir & Shamir, 1997). Social and political groups, economic structure, cultural values, and especially the media all provide indicators on which to base estimates of public sentiment. Just like opinions about the causes of climate change, there are competing claims about support and opposition toward climate change policy interventions. These claims are doubtless influenced by similar biases to those we have just explored. In the next chapter, I explore how factors influencing policy support are embedded in social and cultural processes, and how these in turn are linked to individual-level biases.

CHAPTER 7. THE SYSTEM-LEGITIMISING FUNCTIONS OF RESPONSES TO CLIMATE CHANGE

One of the notable outcomes in Chapter 4 was the strong link between political voting behaviour and opinion-type. Those voting Greens or Labor were much more likely to accept human-induced climate change; those voting Liberal and National much less likely. This political link extended to pro-environmental behaviours, with those voting for parties with stronger, more proactive policy positions on climate change action (the Greens and Labor), engaging in more pro-environmental behaviours than other respondents. This is in keeping with recent research in the US indicating that Democrats are much more likely than Republicans to endorse the concept of anthropogenic climate change (Leiserowitz et al., 2011; McCright & Dunlap, 2011b; Scruggs & Benegal, 2012). On face value these results suggest that people's opinions about climate change and their subsequent behaviours are drawn directly from the opinions and policy positions of the political parties people identify with. Conversely, we could argue that people's opinion on climate change drives their voting behaviour. But people vote for political parties for a myriad of reasons; rarely are decisions based on a single issue like climate change. Using a System Justification Theory approach, in this chapter I explore the extent to which underlying ideological drivers are behind these political party relationships with climate change responses. I also investigate whether these drivers are related to support for policy action on climate change. In doing so, I attempt to integrate some of the concepts of moral disengagement into this system justification approach. Throughout the introduction I will pose several research questions, which are subsequently tested with the national survey data.

7.1.1 System Justification

Numerous personality traits and values purportedly underlie people's overt political preferences and inform their voting behaviour. These include tolerance of diversity, ambiguity, and change, and the way tradition, hierarchy, and equality are valued (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950; Jost, Nosek, & Gosling, 2008). But there is often discrepancy between the 'official' political ideologies of a person (as denoted through their party-political preferences) and their *actual* politically-relevant personal ideologies (Adorno et al., 1950). Further, for many individuals, political preferences change from election to election, suggesting the link between underlying drivers and political affiliation

is malleable, or that the drivers themselves are malleable, or that these drivers (or tendencies) exert more or less influence under different conditions. This last possibility is posited in system justification theory.

System justification refers to a psychological motive to defend the status quo, so that existing political and economic arrangements are perceived as fair and legitimate (Jost & Banaji, 1994). System-justifying ideologies (or tendencies) take many forms; they include preferences toward a Protestant work ethic, meritocratic ideology, fair market ideology, belief in a just world, power distance, opposition to inequality, economic system justification, social dominance orientation, right-wing authoritarianism, and political conservatism (Jost & Hunyady, 2005). These ideologies, while distinct from each other, are typically interrelated, suggesting they serve the same broad ideological function: to justify the existing social and economic arrangements of the State.

System justification may function to increase self-esteem and well-being, particularly for groups that are privileged by existing systems. System justification also functions to reduce negative affect, such as that produced by guilt and anxiety, by maintaining the illusion that systemic inequities are fair. This works for people of privileged groups – who might experience guilt if illegitimate system inequalities are acknowledged. Importantly, it also works for people of under-privileged groups – who risk experiencing anxiety, anger, and helplessness if system inequalities are acknowledged. As such, an outcome of system justification is that disadvantaged groups can (and often do) work against their own self-interest, opposing policies designed to benefit those with access to fewer resources. System-justification also influences levels of moral engagement; for instance, Wakslak et al. (2007) found that high system-justifying tendencies undercut support for wealth redistribution policies, and that this was mediated by a reduction in moral outrage. This mediation effect is cited as a key determinant of one of the outcomes of system-justification: as moral outrage is a critical driver of efforts to alleviate the impacts of inequitable systems, a reduction in moral outrage results in withdrawal of support for social change (Jost & Hunyady, 2005). System justification has also been linked to a decreased willingness to protest, even among political activists (Jost et al., 2012).

7.1.2 System Justification and Climate Change

A motivated social cognition approach to ideologies such as right-wing authoritarianism differs from traditional psychological accounts. While personality theorists typically think of such constructs as stable individual differences, a motivated social cognition approach assumes that various directional and non-directional motives influence the extent to which system-justifying tendencies are expressed. Motives might be based on dispositional antecedents such as need for closure, or discomfort with ambiguity (Jost & Hunyady, 2005), and variation in these dispositions leads to substantial differences in the expression of system-justifying ideologies. *Situational* factors, including threats to existing political, social, and economic systems, and mortality salience, can also increase the expression of system-justifying tendencies.

These situational factors arguably make system-justification tendencies particularly relevant to climate change responses. First, responding effectively to climate change necessitates moving to a more sustainable, steady state economy, away from the prevailing Western economic system predicated on continuous economic growth (Jackson, 2009). Acknowledgement that climate change is a serious issue may also entail the recognition and acceptance that a fundamental shift in existing systems must occur. Second, acknowledgement of climate change as a serious threat might entail the recognition that life is fragile, prompting mortality salience. As both situations threaten the status quo, we might reasonably expect individuals with greater system-justifying tendencies to be motivated to disavow the role that humans play in changing the climate. Indeed, Feygina, Jost and Goldsmith (2010) found that general system-justifying tendencies were linked to environmental denial and less commitment to pro-environmental behaviour in the United States.

Because we know that opinions about the causes of climate change are strongly linked to political preferences (which in turn we expect to be related to system-justifying tendencies), we need to establish whether opinions and system justification are related *independent* of political preferences (*Hypothesis 1*). Further, if system justification functions to reduce negative affect and moral outrage, we should observe associations between high system-justifying tendencies and low levels of negative affect (*Hypothesis 2*) and moral engagement (*Hypothesis 3*) even *within* opinion-type.

7.1.3 System Justification, Climate Change, and Policy Support

So far in this thesis, I have focused on the outcomes and antecedents of two aspects of climate change response in particular: opinion-type and pro-environmental behaviour. But there is another climate change response that is particularly relevant in Australia and many other countries at the moment: responses to policies designed to mitigate and adapt to climate change. Levels of policy support among the general community are obviously important: they provide an indicator for political parties to know how far to push things. Politicians judge whether policies accord with the wishes, values, and priorities of their constituents, or whether they risk defeat at the next election by introducing broadly unpopular measures.

At the time of writing, considerable debate ensues over the introduction and implementation of a carbon pricing scheme (popularly referred to as 'the carbon tax') by the (centre-left) Federal Labor Government. The carbon pricing scheme is a market-based mechanism in which the top 500 greenhouse gas-emitting companies in Australia are charged on a 'per tonne of carbon-equivalent emissions' basis. A central characteristic of the scheme is financial compensation for low- and middle-income households, designed to negate the financial impact of anticipated price-rises to energy-intensive products such as petrol and electricity. This characteristic has led some commentators to suggest that the scheme represents a covert way to undermine free-market systems by redirecting wealth away from the private sector to the State (Riley, 2011). Others suggest that, because the scheme relies on a market-based mechanism, it represents a departure from the centre-left tradition of State intervention (e.g. "Did you know Gillard and Abbott agree on climate change?", 2012). Such discourse is arguably a strong situational factor under which system-justifying tendencies are made salient. Therefore, we should expect support for carbon policy to be influenced by system-justifying tendencies, again above and beyond political voting intentions (*Hypothesis 4*). A further way to disentangle system-justifying tendencies with political preferences is by observing the influence of the message-bearer on policy support. That is, would levels of policy support for an equivalent carbon price policy vary if it was not associated with a particular political party? (*Hypothesis 5*).

One other determinant of policy support is relevant in light of System Justification Theory. The compensation component to households was devised so that people on lower income levels in particular would be slightly better off even when factoring in anticipated price-rises in the cost of living, whereas those on higher incomes would receive no compensation to combat price-rises. If system justification occurs as much for disadvantaged groups as it does for advantaged groups, we should expect levels of personal and household income to be unrelated to policy support, despite those on lower-incomes receiving greater assistance (*Hypothesis 6*).

7.1.4 Social Dominance Theory, Climate Change, and Policy Support

The compensation characteristic of Australia's carbon pricing scheme is also relevant to Social Dominance Theory, introduced in Chapter 2. Under this approach, power hierarchies are maintained at a system level by 'legitimising myths': moral and intellectual justifications of the hierarchy. In Chapter 5, I argued that two attitudinal statements about the impacts of collective action on climate change (one concerning Australian job losses, and the other financial cost to Australia) were 'moral justifications' for inaction. A third (concerning hardship to individuals) I argued to reflect a genuine moral concern. If the former are indeed types of moral justifications, they can be thought of as synonymous with the hierarchy-enhancing legitimising myths proposed by Social Dominance Theory. If people perceive the carbon price compensation mechanism as a means to (covertly or otherwise) redistribute wealth, in that it compensates under-privileged groups to a greater extent than privileged groups, then we might expect to see the link between system-justifying tendencies mediated by these 'moral justifications' surrounding the supposed impacts of collective responses to climate change. While Bandura's concept of moral justifications is used in an exclusively negative sense, Social Dominance Theory posits that there are also hierarchy-*attenuating* myths: those that promote equality and democracy, not in *what is*, but in *what should be*. If this is so, we might expect system-justification tendencies and policy support to be mediated by evaluations of the potential *positive* corollaries of climate change policy action (*Hypothesis 7*).

To further test the idea that legitimising myths are synonymous with moral justifications, we should see system-legitimising tendencies influence support for policy via a reduction in

moral engagement (*Hypothesis 8*). The same mediating influence of moral engagement should apply for negative affect (*Hypothesis 9*).

I select three system-justification ideologies for investigation: economic system justification, right-wing authoritarianism, and social dominance orientation. The second and third are selected because they are well-established constructs that relate to concepts of fairness, equality, morality, and inter-group tolerance, all of which have theoretical corollaries for climate change responses. The first is selected because of the ramifications to the overarching economic system that climate change policy *in particular* represents. Each ideology can be summarised as follows:

Economic System Justification (ESJ). ESJ can be summarised as a tendency to view economic inequality as natural, inevitable, and legitimate, and to view economic outcomes as fair and deserved (Jost & Thompson, 2000).

Right-Wing Authoritarianism (RWA). RWA is an endorsement of conventional traditions and established authorities. It can be thought of as a continuum from extreme authoritarianism on the high end, where the preference is for uniformity and group authority, to extreme libertarianism on the low end, where the preference is for diversity and individual autonomy (Altemeyer, 1988; Stenner, 2009). High RWA individuals value traditional beliefs, morality, and lifestyles, while those low in RWA value change and innovation.

Social Dominance Orientation (SDO). SDO refers to the preference for relationships to be hierarchical rather than equal, and for advocating the right of more powerful groups to dominate weaker groups. Social dominance relies on the systematic distribution of resources (which may be cultural, financial, or environmental) to favour dominant groups at the expense of subordinate groups (Sidanius & Pratto, 1999). Despite its apparent similarities with RWA, the two are conceptually and empirically distinct (Duckitt & Sibley, 2009; Pratto, Sidanius, Stallworth, & Malle, 1994).

7.1.5 Research Questions

For the following research questions, 'system-justifying tendencies' are indicated by higher levels of RWA, SDO, and ESJ.

H1: System-justifying tendencies will predict opinion-type above and beyond political voting intentions.

H2: System-justifying tendencies will be associated with reduced negative affect, even when controlling for opinion-type.

H3: System-justifying tendencies will be associated with reduced moral engagement, even when controlling for opinion-type.

H4: System-justifying tendencies will predict support for carbon policy, above and beyond political voting intentions.

H5: Question-framing will influence levels of support for a carbon policy.

H6: Personal and household levels of income will be unrelated to policy support.

H7: System-justifying tendencies will influence support for policy through moral justifications (legitimising myths).

H8: System-justifying tendencies will influence support for policy through reduction in moral engagement.

H9: System-justifying tendencies will reduce negative affect through a reduction in moral engagement.

7.2 Method

Data were drawn exclusively from the T2 survey. As noted in Chapter 3, the data collection period of the T2 survey straddled the official announcement of the Federal Government's carbon pricing scheme, although the details of the carbon tax were made public 11 days prior to the questionnaire through the unveiling of the Federal Government's Clean Energy Future policy (Australian Government, 2011). Therefore it is assumed the carbon pricing scheme was highly salient for many respondents while undertaking the survey.

7.2.1 Measures

Items measuring system-justifying tendencies were asked at the beginning of the survey, before questions specific to climate change, so that responses would not be subject to priming effects (refer to Appendix B).³⁴

Economic System Justification (ESJ). ESJ was measured by the 17 items of Jost and Thompson's (2000) Economic System Justification Scale (e.g. *Economic positions are legitimate reflections of people's achievements*). Responses were measured on 9-point Likert scales from "1 = Strongly disagree" to "9 = Strongly agree" (alpha = .78).

Right-wing Authoritarianism (RWA). RWA was measured by six items based on Heaven's (1984) short-form Right-Wing Authoritarianism scale (e.g. *Our customs and national heritage are the things that have made us great, and certain people should be made to show greater respect for them*). Responses were measured on 5-point Likert scales from "1 = Strongly disagree" to "5 = Strongly agree" (alpha = .74).

Social Dominance Orientation (SDO). SDO was measured by eight items based on Pratto, Sidanius, Stallworth and Malle's (1994) Social Dominance Orientation scale (e.g. *Some groups of people are simply inferior to others*). Respondents were asked whether they had a positive or negative feeling toward each statement. Responses were measured on 7-point scales from "1 = Very negative" to "7 = Very positive" (alpha = .87).³⁵

Policy Support. A split-sample design was incorporated to test for the effects of question-framing on support for climate change policy. Approximately half of respondents were asked a question with direct reference to the Federal Government: *How much do you support or oppose the Government's plan to reduce Australia's carbon emissions by putting a price on carbon emitted by industry?* The other half of respondents were asked a generically worded question designed to reflect the characteristics of the Federal

³⁴ In this respect what we are measuring are individual system-justifying tendencies independent of situational variables (i.e. climate change) that might bolster system-justifying tendencies. See Discussion for further implications.

³⁵ Response formats vary between the three system-justifying tendencies as the original measurement scales were retained.

Government's carbon policy, but without direct reference to the Government: *Would you support or oppose putting a price on carbon emitted by industry if the money raised was used to ensure low and middle income households are fully compensated for energy price rises?* Responses were recorded on a scale from "1 = Strongly oppose" to "7 = Strongly support".

Voting Intentions. Voting intentions were measured in preference to previous voting behaviour to account for the possibility that the proposed carbon price announcement had influenced respondents' party political preferences. Respondents were asked *Which political party do you intend to vote for in the next Federal election?* A list of the major parties followed, along with the options *Other*, *Prefer not to say*, and *I have no idea*. Respondents selecting one of these three options were excluded from analyses broken down by voting intentions.

The major Federal Australian political parties represent a range of positions in relation to policy action of climate change (Tranter, 2011). The stance of each political party over the 2010-2011 time period can be summarised as follows:

Labor party: Moderate market-based action on climate change

Greens party: Strong market-based and government intervention action on climate change

Liberal party: Cautious, market-based action, but with notable scepticism within the party, and strong opposition to Labor's carbon pricing mechanism

National party: Cautious, market-based action, but with notable scepticism within the party, and strong opposition to Labor's carbon pricing mechanism

Household and Personal Income. Household and personal income were measured by asking people to select the category which corresponded to (i) their personal income level per week, and (ii) their household income per year. Categories were based on those used for reporting purposes by the Australian Bureau of Statistics. A *Prefer not to say* option was also given. Respondents selecting this category were excluded from only those analyses using income variables.

Negative Affect. Negative affect was measured by combining responses to four descriptors to the item *How does the issue of climate change make you feel? Angry, ashamed, guilty and fearful*. This combination was based on the outcome of the factor analysis to emotional descriptors detailed in Chapter 4.

Moral Engagement. Moral engagement was measured by combining and averaging two items: *I feel a moral duty to do something about climate change* and *I feel it is my ethical responsibility to change my individual behaviour to combat climate change* ($\alpha = .77$). Responses were measured on 5-point Likert scales.

Moral Justifications and Legitimising Myths. Based on the results in Chapter 5, I suggested that the following statements, originally termed ‘social attitudes to climate change’, also function as ‘moral justifications’: *Responding to climate change will cost Australia a lot of money* and *Trying to do something about climate change will mean a lot of people lose their jobs*. A further statement was hypothesised to represent a moral attitude: *Climate change will result in financial hardship for many people*. A further social attitude that could serve as a moral justification was also added: *There’s nothing Australia can do about climate change that will make a meaningful difference*. Three positive social attitude statements were included to test for their relevance as hierarchy-attenuating myths: *Doing something about climate change is an opportunity to be part of something bigger than ourselves*, *The challenge of climate change will provide people with a sense of purpose*, *Climate change will foster greater community spirit and connectedness*, and *Climate change may mean that wealth and resources end up being distributed more fairly*. Responses were measured on 5-point Likert scales from “1 = Strongly disagree” to “5 = Strongly agree”.

Certainty. Certainty was used as a proxy for opinion-type when a continuous measure was needed (see Chapter 5). Certainty that climate change is happening was measured by a sliding scale with the instruction *Move the cursor to the place on the slide which best represents how sure you are that humans contribute to climate change*. The scale was labelled “1 = Sure that humans don’t” to “100 = Sure that human do”. A reference to the mid-point of this scale was also included: “Unsure either way”.

7.3 Results

The correlations between the system justification variables of right-wing authoritarianism (RWA), social dominance orientation (SDO), and economic system justification (ESJ) (Table 33) indicate they are related, but separate constructs. As such they were kept separate for the remaining analyses. Responses to individual scale items for SDO, RWA, and ESJ are included as Appendix G.

Table 33. Correlations between system-justifying tendency scales (N = 5030).

	ESJ	RWA	SDO
ESJ	1		
RWA	.39**	1	
SDO	.57**	.19**	1

* $p < .01$
 ** $p < .001$

H1: System-justifying tendencies will predict opinion-type above and beyond political voting intentions.

All opinion-types, on average, rated above the midpoint for RWA, but below the midpoint on SDO. Average ratings for ESJ were around the midpoint for all opinion-types (Figure 20 to Figure 22). There were significant differences of moderate effect for each of the system-justifying tendencies across opinion-type, with slight variations in how the groups differed across each (*F* statistics are included within figures). The *human-induced* opinion-type had significantly lower levels of RWA, SDO, and ESJ than all other opinion-types. There were no significant differences in mean ESJ scores for the *deny*, *don't know*, and *natural* groups. The *deny* group had significantly higher RWA scores than all other groups, followed by the *natural* group, and the *don't know* group. The *deny* and *don't know* groups had the highest SDO levels, followed by the *natural* group.

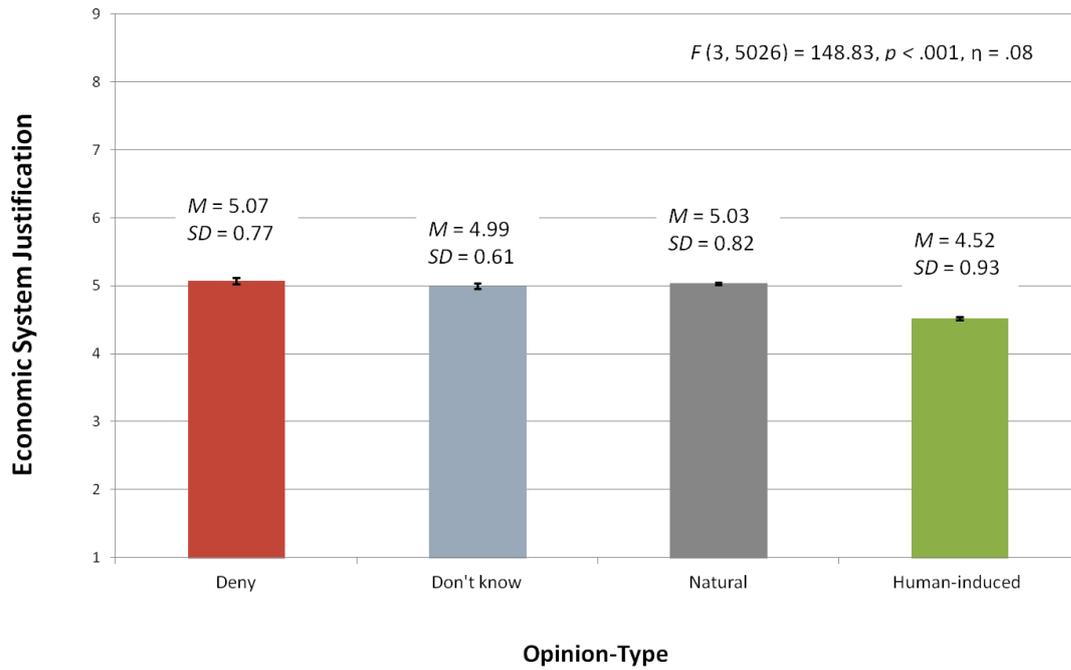


Figure 20. Economic System Justification by opinion-type ($N = 5030$).

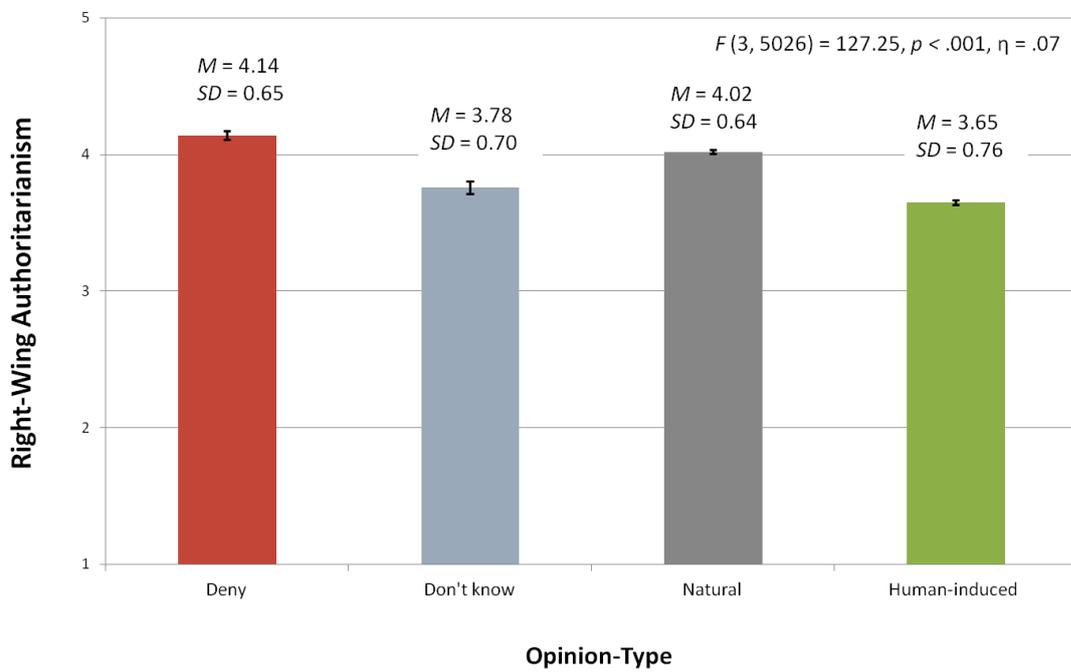


Figure 21. Right-Wing Authoritarianism by opinion-type ($N = 5030$).

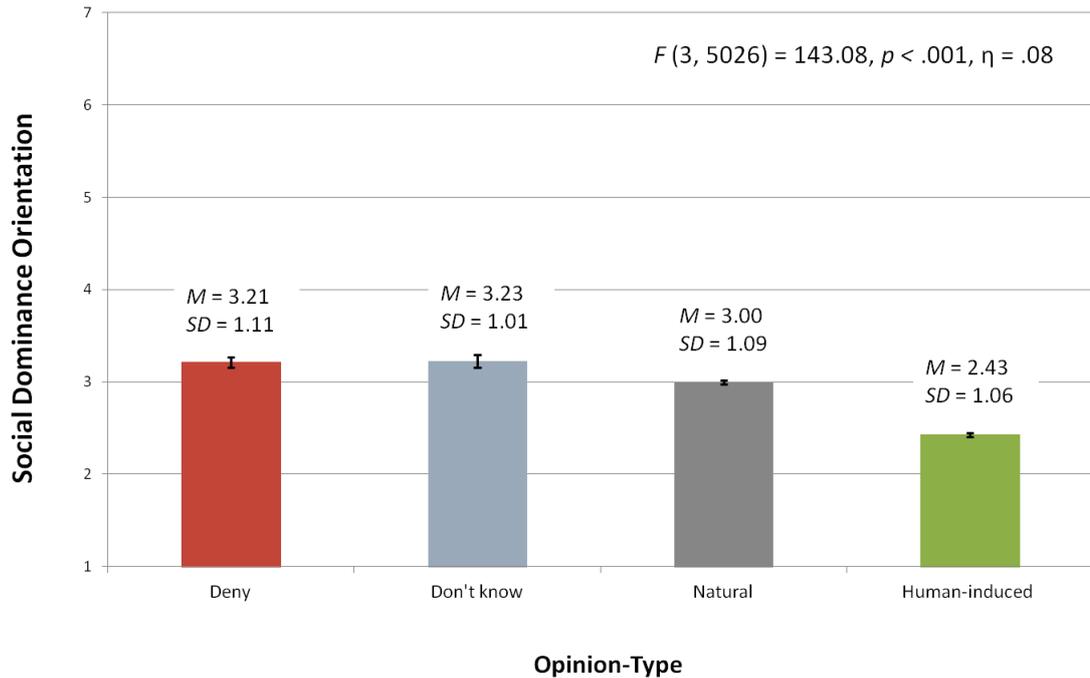


Figure 22. Social Dominance Orientation by opinion-type (N = 5030).

The relationships between system-justifying tendencies and opinion-type were assessed by political party support (as measured by party political voting intentions), as it was expected that system-justifying tendencies would be related to voting intentions. Certainty in anthropogenic climate change was used as a proxy for opinion-type. As Table 34 shows, system-justifying tendencies were negatively and moderately related to certainty in anthropogenic climate change. When these correlations are broken down by voting intentions, the relationships drop, but remain significant. This suggests two things: first, system-justifying tendencies are related to party political preferences; second, the influence of system-justifying tendencies on climate change opinion also operates independently of political preference.

Table 34. Correlations between certainty that climate change is anthropogenic and system-justifying tendencies, grouped by voting intention (N = 5030).

	All respondents	Labor (n = 1031)	Liberal (n = 1759)	Nationals (n = 176)	Greens (n = 438)
Certainty	M = 58.27 SD = 29.19	M = 69.69 SD = 28.65	M = 42.05 SD = 30.47	M = 21.51 SD = 22.49	M = 80.12 SD = 26.75
ESJ	-.32**	-.21**	-.17**	-.18*	-.20**
RWA	-.31**	-.15**	-.17**	-.26**	-.21**
SDO	-.29**	-.26**	-.19**	-.21**	-.16**

** $p < .001$

7.3.1 System-justifying Tendencies, Negative Affect, and Moral Engagement

H2: System-justifying tendencies will be associated with reduced negative affect, even when controlling for opinion-type.

H3: System-justifying tendencies will be associated with reduced moral engagement, even when controlling for opinion-type.

To assess whether system-justifying tendencies reduce both negative affect and moral engagement, the associations between system-justifying variables, negative affect, and moral engagement were broken down by opinion-type (Table 35).

System-justifying tendencies were negatively related to negative affect, as one would expect given the association between opinion-type and negative affect found in Chapter 3. When these associations are broken down by opinion-type, the results are mixed. There are some weak to moderate associations for the *deny*, *natural* and *human-induced* opinion-types, but most striking is the associations between high levels of RWA and low levels of negative affect, particularly for those of the *don't know* opinion-type. For moral engagement, again there are moderate negative relationships with system-justifying tendencies. When this is broken down by opinion-type, most relationships remain significant, particularly for levels of SDO and ESJ for the *human-induced* opinion-type, and levels of RWA for the *deny* opinion-type.

Table 35. Correlations between climate change system-justifying tendencies, negative affect, and moral engagement, grouped by opinion-type (N = 5030).

Negative Affect	All	Deny	Don't know	Natural	Human-Induced
	<i>M</i> = 2.79 <i>SD</i> = 0.82	<i>M</i> = 2.43 <i>SD</i> = 0.86	<i>M</i> = 2.64 <i>SD</i> = 0.66	<i>M</i> = 2.56 <i>SD</i> = 0.79	<i>M</i> = 3.12 <i>SD</i> = 0.74
ESJ	-.25**	-.08	-.07	-.15**	-.17**
RWA	-.23**	-.22**	-.39**	-.18**	-.08**
SDO	-.17**	-.02	.06	-.04	-.13**
Moral Engagement	All	Deny	Don't know	Natural	Human-Induced
	<i>M</i> = 3.23 <i>SD</i> = 0.95	<i>M</i> = 2.39 <i>SD</i> = 0.95	<i>M</i> = 2.84 <i>SD</i> = 0.58	<i>M</i> = 2.94 <i>SD</i> = 0.89	<i>M</i> = 3.78 <i>SD</i> = 0.75
ESJ	-.35**	-.15**	-.08	-.22**	-.29**
RWA	-.27**	-.25**	-.19**	-.16**	-.13**
SDO	-.35**	-.08	-.14*	-.22**	-.34**

* $p < .01$

** $p < .001$

7.3.2 System-justifying Tendencies and Policy Support

H4: System-justifying tendencies will predict support for carbon policy, above and beyond political voting intentions.

H5: Question-framing will influence levels of support for a carbon policy.

H6: Personal and household levels of income will be unrelated to policy support.

Figure 23 shows responses for the two climate change policy questions. There was a significant difference in support based on question framing, with the question phrased generically, and explicitly mentioning compensation to households, garnering slightly more support than when the question was phrased with relation to the Federal Government. Figure 23 also shows significant differences in support based on voting intention, with people intending to vote Greens and Labor offering stronger support than those intending to vote Liberal or National. The effect size was very large for the generically framed question ($F(3, 1685) = 380.62, p < .001, \eta^2 = .40$), and amplified when the question was framed with reference to the Government ($F(3, 1711) = 719.33, p < .001, \eta^2 = .56$).

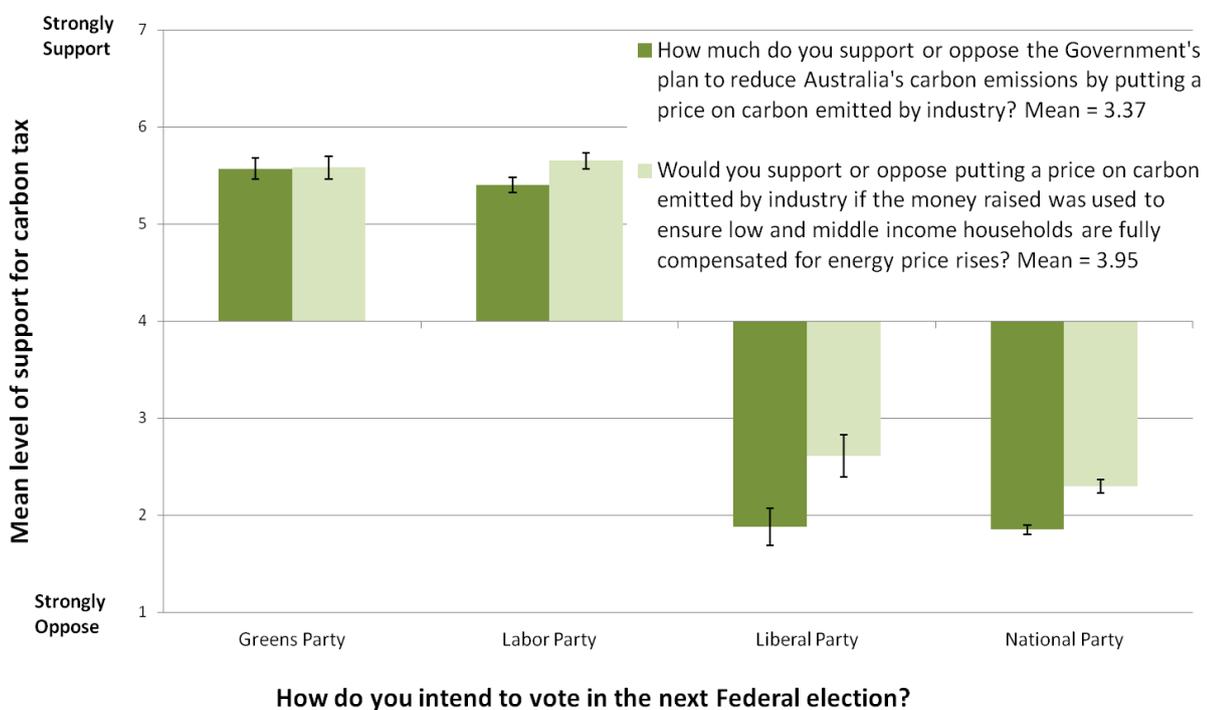


Figure 23. Effects of question framing on support for climate change policy, grouped by voting intention ($N = 5030$).

Table 36 shows that system-justifying tendencies were negatively and moderately related to policy support, regardless of framing. Levels of household and personal income had little influence over either policy support or system-justifying tendencies.

Table 36. Correlations between climate change policy support, income levels, and system-justifying tendencies (N = 5030).

	1	2	3	4	5	6
1. Government Carbon Price						
2. Generic Carbon Price						
3. Household Income	-.03	-.05*				
4. Personal Income	-.05*	-.07**	.60**			
5. ESJ	-.35**	-.35**	.08**	.07**		
6. RWA	-.34**	-.27**	-.08**	-.05*	.39**	
7. SDO	-.29**	-.33**	.01	.05*	.57**	.20**

* $p < .01$
 ** $p < .001$

Table 37 shows that, when correlations between policy support and system-justifying tendencies are broken down by voting intentions, the relationships drop but remain significant in all but a few cases. This suggests that, for the most part, system-justifying tendencies predict support for climate change independently of party political preference. Of note however, is the effect of question framing on associations between system-justifying tendencies and policy support for those intending to vote for the National party; here, the associations are significantly larger when policy is framed with specific mention of the Government.

Table 37. Correlations between climate change policy support and system-justifying tendencies, grouped by voting intention ($N = 5030$).

	Government Carbon Price (Generic Carbon Price)			
	Labor	Liberal	Nationals	Greens
	($n = 1031$)	($n = 1759$)	($n = 176$)	($n = 438$)
ESJ	-.28** (-.24**)	-.16** (-.18**)	-.39** (-.11) †	-.15** (-.29**) [†]
RWA	-.12** (-.08)	-.22** (-.08**) [†]	-.39** (-.05) †	-.21** (-.15**)
SDO	-.25** (-.31**)	-.11** (-.19**) [†]	-.27** (-.07) †	-.19** (-.30**)

* $p < .01$

** $p < .001$

† Significant differences between correlations due to question wording, based on z_{obs} values (see Appendix H)

7.3.3 The Mediating Influence of Moral Justifications and Moral Engagement on Policy Support

H7: System-justifying tendencies will influence support for policy through moral justifications (legitimising myths).

To test the mediating influence of moral justifications on the relationship between system-justifying tendencies and policy support, the two policy questions were combined into one variable. The steps suggested by Baron and Kenny (1986) to establish mediation were taken. Firstly, the system-justification variables were all significantly correlated with policy support (Table 36), establishing that there is an effect that may be mediated. Secondly, the system-justification variables were significantly correlated with the mediators (moral justifications) (as indicated by the bivariate r values in Table 38). A regression was then performed to test the effects of moral justifications on policy support, when holding the system-justification variables constant. Table 38 shows the addition of the moral justification variables led to a significant increase in R^2 , explaining an additional 28% of variance in policy support. Further, the coefficients for the system-justification variables were reduced at Step 2. While higher levels of agreement with the statements relating to *money* and *jobs* predicted reduced policy support, agreement with the statement regarding

individual hardship did not reach significance. By contrast, higher levels of agreement with statements about being part of something bigger, providing purpose, fairer wealth distribution and sense of community predicted higher policy support. This result supports a hypothesis that the link between system-justifying tendencies and policy support is partially mediated by moral justifications and legitimising myths.

Table 38. Hierarchical regression of the effect of moral justifications on Policy support (*N* = 5030).

Model		<i>r</i>	β
Step 1	ESJ		-.18**
	RWA		-.20**
	SDO		-.15**
			$R^2 = .16$
Step 2	ESJ	-.34**	-.07**
	RWA	-.29**	-.05**
	SDO	-.29**	-.02
	Nothing Australia Can Do	-.41**	-.25**
	Cost Australia Money	-.34**	-.03*
	Job Losses	-.51**	-.17**
	Financial Hardship	.06**	.01
	Sense of Community	.37**	.03*
	Part of Something Bigger	.55**	.20**
	Fairer Wealth Distribution	.26**	.06**
	Sense of Purpose	.44**	.05*
			$R^2 = .44$
R^2 Change = .28, Sig <i>F</i> Change < .0005			

* $p < .01$

** $p < .001$

H8: System-justifying tendencies will influence support for policy through reduction in moral engagement.

The process was repeated to test the mediating influence of moral engagement on system-justifying tendencies and policy support. The system-justification variables were all significantly correlated with policy support (refer Table 36), establishing that there is an effect that may be mediated. The system-justification variables were significantly correlated with the mediator (moral engagement) (Table 39). A regression was then performed to test the effect of moral engagement on policy support, when holding the system-justification variables constant. Table 39 shows the addition of moral engagement led to a significant increase in R^2 , explaining an additional 15% of variance in policy support. Further, the coefficients for the system-justification variables were reduced at Step 2. This supports a hypothesis that the link between system-justifying tendencies and policy support is partially mediated by levels of moral engagement.

Table 39. Hierarchical regression of the effect of Moral Engagement on Policy support ($N = 5030$).

Model		r	β
Step 1	ESJ		-.18**
	RWA		-.20**
	SDO		-.15**
			$R^2 = .16$
Step 2	ESJ	-.34**	-.12**
	RWA	-.29**	-.13**
	SDO	-.29**	-.05*
	Moral Engagement	.52**	.43**
			$R^2 = .31$
R^2 Change = .15, Sig F Change < .0005			
* $p < .01$			
** $p < .001$			

H9: System-justifying tendencies will reduce negative affect through a reduction in moral engagement.

The process was once more repeated to test the mediating influence of moral engagement on system-justifying tendencies and negative affect (Table 40). The addition of moral engagement led to a significant increase in R^2 , explaining an additional 8% of variance in levels of negative affect. The coefficients for system-justifying variables were reduced at Step 2, with the exception of SDO. This lends tentative support to a hypothesis that the link between system-justifying tendencies and negative affect is mediated by moral engagement.

Table 40. Hierarchical regression of the effect of Moral Engagement on negative affect ($N = 5030$).[†]

Model		r	β
Step 1	ESJ		-.15**
	RWA		-.16**
	SDO		-.06*
			$R^2 = .09$
Step 2	ESJ	-.25**	-.08**
	RWA	-.23**	-.09**
	SDO	-.17**	.05**
	Moral Engagement	.49**	.46**
			$R^2 = .17$
R^2 Change = .08, Sig F Change < .0005			

[†] All Constants were significant

* $p < .01$

** $p < .001$

7.4 Discussion

The results presented in this chapter suggest that underlying ideological drivers are behind the observed relationships between political preference and climate change responses.

Further, support for policy action on climate change is derived not only from the orientation and policy positions of the political parties people identify with, but are influenced by people's underlying ideologies. System-justifying tendencies influence opinion-type and pro-environmental behaviour independently of voting intentions, though voting intentions remain important. Further, system-justifying tendencies are associated with reduced negative affect and moral engagement, the latter of which also reduces support for policy action on climate change.

The influence of voting intention alone on policy support was strong, suggesting that policy responses serve political identification functions. But there were also appreciable effects *independent* of voting intention, indicating that system-justification functions also operate. It is tempting to deduce from this that political identification is simply the expression of underlying system-justification tendencies, but the effects found for question framing suggest that *both* operate independently. One explanation is that party political identification is activated when *who* is delivering the message is made salient, whereas system-justification tendencies are accessed when deliberating on the *content* of the message. There was one curious exception to this; for those who intended to vote for the National party, the influence of system-justifying tendencies on policy support was much greater when the policy question was framed with specific reference to the Government. This suggests that system-justifying tendencies are triggered for these people when the Government is mentioned. Why should this occur for this voting group and not others? The National Party has its historical roots in country Australia, and is still considered the party that represents the needs of rural citizens. There is considerable distrust of Government (especially Labor governments) in rural Australia (Leviston, Price, & Bates, 2011). Further, recent Australian research suggests that, while most rural Australians accept climate change as a reality, there are high levels of distrust in the Government when it comes to how to address it (Buys, Aird, Van Megen, Miller, & Sommerfeld, 2012). It is possible that the effects for question framing reflect dissatisfaction with and even suspicion of the government and its perceived vested interests, which may make system-justifying tendencies more salient for this constituent.

A perplexing issue for the Federal Government in defending the announcement of their carbon pricing scheme was why people reacted so negatively to it when repeated attempts were made to communicate its financial compensation component. This was coupled with assurances to the electorate that most people, and especially those on low incomes, would be financially better off as a result (Australian Government, 2011). In the current analysis, opposition to the policy question framed in relation to the Government can be explained with reference to people's views on the Government (as a whole) at the time; but it is less evident why there was such opposition to the generically framed policy question. Policy support was largely unrelated to personal and household income, suggesting that financial self-interest had little influence over support for redistribution policies. This is consistent with a system-justification approach that people do not necessarily act in accordance with their own best interests, especially when tendencies towards system legitimacy are high.³⁶

The system-justifying ideologies tested here had clear relationships with opinion-type and policy support. But the patterns varied between ideologies (i.e. between SDO, RWA, and ESJ) and between opinion-type, which makes specific interpretations tricky. What does emerge clearly however is that there are two general *sets* of responses: one relating to high system-justifying tendencies, the other to low system-justifying tendencies.

High system-justification appears to be related to the following confluence of characteristics: preferences for right-of-centre political parties, lower levels of negative affect, moral disengagement, and strong opposition to climate change policy. Traditionally, the characteristics of RWA include trust in authorities and nationalism, patriotism, and intolerance of difference. Foreigners, outgroups, and minorities in general are less favoured (Adorno et al., 1950; Altemeyer, 1988). Climate change is of course impervious to national boundaries, indifferent to patriotism, and refuses to yield to authority. But action on climate change is also explicitly (and perhaps implicitly, as is addressed in the next chapter) associated with Green political parties and the Green movement in general. The Green movement arguably epitomises 'difference' within Western societies (Crompton & Kasser,

³⁶ It should be noted that there is significant confusion over the compensation mechanism contained in the carbon pricing scheme, and my analysis does not preclude the perception that compensation will inadequately absorb projected rises in the cost of living. Nevertheless, the associations between system-justification variables and income variables were also negligible.

2009). Further, if the victims of climate change are anticipated to be not us but others, in far away non-Western countries (as previous research suggests, e.g. O'Neill & Nicholson-Cole, 2009), then individuals high in RWA are unlikely to become morally engaged in the plight of these people. Even more, if these groups are disproportionately disadvantaged by the impacts of climate change, then legitimising myths can be employed to rationalise that these victims are deserving of the consequences. High SDO has also been found to correlate with prejudice based on nationalism (Sidanius & Pratto, 1999).

Taking this line of argument further, another characteristic of individuals high in RWA is a tendency toward 'anti-introspection', including a tendency to avoid the imaginative, and a higher propensity to believe in the mystical determinants of fate (Adorno et al., 1950). Perhaps individuals high in RWA find it more difficult to imagine and/or anticipate alternative future scenarios arising from climate change, and hence are less prone to negative emotions about it. Further, they may see anthropogenic climate change as an affront to the notion that humans are not ultimately in control of the planet's destiny. It is of interest that RWA was particularly high for those of the *don't know* opinion-type ($r = -.39$), perhaps reflecting a tendency to avoid cogitating on climate change in order to avoid negative affect. This supports previous findings linking increased system justification to increased desires to avoid learning about relevant issues when the information is negative (Shepherd & Kay, 2012). Those high in RWA and SDO are also behaviourally less flexible, and are more resistant to change (Duckitt & Sibley, 2009), meaning that policy designed to foster less reliance on traditional energy sources might be resisted.

Low system-justification appears to be related to a different confluence of characteristics: preferences for left-of-centre political parties, higher levels of negative affect, moral engagement, and strong support for climate change policy. Of particular interest for this last point was the importance of system-legitimising tendencies *within* the human-induced group. Also, the highest correlation between system-justifying tendencies and moral engagement was for the *human-induced* opinion-type with social dominance orientation ($r = -.34$). Previous research tells us that a reduction in moral outrage results in withdrawal of support for social change (Jost & Hunyady, 2005). Consequently, we should expect moral engagement to have the correspondingly opposite effect: to drive social change in order to ameliorate inequitable systems. System-justifying tendencies are overcome when the

threats and costs of maintaining the status quo become too great (Jost & Hunyady). It is at this point that support for alternative systems gathers momentum. If enough support is gained, a new system becomes inevitable, because it is endorsed by enough people to make it normative. Previous research suggests that when people think a new system is inevitable, they immediately begin to justify and rationalise the new system at the expense of the old one (Kay et al., 2002). It could be argued that those of the *human-induced* opinion, who generally have low system-justifying dispositions to begin with, and who identify politically with parties associated with progressive economic and social systems (such as the Greens), have begun to modify their behaviour, and are driving the shift to a new norm.

How might such a shift work at a system level? Opinions about climate change, influenced by system-justifying tendencies, may be perpetuated and entrenched through legitimising myths. As previously noted, such myths are employed not only by those with high system-justifying tendencies, but also for those who wish to promote equality and democracy. The results suggest that two social attitudes to the perceived consequences of climate change action: that there is nothing Australia can do to make a meaningful difference, and that it will cost a lot of people their jobs, mediated the link between high system-justification tendencies and low policy support. We can think of these two attitudes as potential hierarchy-enhancing myths.³⁷ There was no such mediation for the attitude that action on climate change would mean financial hardship to people, suggesting that this argument is not deployed for the same legitimising function (this is perhaps not surprising, given that financial hardship might be something that people low in system justification would be particularly attuned to, and policies containing low-income compensation looked upon favourably). By contrast, the attitude that responding to climate change provides people an opportunity to be part of something bigger, mediated the link between low system-justifying tendencies and high policy support. To a lesser extent, the same was true for the attitudes that responding would provide people with a sense of purpose and community connectedness, and result in fairer wealth distribution. These can be thought of as potential hierarchy-attenuating legitimising myths.

³⁷ A third social attitude: that it will cost Australia a lot of money, was marginally significant.

If we consider system-justifying tendencies as *ideological justifications* that are inherent within individuals to a greater or lesser extent, I propose that these ideologies are expressed through social attitudes about the impacts of climate change action. These attitudes function to morally excuse inaction (e.g. ‘we can’t rush into this carbon tax, it will cost jobs, think of the suffering’) or provide a justification *for* action (e.g. ‘moving to a green economy will mean everyone gets to be a part of a fairer society’). As these attitudes are repeated and refined within societal discourse (where they are subject to false consensus and pluralistic ignorance effects) they compete to become ‘true’ legitimising myths: generally accepted beliefs about the world, whether objectively true or not (Sidanius & Pratto, 1999). The extent to which enhancing or attenuating myths prevail should in turn determine the extent to which strong action on climate change is supported by the broader community.

7.4.1 Conclusion

A motivated social cognition account of system-justification tendencies allows for the possibility that social influences external to the self can lead to substantial variations in the expression of system-justifying ideologies *within* individuals on different occasions (Jost et al., 2003). The system justification lens is useful, as it allows us to theorise about anticipated consequences of system justification on an issue such as climate change. It also helps explain the increasing polarisation on climate change evidenced in countries like Australia that has not occurred in other Western democracies, such as the UK and Germany. Nevertheless the results presented here are static rather than dynamic,³⁸ therefore it can only be concluded with certainty that differences in system-legitimising tendencies *between* individuals are important; it is still possible that the relationships are due to stable individual trait differences. As such it is important to test whether exposure to climate change information enhances system-justifying tendencies in certain individuals, and the specific conditions under which this occurs. Similarly, it would be interesting to test mindset priming techniques that make system-justifying tendencies salient, to investigate subsequent variations in moral responses. Such tests would lend weight for the palliative functions of system-legitimising tendencies. Further, future research should incorporate system justification ideologies beyond the three examined here.

³⁸ System-justification measures were not included in the T1 survey.

In conclusion, system-justifying ideologies appear to influence responses to climate change. But party political preferences and identification are also important, as evidenced by the influence of question framing on policy support, and the large correspondence between voting behaviour, voting intention, and opinion-type. A motivated cognition approach posits that people form opinions about new information by accessing pre-existing sub-sets of knowledge, rules, and beliefs. In the next chapter I explore whether system-justifying ideologies are accessed because of people's implicit associations with climate change.

CHAPTER 8. CLIMATE CHANGE ASSOCIATIONS

So far, I have established that people's responses to climate change are linked to a myriad of other factors, such as political preferences, ideological variables, moral engagement, consensus estimates, and so on. Many of these factors are ostensibly unrelated to climate change. I have argued that these links exist because responses serve important social and psychological functions for individuals (such as to reduce guilt and other negative feelings, and bolster social support and self-esteem). These functions shape our reasoning process, and this reasoning process can be partially revealed by responses to self-report survey items. But the functions served by our responses often lie outside our conscious awareness (Kruglanski, 1999). Responses to particular items in a survey can be carefully considered, reconsidered, and revised, perhaps to make sure the answer is consistent with previous answers, or to cast ourselves in a good light (a self-presentational function in itself!). As such, direct self-reporting methods cannot fully capture more immediate, implicit, and automatic processes that occur when presented with a stimulus such as climate change. To overcome these issues, a more indirect method of analysing people's responses to climate change is required. One such method is to examine the associations people make with climate change.

In this chapter I investigate associations with climate change in order to (i) explore the types of prior knowledge people draw on to make sense of climate change, (ii) test the extent to which these associations are personal or impersonal in nature, (iii) test whether proximal and distal defences are in evidence, and (iv) investigate affective responses surrounding these associations. The chapter is comprised of two parts. The first part presents results from a word-elicitation task from the first national survey. The second part details a workshop where actual images based on the common associations from the word-elicitation task were presented to participants. A thematic analysis of workshop group discussions elucidates how these associations shape people's responses to climate change.

8.1.1 Associations and Climate Change

Several characteristics of climate change make association testing pertinent. Along with the scale, magnitude, and uncertainty surrounding the effects of climate change, among the

most defining characteristic of climate change is its *intangibility*. Climate change cannot be directly seen, smelt, heard, or touched. In this respect it exists in the realm of the conceptual, as its existence is beyond the resources of the majority to be verified by ‘everyday’ means (O’Neill & Hulme, 2009). Perhaps because of this intangibility, people find it difficult to conceptualise the risks involved with climate change (Budescu, Broomell, & Por, 2009; Whitmarsh, 2009), and thinking about climate change consequently depends on value-laden judgements about the nature and distribution of the perceived risks it poses (Baer & Risbey, 2009). While humans are not accustomed to dealing with threats of such scale, magnitude, uncertainty, and intangibility, we have a range of heuristic devices at our disposal that can be deployed when trying to make sense of something unfamiliar. One such device is to think about new things by making reference to what is already known, or what has already been experienced. Association, or the pairing of two discrete stimuli, objects, or thoughts (so that thinking, observing, or being exposed to one will lead to thoughts about the other), captures this historical reference sense-making process (Deutsch & Strack, 2010).

8.1.2 Associations and Motivated Social Cognition

From a motivated reasoning perspective, prior knowledge is important in determining what beliefs and rules people access in the face of new information. This prior knowledge is called upon to form cognitive representations (Kunda, 1990). Rules and beliefs can also constrain motivated shifts in opinions and attitudes (Kunda, 1990). In the case of climate change, if we want to, say, avoid performing the difficult and inconvenient behaviours needed to combat a large problem, or if we want to avoid feeling guilty, we might be motivated (albeit unconsciously) to draw upon a sub-set of pre-existing knowledge that disavows the personal relevance of climate change, and to favour information consistent with the notion that it is “somebody else’s problem”, or that it doesn’t exist at all. Similarly, if we take motivated reasoning as a form of implicit emotion regulation, we might expect people to be drawn to associations that assuage negative affect and maximise positive affect (Westen et al., 2006). Again, we might expect people to search their prior knowledge selectively for associations that are less troubling, or less threatening to the self. Westen et al. (2006) argue that people may implicitly approach or avoid judgements based on their

emotional associations, but explicit processes, notably suppression and distraction, may also be employed.³⁹

From a moral agency perspective, one of the ways we morally disengage is by reducing identification with the targets of harmful acts (Bandura, 1990). This can occur through a process of blaming and/or dehumanising victims. If the target of a harmful act is dehumanised, vicariously aroused personal distress and self-censure is avoided. The more that victims are perceived to be dissimilar to self, the less chance that empathetic emotional distress will be felt (Bandura, 1991). With climate change, moral disengagement might be accomplished by displacing the harmful impacts of climate change onto people who are less similar to us: for example, to those in countries remote to our own. Or the perceived victims might not be human at all, but insensate and/or remote elements of the natural environment.

Displacing the impacts of climate change onto remote locations also accords with terror management perspectives of proximal and distal defence mechanisms. Working from such a perspective, Dickinson (2009) theorises that thinking about climate change is enough to make our mortality salient, and consequently we employ a host of distal and proximal defences that serve to assuage anxieties associated with this mortality salience. Such defences aren't necessarily consciously accessible to the individual, but may work at an automatic, sub-conscious level. Proximal defences involve both cognitive distortions and active suppression that push the immediate problem to a distant future. With relation to climate change, this may manifest in a tendency to project the impacts of climate change into the far distant future so it no longer represents a personal danger, or to actively deny the existence of the problem altogether (Dickinson, 2009). Distal defences, by contrast, are thought to occur in the absence of negative affect or physiological arousal. Such defences include self-esteem bolstering, increased antagonism towards out-groups, increased support for strong political leaders, and even increases in consumption (Kasser & Sheldon,

³⁹ Whether associations are the product of explicit or implicit processes is a point of some contention. Fazio, Sanbonmatsu, Poweu and Kardes (1986) conceptualise attitudes as based on object-evaluation associations in memory, which are often activated automatically, or unconsciously, when an attitude object is perceived. Such 'automaticity' implies that associations may be 'implicit' in the sense that they are very fast, often unintentional, uncontrollable, impulsive and unconscious. However, diverging empirical evidence exists regarding the extent to which automatic evaluative judgements and influences can be recognised and controlled (Deutsch & Strack, 2010).

2000; Solomon et al., 1991). With regards to climate change, Dickinson suggests that such defences might manifest as, for example, a devaluation and marginalisation of environmental groups, an increase in conspicuous consumption, and enhanced support for politicians with similar worldviews to those of the individual.

The following two studies test whether these motivated social cognition processes are revealed in people's associations with climate change. Specifically, I want to examine the prior knowledge people draw on to make sense of climate change, to examine how personally relevant these associations are, and to investigate what sort of emotions attend these associations.

8.2 Part 1: Word-elicitation Task: Images and People Associated with Climate Change

Part 1 of this chapter details the word-elicitation task incorporated into the T1 national survey. The purpose of the task was to explore the types of prior knowledge people access to form cognitive representations of climate change, to see if these representations were personal in nature, and to investigate levels of affect surrounding these associations. It also investigated whether (and which) associations with climate change are unique to Australians.

8.2.1 Previous Work on Associations with Climate Change

The most comprehensive research to date on associations with and representations of climate change comes from the US and the UK. Leiserowitz (2006) conducted a survey of 673 people in the US where people were asked to provide the first thought or word that came to mind when they heard the words "global warming". The top eight categories, accounting for 97% of responses, were 'melting ice', 'heat', 'nature', 'ozone', 'alarmists' (images of devastation), 'floods/sea-level rise', 'climate change', and 'naysayers'. Leiserowitz concluded that 61% of Americans provided associations that represented geographically and psychologically distant climate change impacts, and that vivid, concrete, and personally relevant affective images of climate change were lacking.

In a cross-national comparison of people's image associations with the words "climate change" (UK) and "global warming" (US), Lorenzoni, Leiserowitz and Doria (2006) found both differences and similarities between UK and US respondents. Images of 'weather' were more frequently cited by UK respondents, whereas imagery surrounding 'ice melting', 'natural disasters', and 'scepticism' were more common among US respondents. UK respondents also had a higher proportion of respondents for whom an image did not come to mind. Across both countries, there was a prevalence of negative, psychologically distant associations, with personally relevant impacts and solutions rarely mentioned.

Finally, a survey with Portuguese respondents (Cabecinhas, Lazaro, & Carvalho, 2008) on the social representations of climate change found that free-association mental images with climate change were rated emotionally negatively, and that news media were the main sources of climate change information for people.

A systematic quantitative investigation of image associations with climate change with people in Australia was yet to be conducted at the time of writing. To my knowledge, no previous studies anywhere have asked people to describe the *people* they think of when they think of climate change (although this does not preclude the possibility that images and words could incorporate people). This is a critical oversight in light of the importance of personal relevance in promoting engagement and pro-environmental behaviour.

8.2.2 Method

Data were drawn from the word-elicitation task included in the T1 survey. To avoid priming, the word-elicitation task items appeared before all other questions in the survey.

Associations. To test for image associations, half the respondents from the national survey were asked the following question: *Who are the first 3 images that come to mind when you think about climate change?*⁴⁰ Up to three responses were recorded for each respondent.

⁴⁰ The other half of respondents was asked to select the first three *words* that came to mind. Image associations were deemed more suitable for implicit association testing than word associations given their valency had a stronger relationship with pro-environmental behaviour than image associations

To test for people associations, all respondents were then asked *What are the first 3 people that come to mind when you think about climate change?* Up to three responses were recorded for each respondent.

Affective Evaluation. To assess the affective evaluations of each association, respondents were asked the following: *Using the following scale, how would you rate each of these images in relation to climate change?* Responses were measured on a scale from ‘-5 = very negative’ to ‘+5 = very positive’, with ‘0 = neutral’. The question was repeated in relation to people associations.

8.2.3 Results

Image Associations. Responses were coded by me and one other researcher. Semantically and thematically similar words, plurals, singular words, and misspellings were categorised under the most frequently occurring response (see Appendix I for an example of how different responses were combined). Ambiguous responses were put aside and later categorised in consultation with the other coder. After coding, a total of 215 distinct image categories emerged. Figure 24 shows the 15 most frequently nominated image categories (a list of all image categories is included as Appendix J). The most commonly nominated image associations were ‘rising sea levels’, ‘drought’, and ‘melting ice caps’. The ‘ozone layer’ was the 15th most commonly nominated image.

The seven most common images were similar across capital city respondents, regional respondents, and rurally located respondents, though there were some minor differences in rank orders for ‘pollution’, ‘hot weather’, and ‘don’t know’. Males were more likely to nominate ‘don’t know’, while women were more likely than men to nominate ‘hot weather’ (Table 41).

(see Table 43 further down). The results of the word association task with the other half of respondents are detailed elsewhere (Moloney et al., 2013).

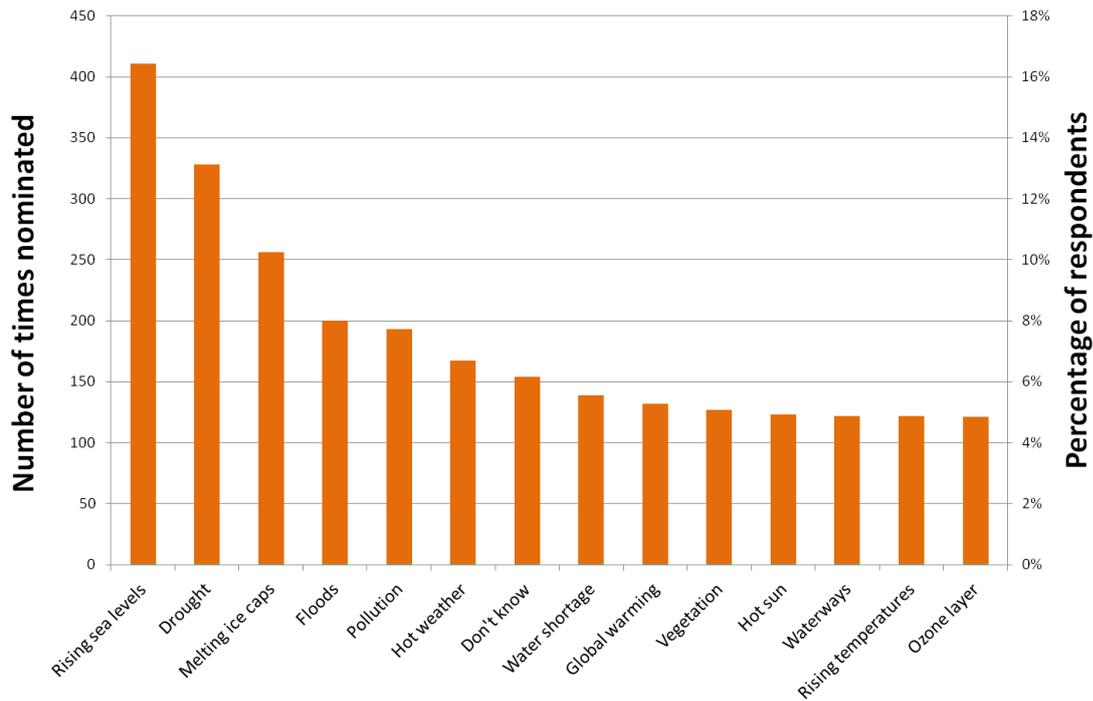


Figure 24. Most frequently nominated image associations (N = 2502).

Table 41. Most frequently nominated image associations by location and gender (N = 2502).

IMAGE	Capital City (n = 1360)	Regional Town (n = 735)	Rural Town (n = 343)	Male (n = 1307)	Female (n = 1198)
Rising sea levels	209 (15.4%*)	128 (17.4%)	61 (17.8%)	237 (18.1%)	174 (14.5%)
Drought	174 (12.8%)	92 (12.5%)	50 (14.6%)	159 (12.2%)	169 (14.1%)
Melting ice caps	147 (10.8%)	79 (10.7%)	25 (7.3%)	121 (9.3%)	135 (11.3%)
Floods	121 (8.9%)	51 (6.9%)	25 (7.3%)	107 (8.2%)	93 (7.8%)
Pollution	118 (8.7%)	48 (6.5%)	24 (7.0%)	103 (7.9%)	90 (7.5%)
Hot weather	94 (6.9%)	50 (6.8%)	22 (6.4%)	72 (5.5%)	95 (7.9%)
Don't know	85 (6.3%)	46 (6.3%)	23 (6.7%)	99 (7.6%)	55 (4.6%)

* within-group percentage

Figure 25 to Figure 28 provide breakdowns of the most commonly nominated images for each opinion-type.

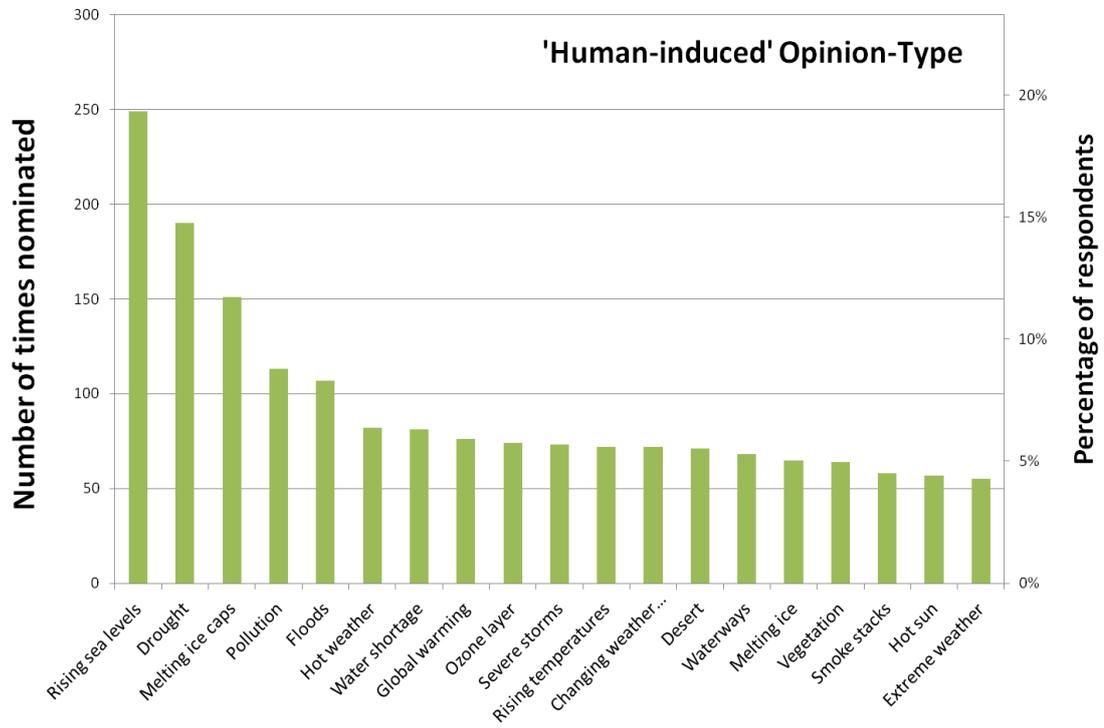


Figure 25. Most frequently nominated image associations for the 'happening and human-induced' opinion-type ($n = 1286$).

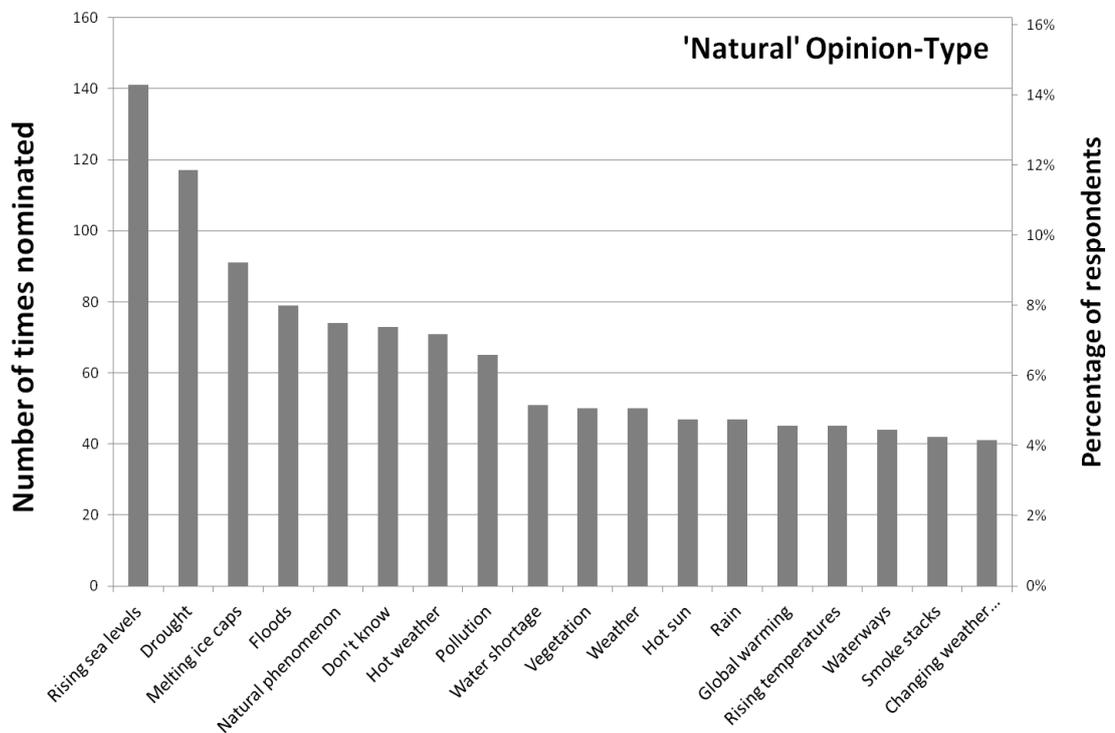


Figure 26. Most frequently nominated image associations for the 'happening, but natural' opinion-type ($n = 990$).

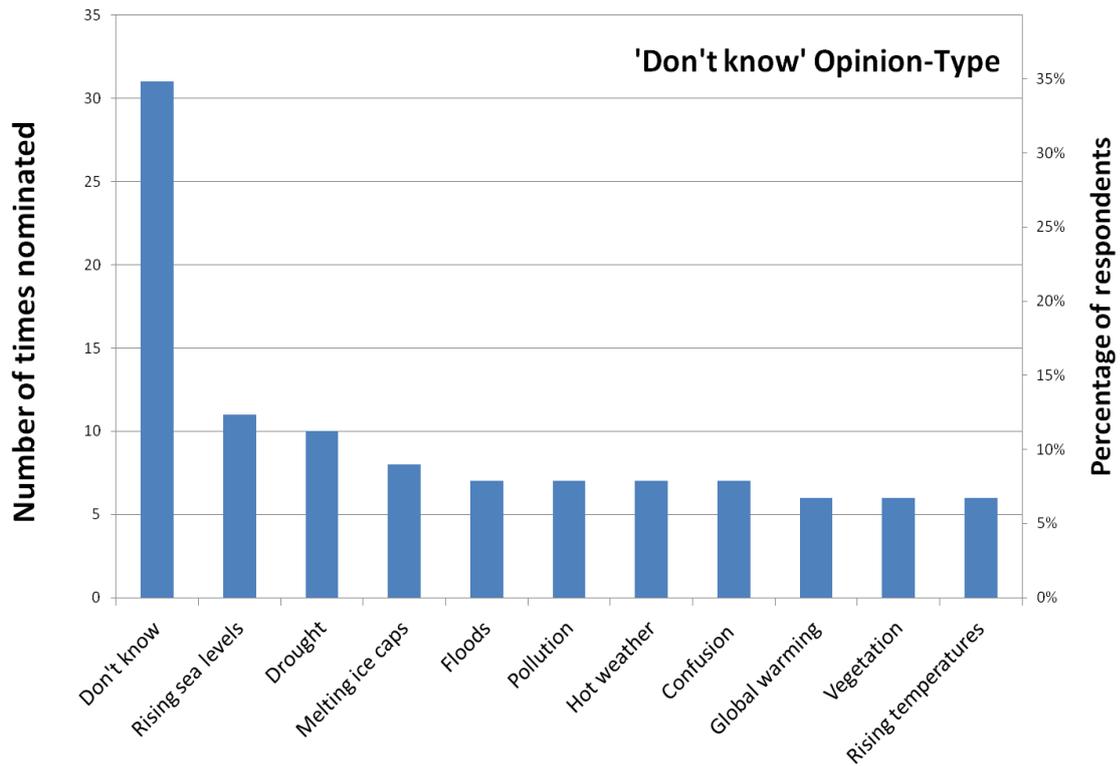


Figure 27. Most frequently nominated image associations for the 'don't know' opinion-type ($n = 89$).

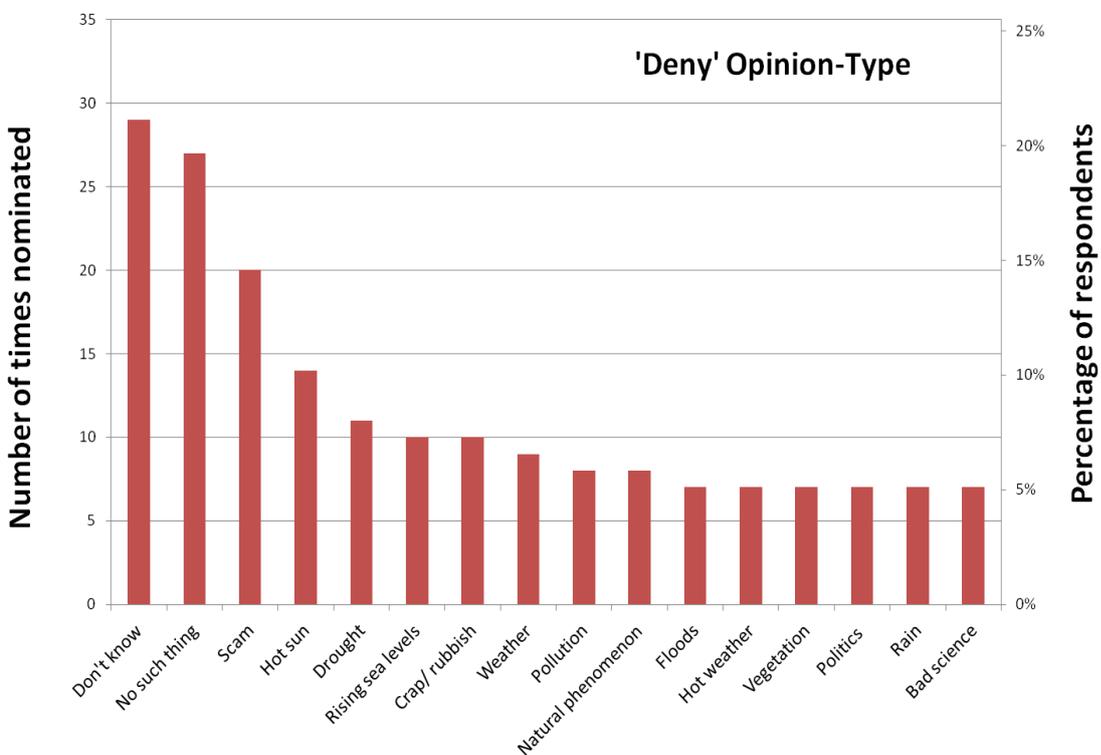


Figure 28. Most frequently nominated image associations for the 'deny' opinion-type ($n = 137$).

Cross-National Comparisons. Table 42 provides a comparison of the top associations found in the current study with those found in recent studies from the UK and the US (Lorenzoni et al., 2006). While amalgamation of categories differed slightly, and there were several years separating the surveys, the main categories identified are comparable. Table 42 shows both consistencies and differences across the three countries, with ‘drought’ being notably higher among Australian respondents than respondents from either the US or the UK.

Table 42. Cross-national comparison of most commonly elicited associations with climate change in descending order.

Australia (2010)	US (2002)*	UK (2003)*
Rising sea levels	Other	Don't know
Drought	Don't know	Other
Melting ice caps	Melting ice	Weather
Floods	Heat	Ozone
Pollution	Nature	Global warming
Hot weather	Disaster	Flood /sea level
Don't know	Flood/sea level	Changing climate
Water shortage	Ozone	Pollution
Global warming	Changing climate	Disaster
Vegetation	Weather	Rain
Hot sun	Pollution	Ice melting
Waterways	Dry / desert	Heat
Rising temperatures	Sceptic	Nature
Ozone layer	Places	Greenhouse

* Source: Lorenzoni et al. (2006)

People Associations. Figure 29 lists the most frequently occurring responses when asked to nominate people associated with climate change. ‘Nobody’ occupied the top spot, indicating that a significant proportion of respondents were unable to list at least three people they associated with climate change.⁴¹ Individual politicians occupied the seven most common specific associations. Six of these seven politicians were domestic federal politicians.

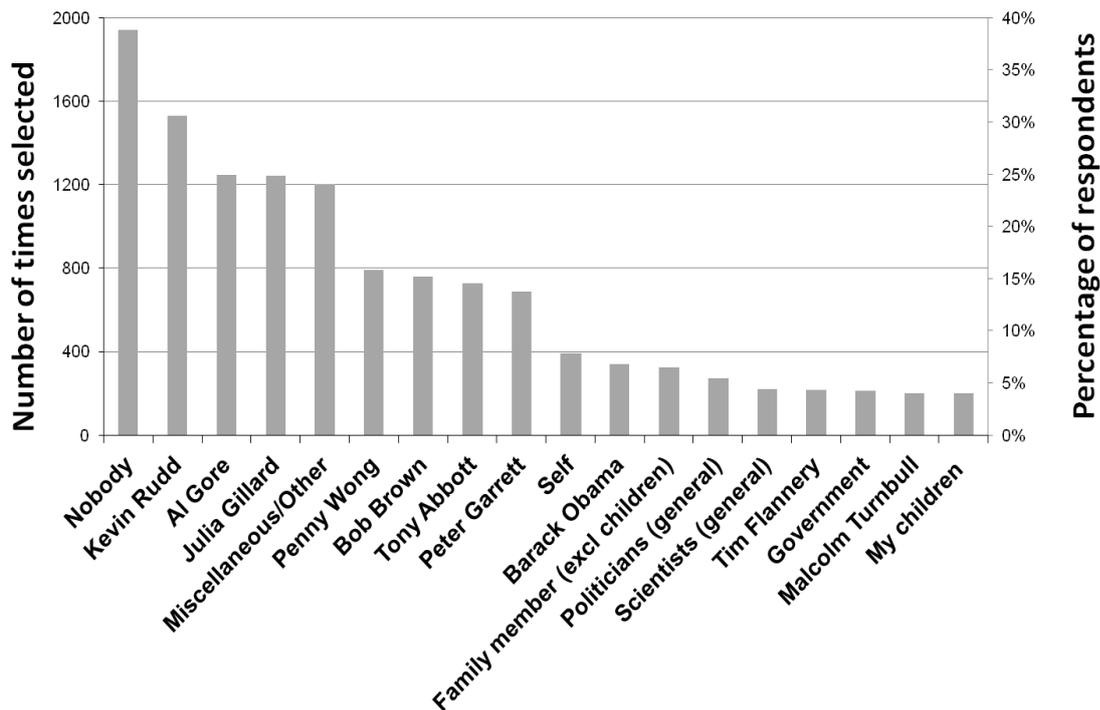


Figure 29. Most commonly nominated person associations (N = 5036).

All responses to people associations were grouped into one of four categories: ‘Politicians’, ‘scientists’, ‘self/family’, and ‘other’. A breakdown of responses is shown in Figure 30. The majority of respondents (55%) nominated a politician (or politicians in general) as one of the three first people that came to mind when they thought of climate change. By contrast, only 5% selected a scientist (or science communicator). Only 8% nominated themselves or someone close to them (family member or friend). A chi-square test for independence indicated a small, significant association between opinion-type and people associations: $\chi^2(9, n=4384) = 72.3, p < .005, \text{Cramer's } V = .07$. Post-hoc comparisons showed those of the

⁴¹ Blank fields were coded as ‘don’t know’s’.

deny and *don't know* opinion-types were less likely to nominate a scientist, and more likely to nominate *nobody*.

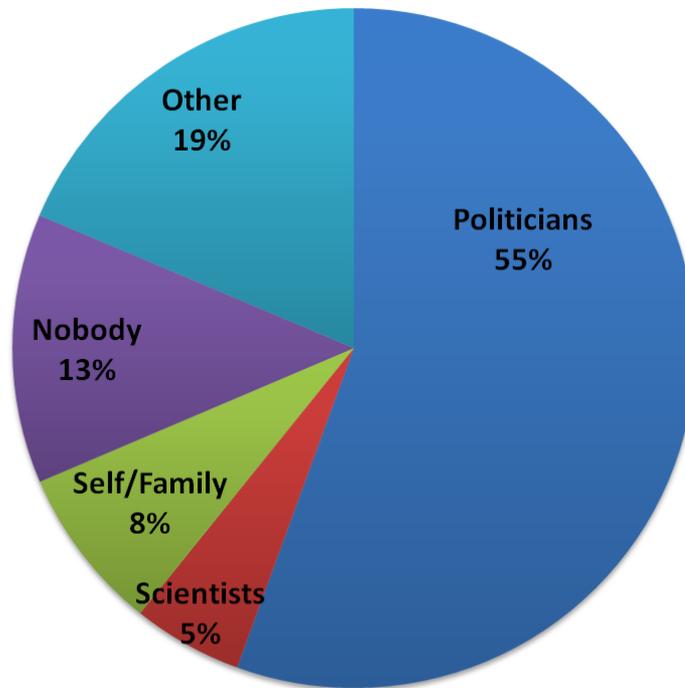


Figure 30. Person Associations by category based on all three responses ($N = 5036$).

8.2.4 Affective Evaluations of Associations

Table 43 shows the average affective valuations for image, word, and people associations, broken down by opinion-type. On average, images associated with climate change were negatively evaluated, while people and word associations were rated relatively neutrally overall (although the standard deviations suggest a mixture of moderately negatively and positively evaluated associations occurred within each category). Those of the *human-induced* opinion-type had the most negative affect responses, with moderately negative affective evaluations given to image associations as a whole. The same opinion-type gave the most positive evaluations for person and word associations.

Table 43. Mean (and standard deviation) ratings for word, image, and people associations by opinion-type.

Association	All respondents	Deny	Don't know	Natural	Human-induced
Image Rating	-1.60 (3.11)	-0.60 (3.42)	-1.02 (2.66)	-0.88 (2.98)	-2.31 (3.04)
Person Rating	0.28 (2.74)	-1.00 (3.20)	-0.38 (2.39)	-0.14 (2.67)	0.81 (2.64)
Word Rating	0.32 (2.80)	-0.80 (3.44)	-0.62 (2.37)	-0.19 (2.76)	0.94 (2.62)

Figure 31 displays the average affective evaluations for the most commonly nominated image associations. ‘Melting ice caps’, ‘desert’, and ‘smoke stacks’ were given the most negative evaluations on average, while ‘vegetation’ was given a positive evaluation.

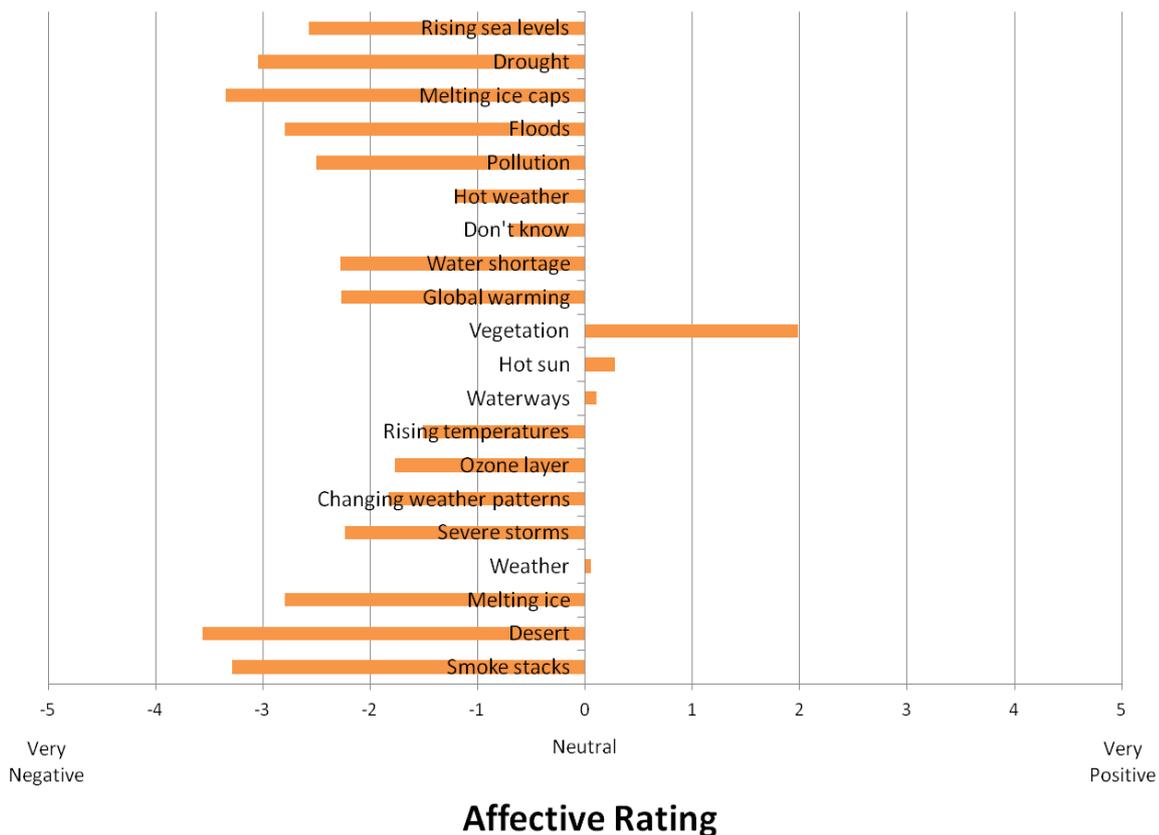


Figure 31. Mean affective evaluations of top image associations (N = 2502).

Figure 32 shows the mean affective rating for the 10 most commonly selected people, broken down by opinion-type. In general, affective ratings for Labor/Green politicians (Kevin Rudd, Julia Gillard, Penny Wong, Bob Brown, and Peter Garrett) were positive for the *human-induced* group and negative for the *deny* and *natural* groups. This pattern is reversed for Tony Abbott, leader of the Liberal/National party. Affective ratings for Malcolm Turnbull (Liberal party politician and former Liberal leader) are against the trend, with medium to strong affective ratings from all groups who selected him. Similarly, Barack Obama and Tim Flannery (scientist) received positive ratings from everyone.

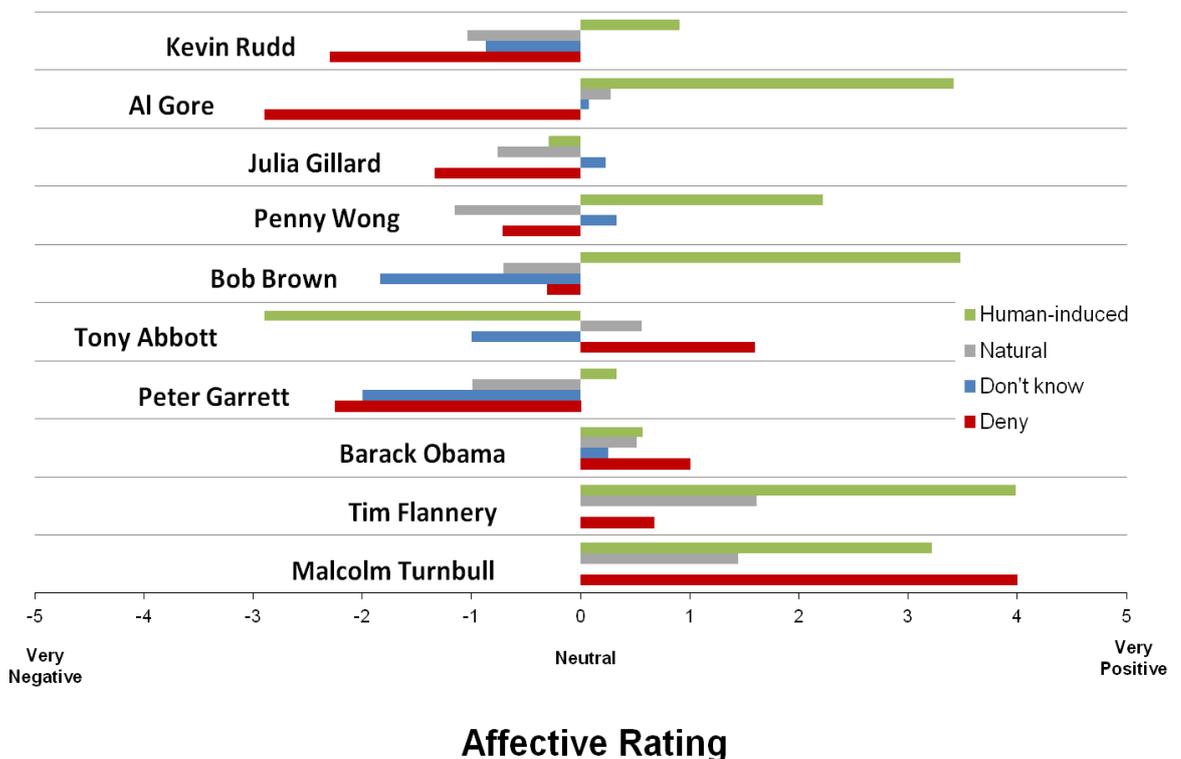


Figure 32. Affective ratings of most common people associations by opinion-type (N = 5036).

Figure 33 displays the average affective evaluations for each type of people association. Both 'scientists' and 'self/family' groups were given positive evaluations on average, while the other two groups were rated relatively neutrally.

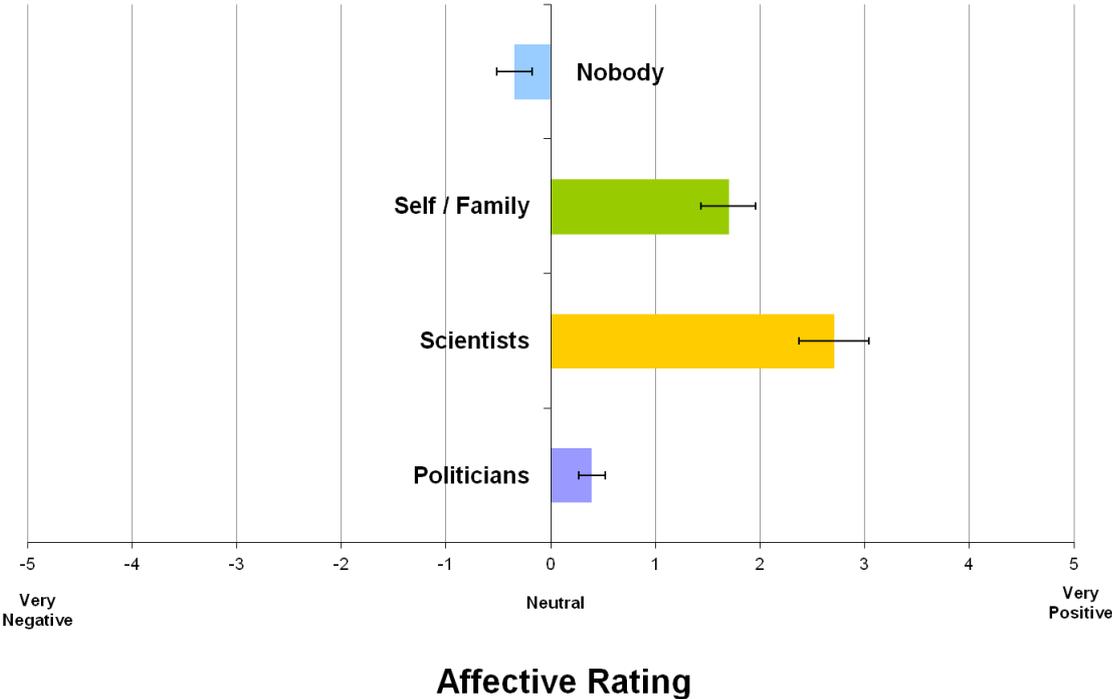


Figure 33. Mean affective evaluations of each type of people association (N = 5036).

When these affective ratings are broken down by opinion-type (Figure 34), there are differences in affective ratings, notably of 'scientists', who are rated most positively by those of the *human-induced* opinion-type (in fact, scientists are rated more favourably than self-family by this group), and 'politicians', who are most negatively rated by the *deny* opinion-type; only the *human-induced* group rate politicians positively.

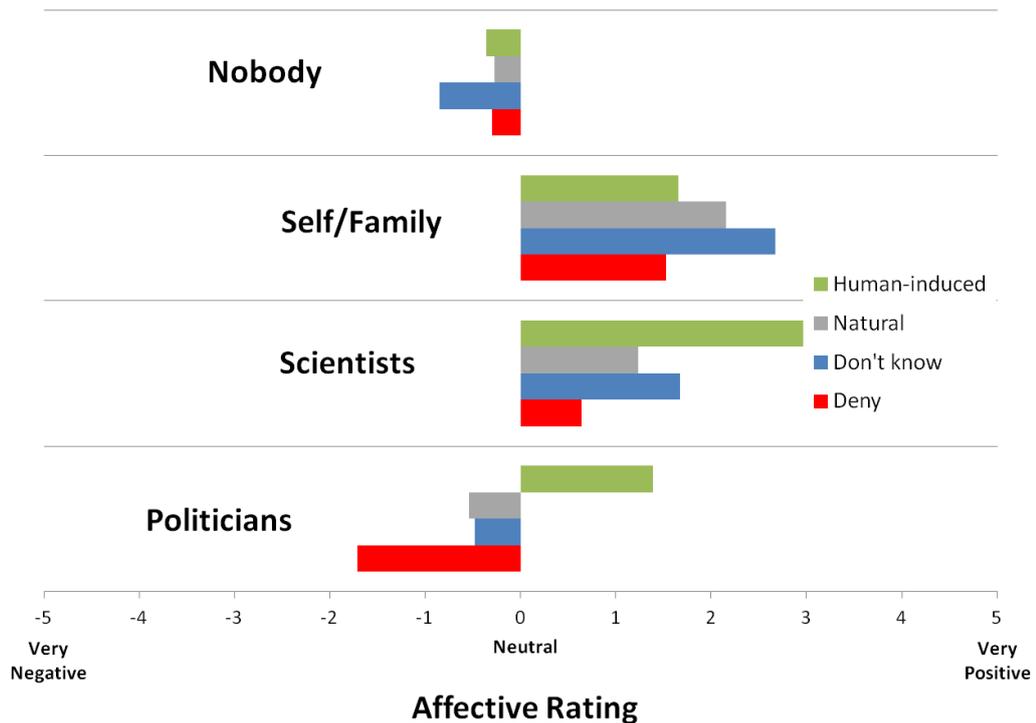


Figure 34. Affect ratings of people groups by opinion-type ($N = 5036$).

8.2.5 Discussion of the Word Elicitation Task

The most frequently nominated image associations with climate change were ‘rising sea levels’, ‘drought’, ‘melting ice caps’, and ‘floods’. Other common image associations suggest that national weather events and climate are implicitly associated with climate change, though these associations differed according to opinion-type. By far the most frequently nominated type of people association was politicians, with some small differences based on opinion-type. Images were, in general, evaluated negatively, while scientists, and self and family were evaluated positively.

A comparison with UK and US association studies revealed many similarities across the three countries, with some notable exceptions. Australian respondents were more likely to be able to nominate an image association compared with UK and US respondents. It is unclear whether this is a product of the survey timing (the Australian survey was conducted seven years after the UK survey, and eight years after the US survey), the outcome of some national difference (i.e. Australians can more readily conjure up images about climate change), or the result of question-framing (i.e. people more readily produce associations

when asked specifically about images, rather than when asked simply to write down words).

The other clear difference between countries was that drought featured prominently among Australian respondents. This high rating was consistent across location, suggesting that issues of climate-related drought are salient in the minds of all Australians, not just those from regional and rural areas. Australia has a long history of drought, including a widespread and severe drought throughout most of the 1990s. Other associations that figured prominently among Australian respondents were 'hot sun' and 'hot weather', possibly reflecting Australia's warmer climate more generally (note that 'heat' appears in the US example, but is noticeably absent from the UK sample, where 'rain' appears tenth on the list!). 'Floods' was also prominent in the Australian sample, as were associations relating to water shortages. This perhaps reflects the (highly publicised) increasing pressures on potable water supplies in many areas of Australia, including urban centres. Other associations, including 'rising sea levels' and 'melting ice caps', were more remote, but reflect impacts more specifically associated with climate change.

Perhaps unsurprisingly, for many of those of the *deny* opinion-type, the association task presented an opportunity to dispute climate change's existence (e.g. 'scam', 'no such thing', 'crap / rubbish'). Whether there was mental imagery accompanying these responses one can only speculate. Notwithstanding, associations like 'hot sun', 'drought', and 'rising sea levels' were also offered, possibly in response to media portrayals of climate change. For those of the *natural* opinion-type, specific climate change impacts occurred more frequently, again suggesting that this opinion is distinct from those who dispute outright the existence of climate change. 'Natural phenomenon' figured highly, once more supporting the notion that, for this group, it is not necessarily the impacts of climate change which are under dispute, but the cause.

The inability to nominate an association was common (as designated by 'don't know' responses), suggesting that, for many, it is difficult to construct mental representations of climate change. Those who think of climate change as human-induced were more often able to nominate an association. It does not necessarily follow that these representations were accurate however. The prevalence of people nominating the ozone layer, for

instance, suggests that significant conflation of the two issues persists, and it is interesting that the ozone layer was most prevalent among those accepting of human-induced climate change.⁴² These findings reflect research findings in other countries where climate change is frequently confused with both ozone depletion and air pollution (Lorenzoni et al., 2006; Stamm, Clark, & Eblacas, 2009).

Overall, while image associations were not clearly associated with phenomena that were personally relevant, there was some suggestion that common associations had national-level relevance. The prevalence of drought, water shortages, and flood, for instance, is consistent with the notion that people's associations with climate change reflect the specific historical and cultural climatic context of the respondent (Nicholls, 2005).

Clearer evidence that associations lack personal relevance emerged when respondents were asked to provide their associations with particular people. Eleven of the top 18 associations referenced particular politicians, or politicians and the government in general. Seven of the top nine responses were for individual politicians at the federal level, again suggesting that associations have national-level relevance. Politicians accounted for over half of all responses, whereas reference to the self or close others accounted for just 8%. Only 5% of respondents selected scientists. This 5% incorporated responses about scientists in general, not just specific scientists, so it is unlikely that lack of awareness of individual scientists was behind the low figure. Taken together, these results reinforce the notion that people now see climate change more as a political issue than a scientific issue.

Affective ratings for individual politicians suggest politicians function as both negative and positive referents for people. For those sceptical of human-induced climate change, when left-wing politicians were brought to mind, the association was negative, while right-wing politicians were positively evaluated. The reverse pattern was true for those accepting of human-induced climate change. There was one exception to this rule: Malcolm Turnbull. The deposed leader of the conservative Liberal party, Turnbull has been a vocal advocator for market-based policy to curb climate change emissions. Yet he was rated positively

⁴² However, a counter-argument is that an association between the two does not represent a scientific inaccuracy. Perhaps for some the association occurs because the ozone layer represented a large, global environmental challenge, in the same way that climate change does.

independent of opinion-type; he was a positive referent for all people. One might speculate that the landscape of climate change opinion in Australia might have been different had Turnbull remained leader, and federal climate change policy retained bipartisan support.

The tendency to think of politicians when we think of climate change goes some way to explaining the strong associations between opinion-type and voting behaviour found in Chapter 4. But it suggests a further possibility: these associations with politics and politicians are the trigger for a motivated search of rules, beliefs, and opinions. The sub-set of rules, beliefs, and opinions that are accessed are those upon which political partisanship itself is based, including some of the deep-seated values and dispositions surrounding the way the world should operate that were identified in the previous chapter. These deep-seated dispositions may drive our categorisation process: as we mentally sift through the group membership categories available to us, our political affiliations become the most salient. Politicians and politics then act as our 'quick guides' to instruct our opinions, thoughts, and actions, which in turn alleviate our anxieties provoked by uncertainty (Hogg, 2007). The data suggest that this categorisation process might not be the same for everyone; in some instances other categories (e.g. mother, scientist, Australian) might be the most salient, in which cases our thoughts and actions are presumably directed differently.

Scientists, for the 5% who *did* nominate them, were in general evaluated positively, suggesting that linking climate change with the right scientists (or science communicators) could be beneficial for engaging people with the issue. However, it is likely that positive associations with scientists and the scientific community reflects other underlying values that resonate only for a subset of the community. Perhaps science and scientists themselves are now viewed by many in the community as politically partisan advocates. Indeed, research from the US suggests that trust in science falls along party lines (Leiserowitz et al., 2011). As such, science communication that fails to recognise how climate change opinions may be influenced by social identification and political partisanship could risk amplifying rather than attenuating political polarisation (Hart & Nisbet, 2012).

8.3 Part 2: Imagery Associations Workshops

In Part 1 of this chapter, associations were measured by asking people to write down the first three images and people that came to mind when they thought about climate change, consistent with traditional ways of eliciting associations. This method reduces biases introduced by closed questions, and responses are relatively spontaneous and unconstrained (Lorenzoni et al., 2006; Szalay, 1978). Yet it is also possible that respondents will engage in a considered deliberative process when responding, particularly when they are responding in private with no externally imposed time constraints. One way to overcome this is to present people with visual stimuli in a controlled setting and direct them to make spontaneous evaluations.

In Part 2 of this chapter, I investigate whether people's associations with climate change imagery differ when presented with images of climate change from those given when asked to generate associations. Of particular interest is whether content differs in relation to personal relevance, and whether there is evidence of proximal and distal defences. Follow-up discussions with participants provide an opportunity to identify how these mental representations are constructed, and whether rationalisations and justifications are linked to common image associations.

8.3.1 Previous Work on Climate Change and Imagery

How is *presenting* people with climate change images different from asking people to generate imagery? Given the intangibility of climate change, and the intense media coverage of it, it is likely that our associations are heavily influenced by the imagery that accompanies climate change commentary. The most prevalent type of climate change iconography employed by the media is negative and often fear-laden (Manzo, 2010; O'Neill & Nicholson-Cole, 2009). Doyle (2007) discusses the problem of climate change imagery in the context of the intangibility of climate change. Because the current and future impacts of climate change are mostly invisible, communicating climate change through visual imagery becomes problematic as, she argues, photographs can only convey the *outcomes* of what has gone before. This poses a problem to scientific circles and Western cultures in general, where sight is the sense most emphasised (Dennett, 1991). The ontological and epistemological privileging of vision, Doyle argues, undermines the legitimacy of climate change science, as climate change cannot be adequately expressed pictorially. Can people's

cognitive representations overcome such 'sense privileging' by evoking a more complex multi-faceted construction of climate change? Or is, on being presented with images, the complexity of one's mental constructions overridden, replaced by a sub-set of mental constructions that are cued by particular images?

The most detailed research to date of responses to climate change imagery comes from O'Neill and Nicholson-Cole (2009), who used Q-methodology and icon representation to conduct their investigations. Imagery included both negative imagery such as smoke stacks, and positive imagery such as solar panels. They found that, while highly affective images that provoked fear also grabbed people's attention, these images were also likely to distance and disengage people, suggesting that certain visual and mental imagery can provoke counter-productive responses. Specifically, negative and distant representations led to issue-avoidance, disempowerment and feelings that climate change issues were too overwhelming for individual responses to be efficacious.

There is current debate about whether negative or positive emotions are more conducive to adaptive behavioural responses to climate change. On the one side of the debate it is argued that presenting people with a positive picture of an alternative future and stressing the positives about what can be done will motivate people to change their lifestyle and consumption behaviours (Manzo, 2010). Further, there is empirical evidence that dire messaging in climate change communication can bolster scepticism in those with strong just-world beliefs (Feinberg & Willer, 2011). But there is also evidence that fear appeals work to enhance both environmental attitudes and behaviours (Hine & Gifford, 1991; Meijnders, Midden, & Wilke, 2001). In Chapter 4 we saw that some feelings of negative affect (fear, anger, guilt, and shame) predicted higher levels of engagement with pro-environmental behaviour. Regressing emotion factors onto pro-environmental behaviours also showed that other negative emotions (powerlessness, despair, and confusion) had a *negative* relationship with behaviour. I suggest the key difference between these two sets of negative affect is arousal. Fear, anger, guilt, and shame can be considered moderate to high arousal states, while powerlessness, despair, and confusion are all low arousal states. These conflicting findings suggest that, in measuring responses to climate change, it is important to take into account levels of activation in affective experiences in addition to whether the emotion is positive or negative.

8.3.2 Measuring Affective and Emotional Responses

In Part 1 of this chapter we found that people's associations with climate change were, for the most part, negatively evaluated. But this evaluative component of affect is only part of the picture. The measurement of affect has been variously described as uni- or multi-dimensional, and within these dimensions as uni- or bipolar. This dimensional conceptualisation of emotion has prompted researchers to identify which emotions influence different cognitive processes (Keltner & Haidt, 1999). The emotion of anger, for instance, when coupled with high levels of activation, is thought to facilitate approach-related behaviour (Harmon-Jones, Sigelman, Bohlig, & Harmon-Jones, 2003). Another important element in research on emotions concerns the extent to which emotions are automatic. Automatic appraisals, it is suggested, give rise to basic evaluations of good or bad, in turn motivating approach or avoid responses (Zajonc, 1980). From a functional perspective, these automatic appraisals inform individuals of potential problems or opportunities, and prepare the individual for action (Keltner & Haidt, 1999).

In a review of empirical work on affective experiences, Feldman Barrett and Russell (1999) concluded that affect is best conceptualised as comprised of two bipolar independent dimensions: degree of pleasantness (or evaluation) and degree of activation (or arousal). These two dimensions capture the core affective feelings in mood and emotion. This second dimension is important, as it can lead to motivating or inhibiting behaviour. To measure these two dimensions, Russell and Feldman Barrett developed an 'emotion circumplex', which conceptualises emotion along the two dimensions of evaluation and arousal (Feldman Barrett & Russell, 1998; Russell, 1980). From a motivated cognition perspective, the emotion circumplex allows us to determine whether and what levels of anticipated arousal (or cues that cognitions are worrying) accompany associations.

A series of workshops were designed to investigate what sort of imagery was most closely associated with climate change. Built into these workshops was a task designed to capture people's affective responses to this imagery, in respect to both evaluation and activation. Finally, workshop small group discussions were held to further identify any themes in the construction of people's mental representations of climate change.

8.3.3 Workshop Preparation

A total of 82 images were selected to represent the 215 image association categories emerging from the T1 national survey. Several considerations guided this process. First, the set of images had to be small enough that participants could sift through the entire set in a short timeframe (see workshop procedure below). Second, preference was given to the more common association categories in the survey. Third, where multiple images could be used to denote the same category, and that category was a common survey association, multiple images were selected. For example, for 'drought', imagery might be about landscape (say, a barren field), or might involve a human component (a struggling farmer), or an animal component (suffering livestock). Fourth, a combination of local (i.e. clearly Australian) and remote imagery was selected.

Images were sourced from the internet using Google Image search.⁴³ A typical search-term consisted of the word(s) of that category coupled with the phrase "climate change". Photos and images were validity tested by piloting the images on five people and asking them to select a word (or words) that they thought the image best represented. Images that produced too varied a response, or responses too removed from the original word-elicitations, were discarded and replaced by another image until consensus was established. Appendix K presents the images used in the workshop, and the source of each. Sets of images were printed on 10cm x 15cm photo paper. Each image had a reference number printed on its back.

8.3.4 Workshop Procedure

Four workshops with a total of 52 participants were conducted. Two workshops were held in December 2010 (11 and 8 participants) and two in March 2011 (14 and 19 participants). All workshops were conducted in Perth, Western Australia. Participants for the first two workshops were recruited by telephone, using randomised telephone lists of households in suburbs local to the workshop venue. Participants for the final two workshops were recruited through university notice boards and email lists targeting post-graduate students from the University of Western Australia. Post-graduate students were chosen instead of undergraduate students so that a broader range of age, backgrounds, and life experiences

⁴³ Only those images labelled for reuse were used, to avoid copyright infringement.

would be represented. Participants received shopping vouchers to the value of \$50 as recompense for their time and associated travel costs, and to reduce selection bias due to the climate change issue.

Each participant was given a complete set of the 82 images. These sets were randomised to reduce any order effects. Participants were asked to scan through all 82 images and “quickly and instinctively” sort them into two piles: a pile for images they immediately associated with climate change, and a pile for images they did not immediately associate with climate change. This direction was given in an effort to maximise the implicitness of participants’ responses. Once participants had sorted through all the images, they were asked to sort through their pile of associated images and rank and record the ten images they most closely associated with climate change in order of strength of association.⁴⁴

After all participants had ranked their selections, they were asked to place the corresponding number of each image on an emotion grid in accordance with the instruction: “How does this image make you feel?”. This grid, pictured in Figure 35, was taken from Feldman Barrett and Russell’s (1998) emotion circumplex. Once all respondents had completed these exercises, they participated in an approximately half-hour discussion in groups of four to eight people. In these discussions they were asked to bring along their top images and express any thoughts they had regarding them. In addition to exploring people’s mental constructions of climate change, the purpose of these discussions was to assess which images most resonated with people and why, to identify ambiguity and consistency in image meaning, and to explore how people spoke about climate change when referring to these images.

⁴⁴ One participant had fewer than 10 images in this pile, and was directed to rank only the ones he had selected.

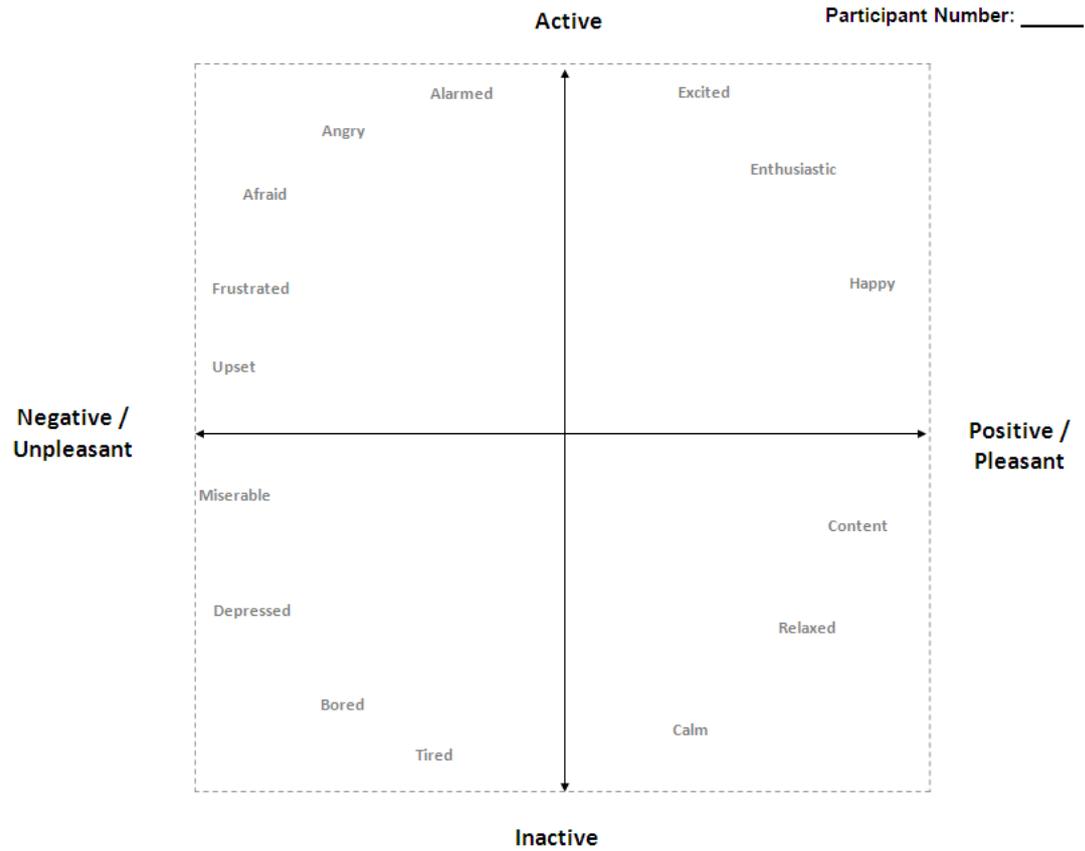


Figure 35. Emotion grid based on Feldman Barrett and Russell's emotion circumplex.

8.3.5 Preliminary Results

Table 44 lists the most commonly selected images in participants' top 10.

Table 44. Most commonly selected images in participants' top 10 ($n = 52$).

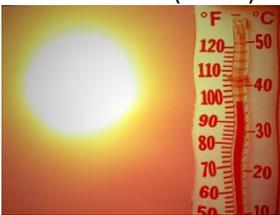
<p>Polar bear ($n = 33$)</p> 	<p>Collapsing ice shelf ($n = 28$)</p> 	<p>Flooded Sydney ($n = 25$)</p> 
<p>Parched earth ($n = 22$)</p> 	<p>Smoke stacks ($n = 21$)</p> 	<p>Coal-powered station ($n = 18$)</p> 
<p>Polar cap ($n = 15$)</p> 	<p>Submerged island ($n = 15$)</p> 	<p>Bushfire ($n = 14$)</p> 
<p>Pollution cars ($n = 14$)</p> 	<p>Windfarm ($n = 14$)</p> 	<p>Solar panel ($n = 13$)</p> 
<p>Tidal wave ($n = 13$)</p> 	<p>China pollution ($n = 11$)</p> 	<p>Coal mining ($n = 11$)</p> 
<p>Deforestation ($n = 11$)</p> 	<p>Earth on fire ($n = 11$)</p> 	<p>Coastal erosion ($n = 11$)</p> 
<p>Al Gore ($n = 10$)</p> 	<p>Extreme heat ($n = 10$)</p> 	<p>End of the world ($n = 9$)</p> 

Figure 36 illustrates the placement of all image selections on the emotion circumplex. The red point represents the average placement of all images. Ratings were most commonly located in the high arousal, negative evaluation quadrant; the least populated quadrant was the low arousal, positive evaluation quadrant.

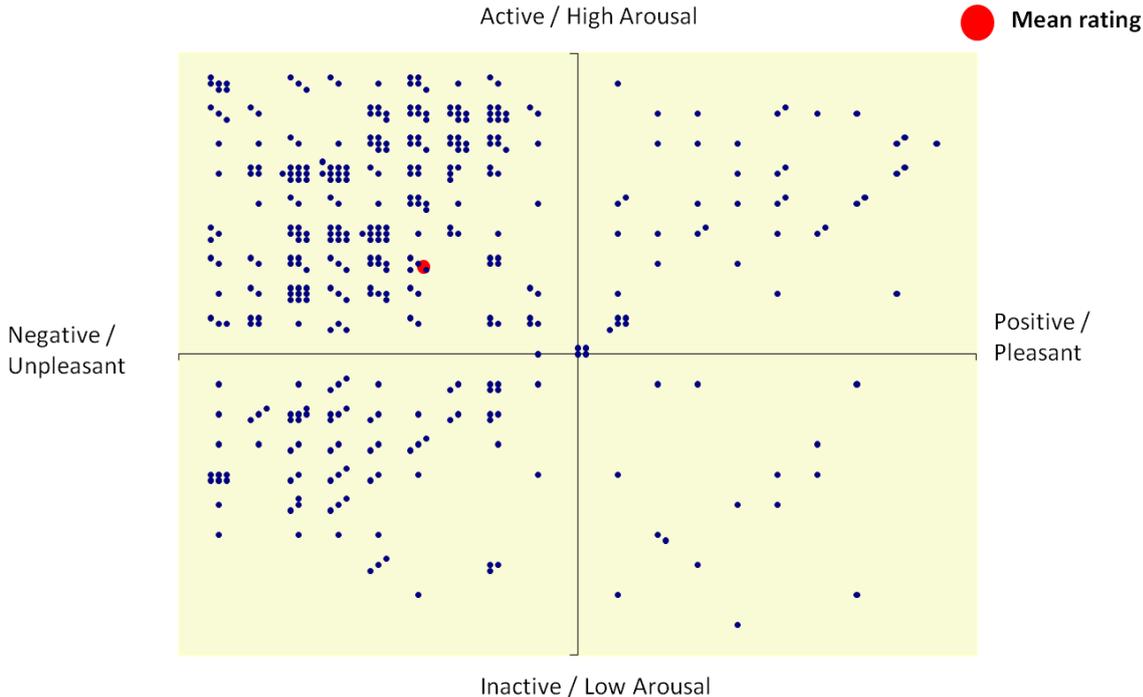


Figure 36. Affective ratings of all image associations.

Figure 37 displays individual affective ratings for the top four images. The average affective evaluations of the 12 most frequently selected images are shown in Figure 38, where the size of each point indicates the frequency of selection.

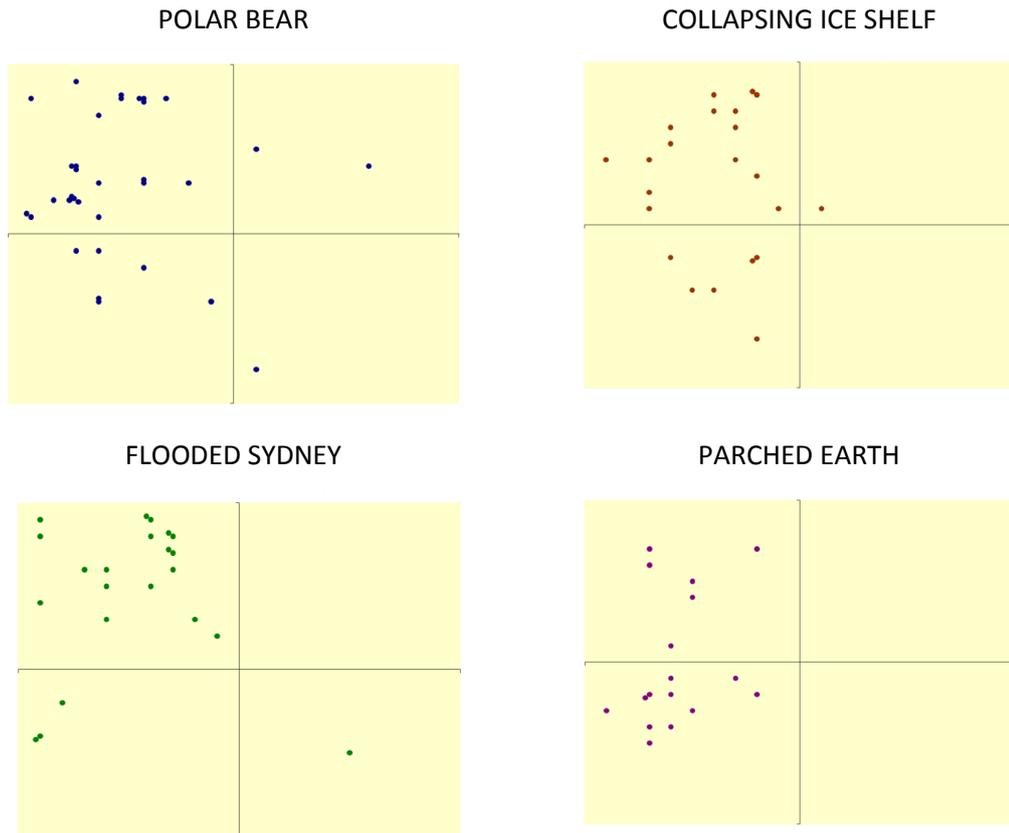


Figure 37. Individual affective ratings for the four most commonly selected images.

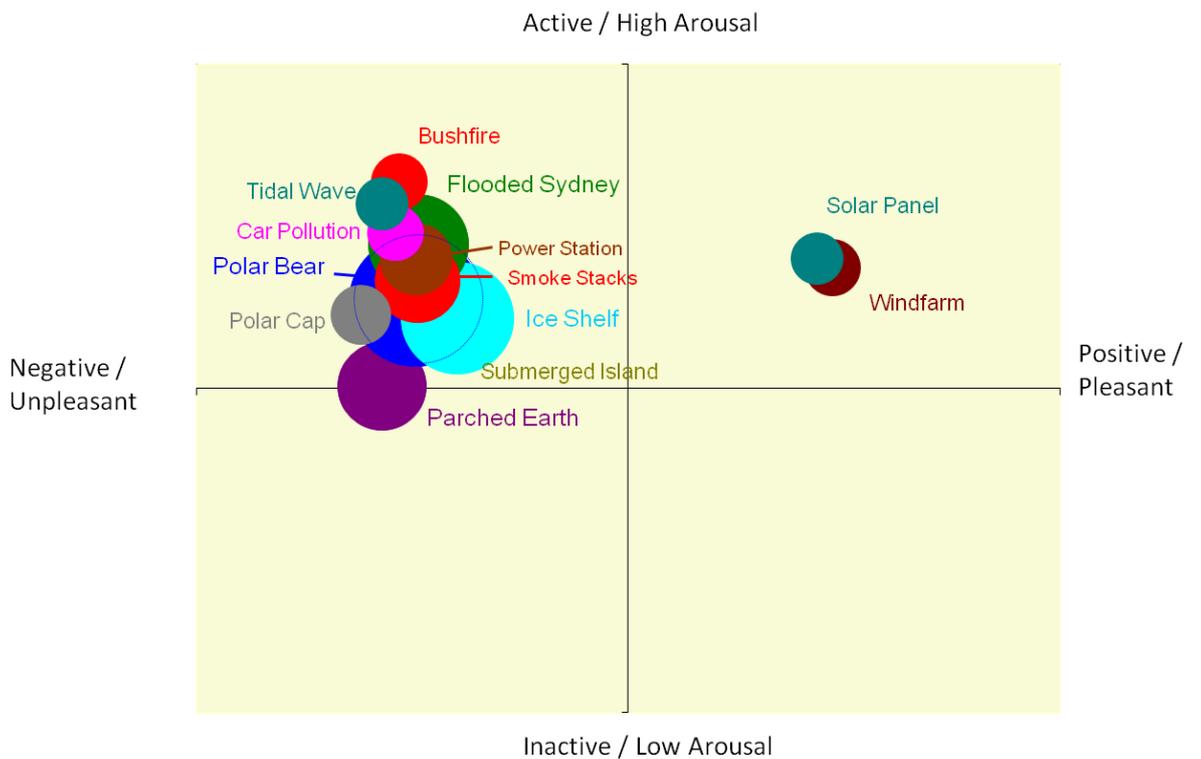


Figure 38. Affective ratings of the top 12 most commonly associated images.

8.3.6 Thematic Analysis

A thematic analysis was performed on written transcripts of workshop discussions in conjunction with another researcher.⁴⁵ Transcripts were corroborated with audio recordings of the workshops. Themes were established by identifying similar images and discussion-points that frequently co-occurred during workshop discussions (Braun & Clarke, 2006). That is, I identified patterns in the workshop transcripts (and from my recollections of the workshops) of groups of images that were often talked about in close conjunction with one another. While there was no formal structure to workshop discussions, I found that talk of a particular image prompted other participants to talk about a related image, even if this image did not rank particularly highly on their list of top 10 images. While the opinion-type of each respondent on the causes of climate change was not formally recorded, it was evident during the course of the discussions that a strong majority of respondents were of the opinion climate change was happening and human-induced; only one respondent made it clear they were of the opinion it was a natural phenomenon. This imbalance of opinion relative to the rest of the community doubtlessly influenced some of the content of the discussions, however the point of the discussions was not about inter-individual differences based on opinion-type, but to establish the consensual themes with which climate change is represented and thus talked about (Moscovici, 1988).⁴⁶ The following section is organised around the themes identified. Quotations are selected on the basis of their utility in representing each theme. Multiple quotations on the same topic are employed to indicate the frequency of an elicited sentiment. The first six themes relate directly to the images themselves, while the last two reflect two common themes emerging from discussions of the set of images as a whole. The identified themes were labelled as follows:

- Icons & ice
- Positives, politics, and power generation
- Pollution
- Disasters
- Drought & denuded landscapes
- Personal relevance
- Missing images

⁴⁵ Ms Jennifer Price, a colleague from the CSIRO's Social & Behavioural Sciences group

⁴⁶ Additionally, rationalisations, justifications, and distal and proximal defences employed by people holding the 'correct' basic opinion were of particular interest.

Icons & ice

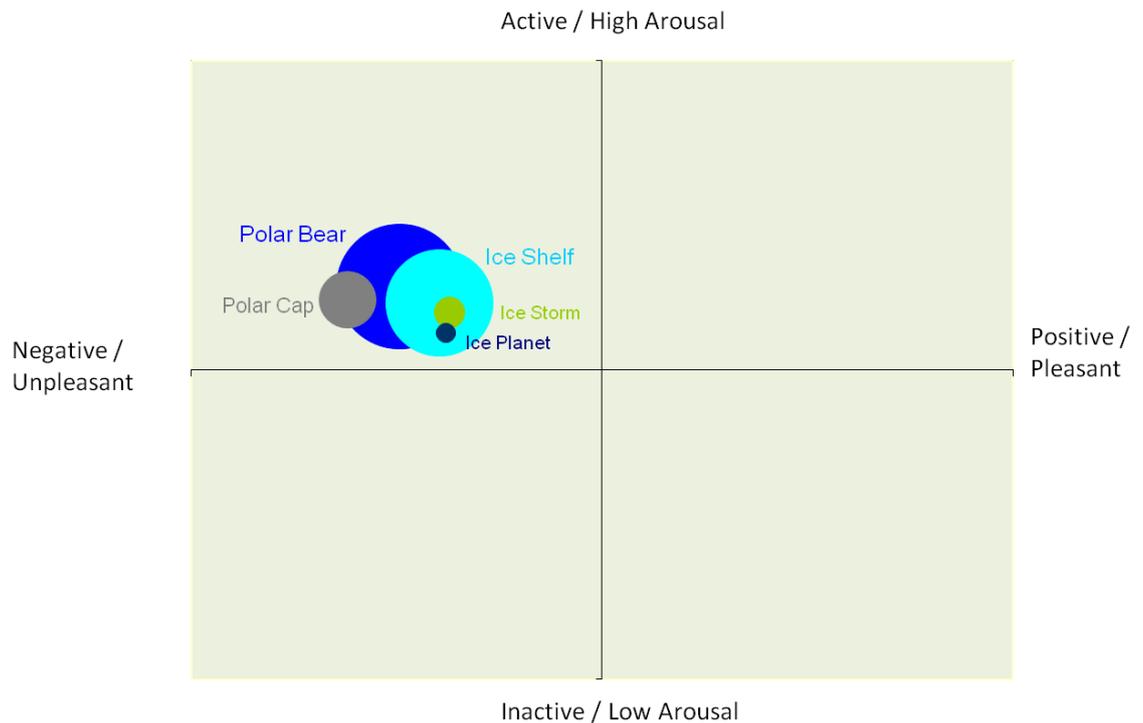


Figure 39. Mean affective ratings of images associated with climate change icons and ice.

Among the most commonly selected images of the set were those relating to ice (Figure 39). These images were consistently negatively evaluated, with moderate to high ratings of arousal.

For many participants, the image of the **polar bear** stranded on a small piece of ice represented an iconic image of climate change. “It’s clichéd, but if you see it you think: ‘climate change’”. Perhaps because of its recognisability, for some the image of the polar bear represented more than the endangerment of the species itself, but evoked the broader natural world and fauna in general: “It’s about the natural world rather than one species. It’s symbolic”; “All of our mega fauna are doomed”. For one participant the image had a more metaphorical meaning: “It has a wider reference to ice-caps, but portrays a sense of clinging to something not there”. Emotive elements were also expressed: “The polar bear is just holding out and it’s very emotional. How the mighty have fallen. It’s a top line predator”; “Animals are innocent so it’s an emotive response”. For another participant, the polar bear image was comical: “It made me laugh... ‘well you fucked up then!’. I had to

respond somewhere between content and bored. There was a Monty Python aspect to it". It is perhaps worth noting that this statement was accompanied by nervous laughter from the participant while making it. She failed to convince others, despite some effort on her behalf, of the image's comedic value. In motivated cognition terms, her bid for social support failed. Perhaps as a result, she made a limited contribution to the rest of the discussion.

The **collapsing ice shelf**, the second most commonly selected image, was described as "clear and unambiguous" by one participant; by another, "the most vivid representation of the photos, it's the most representative". The **ice planet** for one participant represented returning to a "primordial state after our interference", while for others it was a reminder of the changeability of Earth's climate: "I went to a seminar which detailed the past history of the ice age. Whatever your viewpoint about human effects, it demonstrated that that the climate can change".

The map of the **polar cap** was talked about in different terms. For the participants who discussed this image, it represented formal, scientific evidence of climate change: "It's the best evidence of change"; "It's irrefutable"; "[it] visually shows the change"; "People who deny climate change are ignoring this information".

The preponderance of ice-related images was explained by one participant in the following way: "Cold is more fearful than warm...More people die through winter than [through] heat stress". But the lack of personal relevance of ice-related images was also mentioned: "To Australians it can't resonate though". By contrast one participant chose three ice images because of that person's time living in Alaska, where they "saw the glaciers retreating; so it's an emotional connection". For another, the collapsing ice shelf was a reminder of something closer to home: coastal erosion.

Positives, politics, and green power

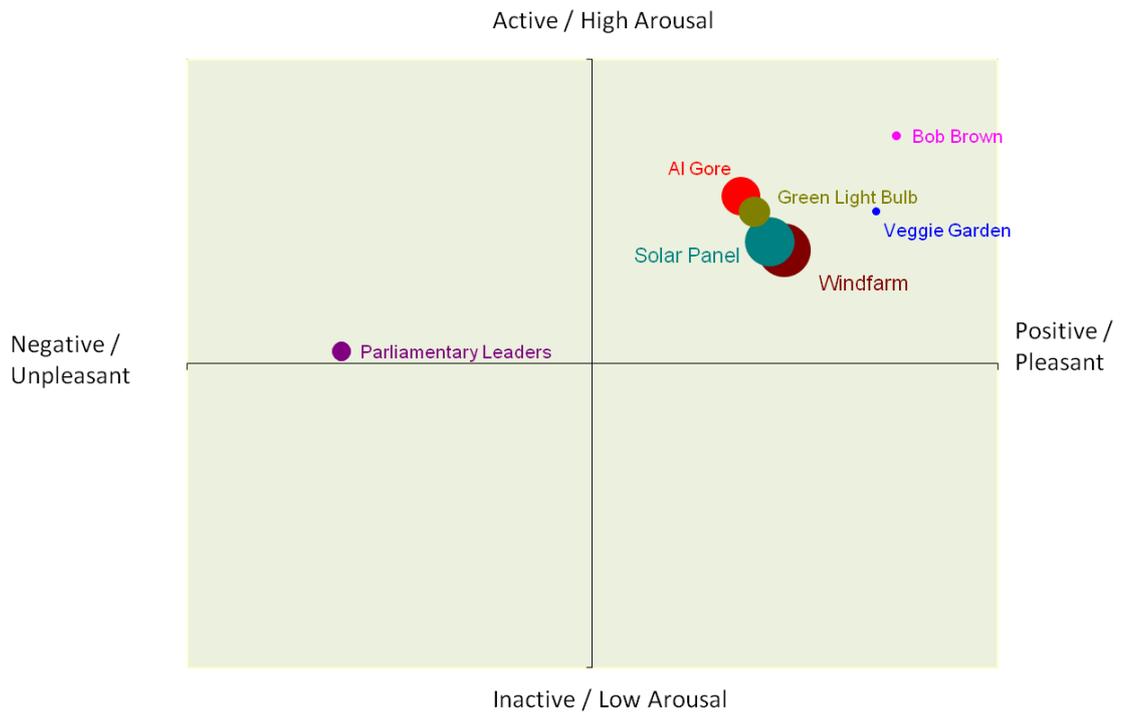


Figure 40. Mean affective ratings of images associated with positives, politics and green power.

Despite the majority of all images being negatively evaluated, a small number of images were rated positively, including images relating to renewable or efficient power generation, and politicians and figureheads related to positive action on climate change (Figure 40).

The **windfarm** and **solar panel** images were consistently evaluated positively. For many who selected these, they represented “things that combat [climate change] and have positive effects”. The windfarm “represents technology and [suggests] that it’s not all doom and gloom”. These alternative power sources were seen as solutions to a problem. Solar panels were described by one participant as representing “your visible green credentials”.

At several points in discussions it emerged that some who had selected these images had done so after a process of considered deliberation (despite being instructed to select “quickly and instinctively”!). This deliberative process is illustrated in the following interchange between two participants: “Things that represent climate change are negative,

but the solutions are positive. But we were asked to find images that represent climate change, not the solution". In response: "I did the opposite because windfarms and so on are the solution, not the causes which represent panic. I've been conditioned into associating climate change with panic". And from another participant, "I changed my images because they were all too negative and I wanted to represent positives too".

Images representing politicians were selected with relative infrequency, but discussions surrounding these images, once brought up, were often protracted. Figureheads of green movements, **Al Gore** and **Bob Brown**,⁴⁷ were seen by most of the participants who selected these images as representing hope. Of Al Gore: "He was the only person in the world to stand up. Copenhagen and Cancun didn't work. Al put his money where his mouth is and was flying the flag for us". Of Bob Brown: "We need icons. I think of climate change as a war, and we need a leader to follow. Government reflects the people". Participants were not unanimous in this view though: "I have a strong view that he [Al Gore] is a hypocritical fraud". There were also strong negative associations with the image showing Australia's **parliamentary leaders** debating each other. This was described as a "helpless image" by one participant, but again, hope was mentioned: "If we are to have any hope they're going to have to do something"; "Leadership is the only hope. Individuals have changed the world".

⁴⁷ At the time of the workshops, Senator Bob Brown was leader of the Australian Greens Party.

Pollution

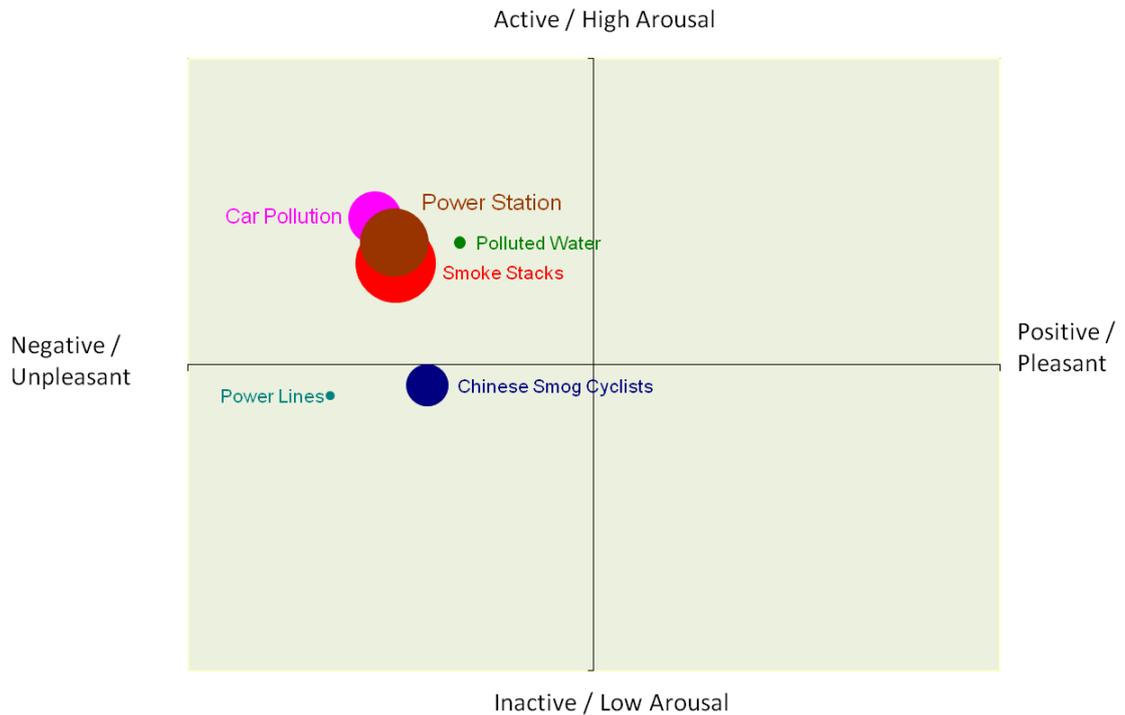


Figure 41. Mean affective ratings of images associated with pollution.

Pollution, whether through localised industrial and vehicle emissions, or as a by-product of power generation, formed a set of images that featured prominently in people’s selected image associations (Figure 41). These images were negatively evaluated, and produced a mixture of moderate to high arousal ratings.

The image of **smoke stacks** had particular resonance, even though many participants disputed its link with climate change: “[The smoke stacks are] iconic if not accurate”; “Smokestacks are very powerful, even if they are an exaggeration of pollution”; “That is water vapour, but regardless we all have to breathe pollution in”. The disempowering and depressing nature of the image was articulated: “It makes me feel helpless and disempowered. The subject is overwhelming, out of reach, but all you can do is talk”.

Disasters

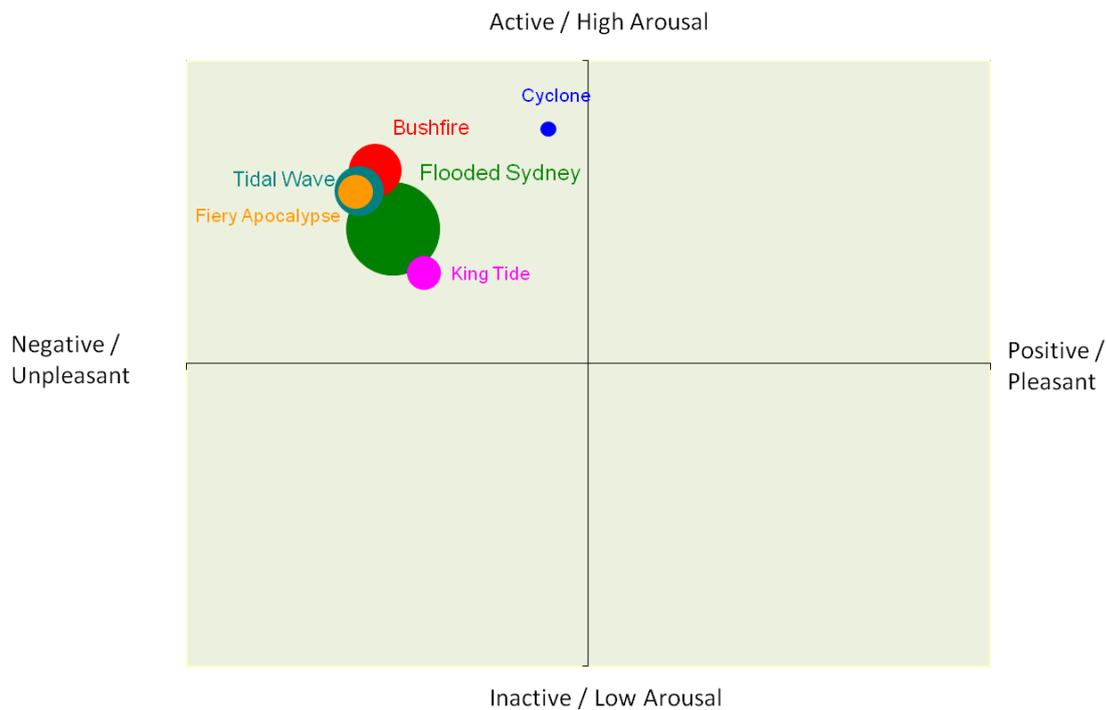


Figure 42. Mean affective ratings of images associated with natural disasters.

Images of natural disasters featured heavily in participants' selections (Figure 42). These images were consistently rated negatively, and were generally given high arousal ratings.

The image of a **flooded Sydney** was the most commonly selected natural disaster image, despite its obvious artificiality. "It's a fake but it really made me jump"; "It's familiar and reminded me of Japan"⁴⁸; "I'm from Sydney so it was relevant". But the most discussed of these images was the Victorian **bushfires**,⁴⁹ which was noted for its personal relevance and immediacy: "This is happening already and we are powerless to stop it. A friend of mine was affected by the fires in Victoria. It's a significant and powerful image"; "It's the thought of people suffering. This is the consequence and it's happening *now*. We have to do something about it".

⁴⁸ This workshop occurred shortly after the Japanese earthquake and ensuing tsunamis of March 2011.

⁴⁹ A series of bushfires, known as the 'Black Saturday Bushfires', swept through the state of Victoria in February 2009, killing 173 people. These bushfires occurred during unprecedentedly extreme bushfire conditions, a combination of record high temperatures for the state and high winds.

Drought & denuded landscapes

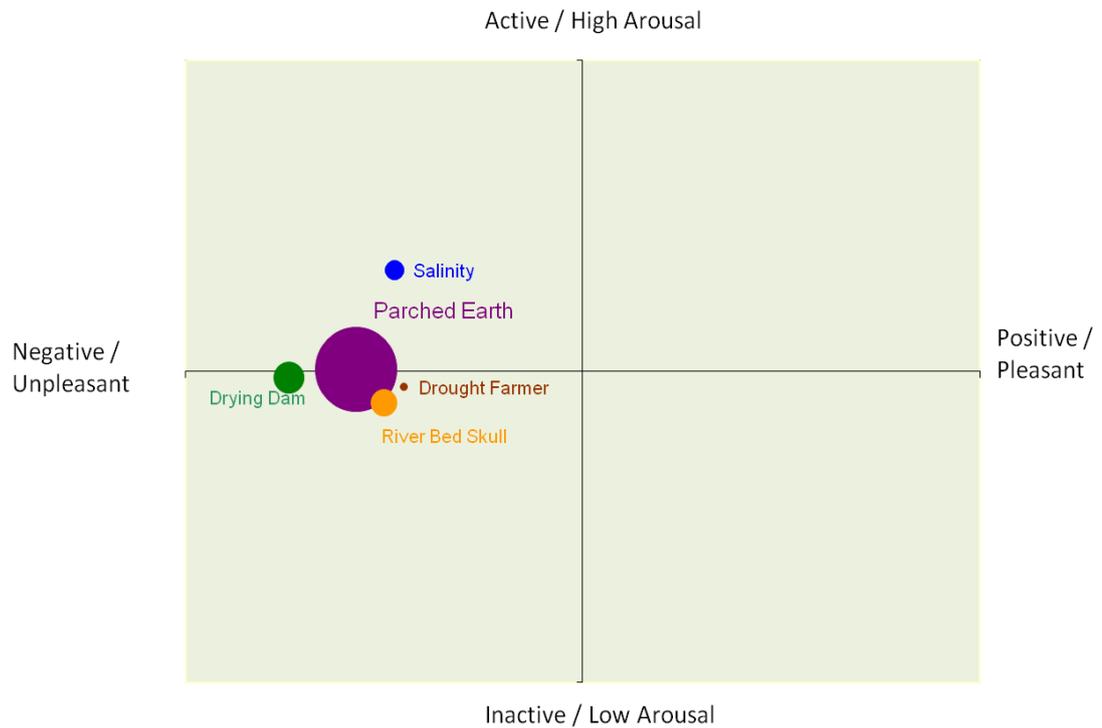


Figure 43. Mean affective ratings of images associated with drought and denuded landscapes.

Drought-related images were selected relatively infrequently by participants, despite being one of the strongest associations in the word-elicitation task. This set of images was rated as producing lower arousal levels relative to other negative image groups (Figure 43).

Participants who talked about the drought-related images expressed the sentiment that they were about issues broader than climate change, and in this sense some had hesitancy in selecting them. For the **drought farmer** image: “this is not exclusively a climate change thing, so again I’m uncertain”, while for another participant, “It’s a natural photo, but it is very evocative now of global warming”. The most commonly selected image of this group, **parched earth**, seemed to have the most resonance, even though it was arguably the least representative of drought specific to Australia⁵⁰: “At first I chose all the harsh land images. But I wanted ones that were related to climate change. This one is, with the red earth and

⁵⁰ Compare this image with ‘drought farmer’ and ‘distressed sheep’ for instance.

the one tree". But again there was a proviso by another participant who selected this image: "The other image I loved, but which is not definitive, is the scorched earth".

Personal relevance

Participants were asked whether any of the images in their selections has particular personal relevance. In addition to those images discussed above, a number of less frequently selected images were nominated. These images included **mining** and **flood plains in Perth**, "because of being in Western Australia"; **hot sun** and **thermometer**, "because of the weather at the moment"; the **mosquito**, "because I work in health"; **coastal erosion**, because "it's relevant where I live. My house might go under"; **refugees**, because "I have worked in East Timor"; the **submerged island**, because "I've lived on an island that was only 12 feet above sea level", and; **images of children**, "because I have a daughter". It is noteworthy that many of the images mentioned in this stage of the workshop discussions did not appear in participants' top ten.

Missing Images

Participants were asked whether they thought anything was missing from the bank of images. Most considered the image set to contain an exhaustive list of associations. On probing, a few suggestions were made of images, or concepts, that were not present in the image set. Some participants stated that, while it was easy to demonstrate the environmental impacts of climate change, they had difficulty selecting images that represented humanity's contribution to climate change. Other suggested images included **stunted drought crops**, "because that's what climate change is doing to farms"; more evocative images of **violence and food riots**: "lots of people don't realise what it means, when food won't grow. People in the city don't realise; they're complacent. The food and water situation is horrific. It's going to happen"; more evocative images of **impacts to animals**, or a representation of how "future generations will have no animals"; "People walking around on the **street in water**, like what will happen in low-lying areas like Bangladesh"; "**graphs, charts and maps**"; a representation of "**deniers**" or "the other side of the argument"; recent "**floods in Queensland**"; more **Indigenous** people: "there was a lot of Western culture images", "climate change is supposed to be global, but all these images are Western"; and images evocative of **war**: "There is nothing now saying 'fight for your planet'".

8.3.7 Discussion of the Imagery Associations Workshops

Images associated with climate change vary appreciably, but nearly all of them are negative. In my workshops, nearly all of the 82 images were selected by at least one participant. Of those commonly selected, most were negatively evaluated, with medium to high levels of attendant activation (or arousal). Further, commonly selected images were often distant, both geographically and culturally. There was little contestation in image meaning, as evidenced by the terms used to signify the images.

The traditional argument against the use of conventional climate change imagery is that it is disempowering and depressing. As such there has been a concerted effort to ‘move beyond’ polar bears and develop a more creative, personally meaningful, and powerful set of imagery (Manzo, 2010). The results from ratings on the emotions circumplex, however, suggest that some of the imagery most associated with climate change produces higher levels of arousal than these arguments suggest, and that the emotional states they are likely to produce are closer to anger and fear than to depression and withdrawal. But evidence from the workshop discussions concerning the activation of high-arousal emotions was conflicting: what was activating for one person was depressing for another. This conflict was also reflected in the relatively large spread of individual affective ratings for some of the top items (see Figure 37).

Some general patterns on the emotion circumplex emerged. The impacts of climate change seemed to produce high arousal if they were associated with one-off extreme events like natural disasters. But ongoing, incremental impacts like dry and denuded landscapes were more depressing. Sources of pollution were also depressing, with discussions suggesting this imagery induced reductions in the perceived efficacy of responding to climate change. If this is the case, then the constant coupling of climate change in the media with imagery of belching smoke stacks risks perpetuating the notion that, as individuals, we are up against it to effect meaningful change, and that those responsible for climate change in the first place are big industry, not us.

By contrast, solutions to the impacts and causes of climate change were rated positively, but subsequent discussions with participants suggested that these were outcomes of explicit, cognitive processes, rather than implicit emotional responses. It seems that long-term concerted efforts to couple communication of climate change issues with positive imagery, such as renewable energy, is required if these stimuli are to become linked at a more automatic level.

The polar bear on the iceberg was a clear stand-out association in the workshops, not only as a selected image but in subsequent discussions. It is also arguably the most iconic representation of climate change in the Western world (Manzo, 2010). Many participants found it evocative, despite also remarking on its being clichéd. Why is it such a powerful image? From a terror management perspective, the evocation of an animal, rather than humans, may function to reduce the connection between humans and nature in the face of a threat to one's mortality. Viewing oneself as distinct from nature serves an important existential function because it allows for the denial of one's connection to nature – mortality (Vess & Arndt, 2008). A similar explanation might be provided for the windfarms and solar panels. Culturally cultivated landscapes affirm the symbolic distinction between humans and the rest of nature, and are preferred when we are reminded of our mortality – images of wild nature are rated more negatively than cultivated landscapes for instance (Koole & Van den Berg, 2005).

With regards to moral agency, images such as that of the polar bear, and the environment in general, may also be a way to deny the moral relevance of the victims of climate change. If the victims of climate change are other animals, not humans, it lies outside of our 'moral community' (Opatow & Weiss, 2000). Of course, for many people, charismatic mega-fauna like polar bears may form part of our moral community; we are still concerned for their welfare. Even so, the comic response to the polar bear evidenced by one participant supports a motivated cognition argument that people are drawn to judgements (or interpretations) that assuage negative affect and maximise positive affect. By reinterpreting the image, one is able to avoid the negative affect associated with the image and produce positive affect, supporting the notion that people explicitly assuage negative affect by suppression and distraction.

Retreating glaciers and melting ice, among the most frequently chosen images, are also iconic representations of climate change. As well as being culturally (and hence, arguably, morally) remote, Doyle (2007) considers such imagery problematic because it represents, temporally, the already seen effects of climate change. But the obvious mock-ups of the flooded Sydney Opera House and an impossible tidal wave threatening high-rises on a beach were also popular selections. These images are a sign of things to come, rather than what has been, and suggest that imagined futures are also influential in making sense of climate change. Further, several images of the already seen effects of climate change that had particular resonance (and personal relevance for many), were images of *local* natural disasters, such as the Victorian bushfires. Perhaps it is these localised impacts that become the known anchor point (based on our prior knowledge) from which representations of future impacts are formed (Moscovici, 1988). Exactly what types of imagery serve proximal defence functions and what types promote pro-environmental adaptation choices would be an interesting area for further exploration.

From what was presented in Chapter 4 it is clear that feelings of personal relevance are important in determining responses to climate change (after ethical and personal responsibility, and the perceived importance of climate change). The personal relevance of images varied from individual to individual, suggesting that moving toward more personalised messages of climate change will prove extremely challenging. More promisingly, in the workshop discussions, numerous references to 'people' were made during discussions about missing images (though it should be noted that the images that *did* contain people were rarely selected, refer to Appendix I). But again, proximal limitations were evident in these discussions. For example, when discussing possible impacts on animals, it was noted how this would impact on *future generations* of people. Similarly, representing the 'other side of the argument' (deniers) removes the focus (and perhaps the responsibility to act) from the individual who accepts climate change. And food riots were talked about as future events in foreign (non-Western, non-developed) lands.

Much of the content and feel of the workshop discussions suggested an element of dissonant or dilemmatic thinking within individuals. On the one hand, there is a motivation to hold climate change at arm's length, yet there is a countervailing force imposing the personal and immediate aspects of climate change and the implications these have on

people's moral responses. Consider the following statement by one participant: "This is happening already and we are powerless to stop it. A friend of mine was affected by the fires in Victoria". The personal relevance and immediacy of climate change is acknowledged, but it is coupled with feelings of powerlessness. Whether immediacy and personal relevance spur this person to take action, or whether powerlessness means she can't see the point of acting, we cannot say. How this tension is managed is probably best established at the level of the individual, with much more in-depth methods than these workshops, perhaps by applying an approach / avoid framework.

Several other limitations of the workshops should be mentioned. Participants in the workshop were from Perth, rather than the whole of Australia as in the word-elicitation task. This may have contributed to the inconsistency between the word-elicitation associations and the images commonly selected by workshop participants. However, Perth has suffered as much as any region in the country from extended periods of severe drought, culminating in persistent potable water shortages in the metropolitan region and crop failures in the surrounding wheat-belt area (Bates & Hughes, 2009). As such, it is arguable that drought-related images should be just as topical and salient, if not more so, to residents of Perth than to other Australian communities. Nevertheless, the workshop participants should not be viewed as wholly representative of the broader Australian community. A self-selecting process might have operated whereby people who felt more engaged with climate change than the average person were overly represented (supported by the observation that the strong majority considered climate change human-induced).

8.4 General Discussion

In Part 1 we saw evidence that word-elicitation associations with climate change lacked personal relevance. But there were suggestions that associations with elements of national-level content and cultural-historical climate legacies were also important. Even so, political matters appear to dominate some of these associations (they are the key 'social amplifiers' of risk – or lack of risk – if you like). The findings from Part 2, by contrast, suggest that our visual associations with climate change are typically iconographic, and societal-level associations such as drought and water shortages largely disappear. This more remote iconography probably reflects dominant media representations of climate change, which

are often more relevant to northern hemisphere locations, remote locations in general, or imagined dystopian futures – all characteristics that facilitate proximal defences.

When discussing the possible ‘boomerang effects’ of science communication, Byrne and Hart (2009) suggest that communication can often unintentionally trigger cues important to self-identity that are seemingly unrelated to the topic itself. A recent finding from Hart and Nisbet (2011) suggests that, when communicating the impacts that climate change will have on people, the more remote and socially distant these people are from an individual’s own context, the more likely motivated reasoning is to occur, and the less likely support for action on climate change is to be granted. This is especially the case when climate change policy action is counter-attitudinal (for example, for those of conservative political persuasions). The results from the two studies in this chapter again suggest that politically-relevant ideologies are cued when people are asked to think about climate change, and that most associations with climate change are personally remote – together this explains the political polarisation of climate change responses evidenced in previous chapters. If we extend this argument, we would expect further polarisation to occur unless (until) climate change communication is reframed and decoupled from political processes. Such further polarisation would also presumably facilitate distal defences, resulting in expressions such as the bolstering of support for strong conservative leaders, and increases in conspicuous consumption. Decoupling from political processes might also mean that underlying ideologies (such as system justification) are less likely to be accessed in response to climate change stimuli.

The association with politicians arguably serves another purpose: it may smooth the way for inaction because it allows us to abdicate personal responsibility for the problem (consider this quote from one of the workshop participants: “If we are to have any hope they’re going to have to do something”). This in turn bodes ill for the prospect of becoming and remaining personally and morally engaged with climate change issues.

How people feel about politicians (as measured by the evaluative component of people associations in the survey) is also critical. In their perceptual theory of legitimacy, Crandall and Beasley (2001), suggest that people imbue other people, politicians, and even governments themselves, with elements of moral worth, with notions of good and bad, and

consequently perceive them as legitimate or illegitimate. What is more, people are generally very poor at thinking ambivalently about politicians and governments; it is much easier to think of them as wholly good or wholly bad. Once we have established in our mind that, let's say, a politician is generally a bad person that we are certain we don't like, we tend to see all of their opinions, actions, and beliefs in a negative light (Crandall & Beasley, 2001). No wonder moral appeals from Kevin Rudd fell flat with conservative climate change sceptics; a moral appeal from someone we imbue with little moral worth is bound to be seen as hypocritical. Coming from a motivated cognition approach, Redlawsk (2002) found that these sorts of affective biases may lead to lower-quality decision making, and that motivated reasoning may increase support for positively evaluated political candidates *even upon learning of negatively evaluated information*. So, perversely, if a politician you initially like believes in pro-active policy action on human-induced climate change, this can increase that politician's likeability in your eyes even if you are sceptical about climate change's causes. Perhaps this partly explains Malcolm Turnbull's positive ratings, especially among those that deny climate change exists.

Similar inferences can be drawn concerning our ability to respond effectively to current and future impacts of climate change, both at the level of the individual and at a societal level. Construal Level Theory (Trope & Liberman, 2003) suggests that people are better at making decisions about events that are psychologically close than psychologically distant. If climate change is associated with stimuli that are removed geographically, temporally, culturally, and personally, we cannot expect it to enter into people's 'finite pool of worry' anytime soon (Weber, 2006). However, somewhat antithetically, recent experimental research into framing effects has found that attitudes toward mitigating climate change are more positive if the problem is framed at the social rather than the personal level (Spence & Pidgeon, 2010). Whether these attitudes translate into pro-environmental behaviour though is another matter.⁵¹ Perhaps the solution lies somewhere in the middle, and prompting and promoting *national* or *societal*-level associations is an effective avenue.

Natural disasters such as bushfires and floods were frequently selected both in the word-elicitation task and in the workshops. For many participants these had personal relevance,

⁵¹ A possible counter-explanation for this finding is that people find information framed at the societal level less threatening, and it is therefore less likely to induce boomerang effects and worldview bolstering.

often because they knew someone who had directly experienced them. In this sense, these impacts are serious enough to capture attention (like communication about switching your lights off perhaps *doesn't*),⁵² and if not directly personal, are vicariously personal. It is this “vicarious emotional reaction”, moderated through perceived similarity with victims, that is bypassed in Bandura’s conception of dehumanisation and moral disengagement (Bandura, 1990, p.38). Designing communication that has direct or vicarious personal relevance (at both an individual and societal level) may help promote more active engagement in climate change issues as it may prevent moral disengagement.

Promoting and communicating climate change issues of societal-level relevance should also include the benefits accrued to society. As we saw in Chapter 4, the most important social attitude predictor of engaging in pro-environmental behaviours was the opportunity to be part of something bigger, which I also argued in the previous chapter might be a useful legitimising myth. Preparing for and responding to higher frequencies and intensities of natural disasters might also increase people’s perception of collective efficacy.

Communication efforts could leverage our socio-cultural history (with caution) of dealing with natural disasters as part of ‘what we’ve always done’, to trigger cues important to social identity for some of the community, without triggering unwanted political cues. For others, global images (imbued with metaphor and personal meaning) rather than local images might be the cue that triggers environmental action, depending on the attendant levels of activated emotion (Devine-Wright, 2009).

This brings us to the end of the investigation of the data. In the next chapter, I hope to bring these (sometimes disparate) threads of evidence together to say what, as a whole, they can reveal about the underlying social and psychological functions served by climate change responses.

⁵² See Lowe (2006) for a discussion of how seemingly trivial everyday solutions to climate change can reduce engagement rather than promote it.

CHAPTER 9. A CONCEPTUAL MODEL FOR UNDERSTANDING RESPONSES TO CLIMATE CHANGE

“You develop an instant global consciousness, a people orientation, an intense dissatisfaction with the state of the world, and a compulsion to do something about it. From out there on the moon, international politics look so petty. You want to grab a politician by the scruff of the neck and drag him a quarter of a million miles out and say, ‘Look at that, you son of a bitch.’”

Edgar Mitchell

Apollo 14 astronaut

In this the final chapter, I start with a recap of the major findings from each of the data chapters, in so doing synthesising the key evidence that responses to climate change serve multiple social and psychological functions. I will then present a model to help conceptualise climate change responses, drawn from both the data and theories of motivated social cognition. I conclude with some theoretical and applied implications of my research, some of the limitations of my approach, and suggestions for where to take the research next.

9.1 A Recap of Major Findings

9.1.1 Key Findings in Chapter 4 – Climate Change in Context

The scientific consensus that climate change is happening, and is mostly caused by human activity, is not reflected in the opinions of the broader community. While most people consider climate change to be happening, the cause is in dispute. The view that climate change is caused solely by natural fluctuation has gained significant traction. This particular opinion (what might be called ‘qualified acceptance’) may operate as a rationalising mechanism to avoid engaging in effortful behaviour, as a cognitive reconstrual for self-presentational purposes, or as a way of morally disengaging from the climate change issue.

Nearly everybody has an opinion about climate change (very few don’t know what to think), suggesting that opinions may function to reduce uncertainty and bolster feelings of control and coping. Opinions are malleable for many; more than a quarter of respondents changed their opinion about the causes of climate change 12 months later. This malleability might reflect the changing needs and goals of the individual, or the influence of community

and media discourse. This second possibility is supported by the finding that opinions tended to shift toward the view that climate change is attributable to natural variability – an argument that has received increased exposure in the media in recent years. Shifts in opinion were largely decoupled from whether people had become more or less certain over the past year about climate change; this ‘conflict of accounts’ is a sign that opinions are not deep-seated, but serve underlying goals and needs that change over time.

People tend to report that their views as most strongly reflecting morality or intelligence, regardless of their opinions about climate change, suggesting that both internal and external self-standards are operating. People who denied climate change strongly rated ‘activism’ as what their views were *not* like, hinting at the importance of value-expressive self-identity needs.

Considerable variation in pro-environmental behaviour occurred *within* types of opinion about the causes of climate change, suggesting that opinions only partially account for behavioural responses. Self-referent and social attitudes towards climate change revealed that moral and ethical engagement, and anticipated societal-level impacts of responding to climate change, were more important drivers of pro-environmental behaviour than certainty in anthropogenic causes. These results suggest that the element of engagement is central to understanding climate change responses, and that positive coping appraisals and meaning-striving might be important underlying needs.

Finally, negative, high arousal emotions were linked to climate change acceptance and behaviour, suggesting that sceptical positions might function to ward off negative affect, and/or reduce the need to engage in effortful behaviours.

9.1.2 Key Findings in Chapter 5 – Moral Responses to Climate Change

People tend to place more responsibility on groups and organisations, and less responsibility on individuals, for both causing and responding to climate change, regardless of opinion-type. Further, those sceptical of climate change consider agents such as big-polluting countries and multi-national corporations as partly responsible for both causing and responding to climate change. This internal contradiction supports further the

notion that disavowal and diffusion of responsibility functions to fulfil moral and adaptive adequacy needs, self-presentational goals, and to maintain positive self-concepts.

Levels of moral engagement mediate the link between opinions and pro-environmental behaviour, and between individual response efficacy and pro-environmental behaviour.

Moral disengagement was also associated with higher levels of annoyance (even within opinion-type), suggesting that misattribution of arousal might facilitate moral disengagement. Further, moral disengagement increased as responsibility became more removed from the individual, irrespective of opinion, suggesting that diffusion and disavowal aid moral disengagement. Taken together, the results from Chapter 5 suggest that moral disengagement is a key mechanism through which needs and goals such as the reduction in effortful behaviour, and consequently, reduction of guilt, might be achieved.

9.1.3 Key Findings in Chapter 6 – Climate Change and Consensus

Estimates

Estimates about what the Australian community thinks about climate change differ markedly from actual opinions. People thought their *own* opinion about climate change was more common than people holding other opinions think it was. This bias was evident for all opinion-types, but was more marled for those holding opinions with little external support. These findings suggest that false consensus bias is not just a general tendency among the population, but functions especially to fulfil needs for social support and to increase self-esteem and belongingness. Those who displayed high initial levels of false consensus were more resistant to changing their opinions about the causes of climate change, suggesting that false consensus also functions to reduce uncertainty. High false consensus was also associated with reduced individual responsibility and response efficacy, suggesting it is an important precursor for moral disengagement.

While privately most people hold the view that the climate is changing, the prevalence of outright climate change denial is strongly overestimated. This result suggests that external cultural influences (such as the media) have been instrumental in distorting actual community sentiment about climate change, and that pluralistic ignorance – whereby people grossly overestimate the prevalence of a minority opinion – may help unpopular opinions gather momentum.

9.1.4 Key Findings in Chapter 7 – System Legitimacy

Underlying ideological values associated with system justification explain climate change responses above and beyond political preferences. High system-justifying tendencies were also associated with reduced negative affect and reduced moral engagement, the latter of which reduced support for policy action on climate change. Support for climate policies that include compensation for low-income households was unrelated to levels of personal and household income. These findings suggest that system justification tendencies are made salient by climate change, and justifications to defend the status-quo function to maintain positive concepts of the world, and reduce guilt and anxiety, for both members of privileged and underprivileged groups.

System-justifying tendencies are related to attitudes about the potential negative and positive impacts of collective responses to climate change. The data suggest that social attitudes might function as legitimising myths that promote or undermine existing system hierarchies, and function to increase or decrease moral engagement at a system level. These myths and justifications might also influence acceptance and resistance to social change in the form of policy action.

9.1.5 Key Findings in Chapter 8 – Climate Change Associations

Images commonly associated with climate change include rising sea levels, drought, melting ice caps, and floods. Drought, floods, and water shortage feature more prominently for Australians than for US and UK respondents, regardless of whether Australians live in cities or rural areas. Many people found it hard to nominate three images, suggesting the construction of mental representations of climate change is difficult. While most image associations were broad and remote, national-level impacts of climate change were also salient for many people.

Politicians dominate *who we associate with climate change*. Scientists and people close to us are less commonly associated with climate change. Scientists and self and family were generally evaluated positively, but the evaluation of politicians was largely dependent on opinion-type. This result suggests that politicians are important negative and positive

referents for people, and that people may look to politicians to inform their own opinions as a way to reduce anxiety in the face of uncertainty and complexity.

When presented with climate change imagery, associations vary appreciably. Most imagery is negatively evaluated, with medium to high levels of attendant arousal.

Strongly associated imagery is often distant, both geographically and culturally.

Iconographic images of climate change dominate people's associations. One-off extreme events like natural disasters were associated with higher arousal than ongoing, incremental impacts like dry and denuded landscapes. Workshop discussions suggest that some people imbue iconographic imagery with personal meaning, which is activating, while for others the same imagery is depressing and inhibiting. The prevalence of iconic imagery is further evidence that the media influences what people associate with climate change. Together the data suggest that both explicit and implicit imagery can function to reduce moral agency through a perceived lack of personal relevance and responsibility (proximal and distal defences). This in turn may alleviate moral agency, negative affect, and existential anxiety.

Solutions to the impacts and causes of climate change are rated positively, but subsequent discussions with participants suggested that these were outcomes of explicit, cognitive processes, rather than implicit emotional responses. This suggests there is little automatic coupling of climate change stimuli with positive outcomes.

9.2 A Model of Functional Responses to Climate Change

Figure 44 conveys these findings conceptually. Its construction is guided by the data observations, including mediating influences and (where possible) causal directionality, in addition to theoretical accounts from motivated social cognition. It is a functional explanation of responses to climate change, intended to incorporate the vast array of responses to climate change (Aim 4).

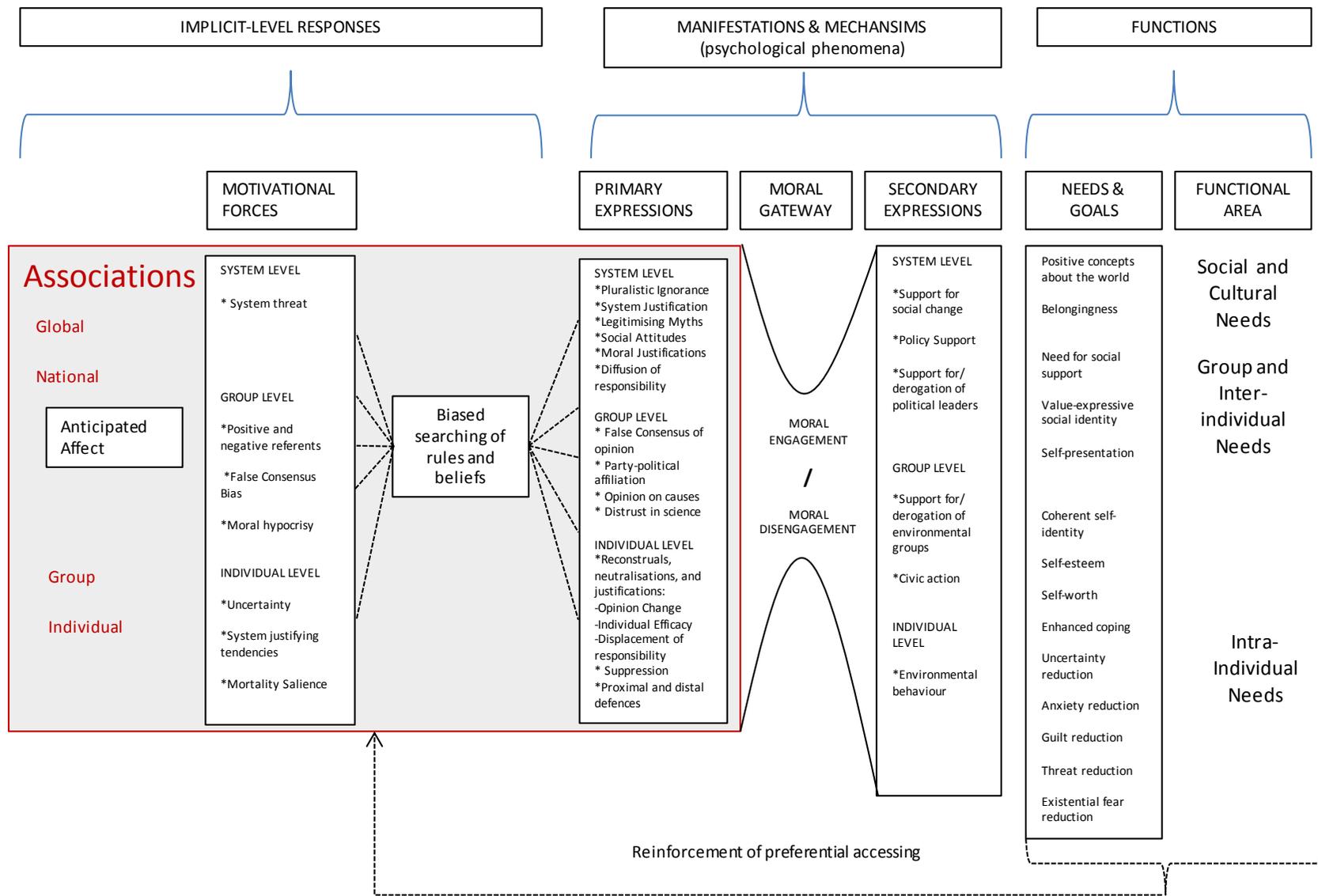


Figure 44. A Model of Functional Responses to Climate Change

9.2.1 Model Characteristics

Basic process When presented with information about an attitude-object (in this case, climate change), we automatically consider the implications of the information for our needs and goals. These needs and goals are primed by both the content and the context of the information. For example, the content might be personally threatening (to the point of priming existential threat reduction needs), and the information might co-occur with other information, such as in the midst of a political debate (perhaps priming social identity needs). Anticipated affect, influenced by our implicit associations (the mental representations we invoke), helps us determine whether we desire a particular conclusion in relation to this information (Kunda, 1990). If a particular conclusion is desired, we begin searching our sets of rules and beliefs for information consistent with that conclusion (i.e. we are directionally motivated). The rules and beliefs available to us are enormous, but associations, external socio-cultural influences, and motivational forces mean that certain sub-sets of information are more likely to be accessed than others. The subset of rules and beliefs that we access provide the 'trigger' (or cue) for our outward expressions about climate change. These expressions may have relevance to social systems, to certain groups, to ourselves as individuals, or to any combination of the three. There is horizontal interplay different levels of implicit responses and different levels of primary and secondary expressions, but if, for instance, the incoming information is coupled with system-relevant information, our primary expressions will be more likely to have relevance at the system-level. Primary and secondary expressions are the mechanisms through which we can reach our pre-determined conclusions while fulfilling our salient needs and goals, without compromising any of our other needs and goals.

Associations: Associations may have relevance to different levels: global, national, group, and personal. There is tension between these levels: we want to hold climate change at arm's length, but a countervailing force reminds us of its personal relevance. Consistent with a motivated reasoning account, our cognitive representations of climate change are *formed* in part by the prior knowledge called upon, by anticipated affect, and by our end needs and goals (Kunda, 1990). Through repeated preferential accessing, these cognitive representations become associations: a 'quick guide' to climate change information that also influences our implicit emotion regulation (Westen et al., 2006). Associations en masse permeate through society, and are amplified and shaped by external cultural forces – such as the media or educational institutions – through the repeated coupling of climate change

information with particular imagery and content (Kasperson, Renn, Slovic, Brown, et al., 1988). This coupling makes some associations more cognitively accessible, and provides the individual with a narrowed-down subset of rules and beliefs through which to sift to find the associations that best fit their needs and goals.

Motivational forces: The first long column on the diagram represents motivational forces: a combination of individual differences (or tendencies), universal traits, socialisation processes, and cultural context. These forces exert influence over our overt expressions where they have relevance to the subset of rules and beliefs that are accessed in response to incoming information. For example, if the rules and beliefs accessed have system-level relevance, then whether one has high or low system-justifying tendencies will be important in shaping an individual's outward response to the incoming information.

Manifestations and mechanisms: The columns under this heading comprise 'responses' to climate change; the beliefs, attitudes, opinions, values, and behaviours we exhibit that relate to climate change. These responses can be thought of as mediators between the inner needs and goals of an individual, and external influences and motivational forces.

Primary Expressions: Our basic opinion about the causes of climate change lies here. As such I am conceptualising opinions and attitudes about climate change as not deep-seated beliefs, but as malleable expressions that shift in accordance with changing needs and goals, and changing external social cues. In this sense we can think of climate change opinions as subservient expressions that do the bidding of dominant motivational forces, and implicit-level rules and beliefs about the world (that are less malleable). A person may hold multiple opinions and attitudes concurrently, and depending on what the end goals and needs are, a different attitude might be expressed by the same person on different occasions. Much of the work of primary expressions (including rationalisations, justifications, and neutralisations) is to find a way to successfully navigate the next stage.

The Moral Gateway: In order to arrive at the pre-desired conclusion, one must negotiate a moral gateway. This negotiation is necessary in large part due to the constant coupling of climate change with notions of morality (Seabright, 2010). Rather than assume

that individuals are naturally motivated to morally engage with threatening information, in the model it assumed that people are also motivated, even geared towards, moral *disengagement*. In this sense moral disengagement is a motivated active process. Moral disengagement allows one to proceed to the next stage without compromising other needs and goals: notably, our self-worth as a moral and adaptive person, and self-presentational needs of appearing moral and consistent (Monin et al., 2008; Steele, 1988).

Secondary Expressions: Pro-environmental behaviour, policy support, and support for social change are all examples of secondary expressions. These expressions are the natural consequence of the proceeding stages, and function to finally satisfy the original needs and goals: for instance, pro-environmental behaviour may reinforce self-identity needs or group belongingness, or make us feel we are contributing to something that will outlast our own lifetimes. These secondary expressions serve important social identity needs too – they are a signal to others of our own individual rules, beliefs, and group belongingness, and these expressions help us to differentiate ourselves from other groups and collectives (in so doing reinforcing the cultural bases of these rules and beliefs).

Needs & Goals and Functional Areas: Our needs and goals are competing. The context and content of climate change make different needs more or less salient at any one time. Needs at different levels can work concurrently: for instance mortality salience might trigger existential fear reduction and social and cultural belongingness needs at the same time. Within individuals, a particular need may predominate, such as chronic disposition to refer to normative standards of judgement (Cooper, 2012), and different expressions may fulfil the same need, dependent on the life history, social position, and cultural context of a particular individual (Smith et al., 1956). These competing needs and goals are grouped into three broad functional areas. Social and cultural needs are those relating to a desire to see prevailing social and cultural structures as fair and legitimate. If these needs are being frustrated, expressions that favour social change might manifest. Group and inter-individual needs might include need for social support or self-presentational goals: they are concerned with our need to be seen as legitimate in the eyes of others. Intra-individual needs concern our own internal coherence; that we are stable, agentic, moral, and worthy contributors to society in our *own* eyes.

Reinforcement of preferential accessing: Finally, the dotted line running along the bottom of the model symbolises how the subsets of rules and beliefs we access when confronted with climate change information are reinforced through repeated accessing.

9.2.2 An Introspective Example

I will use an example drawn from my own life to illustrate how the processes contained in my model might work on an everyday basis.⁵³ I have to work tomorrow. I'll probably drive. I'll probably drive despite the having a perfectly good bicycle sitting in my spare room. I'm aware that my decision to drive or ride is relevant to climate change, and that climate change is an issue I'll read about tomorrow morning (there are floods in Queensland and bushfires in Victoria at the moment, accompanied by intense media debate about the part played by climate change). Therefore my decision of whether to ride or drive is weighed up in the context of the information I know about climate change. My decision is in part guided by anticipated affect: I suspect I'll feel a twinge of guilt from driving, but on the other hand I'll suffer physical discomfort from riding. I have two competing needs. In this case, the avoidance of discomfort from riding outweighs the anticipated guilt, so I want to take the car. I now have pre-determined outcome, so I am directionally motivated to come to a conclusion that accords with that outcome. But I have to come to that conclusion in a way that doesn't jeopardise other needs and goals that are important to me.

What sort of implicit associations come to mind I can only speculate, but chances are on this occasion I will preference those that represent climate change as a big global problem; I won't get a mental image of people saving the world in lycra bike-shorts. Similarly, I can't really know what motivational forces are shaping my reasoning process. But there's that nagging sense of guilt still lurking; I know I'm going to have to morally justify my decision at some point. I've gone through this reasoning process a lot. In fact I've done it so many times I know (implicitly) which set of rules and beliefs to access if I'm to reach my desired conclusion. This particular set allows me to construct rationalisations and justifications for what I'm about to do. Lucky for me, I have loads. I live close to work and it's a fuel-efficient car (what about those guys who drive an hour each way to work in their massive tanks, there's a handy self-exonerating comparison), it sports a recently attached World Wildlife

⁵³ I'm mindful of the limitations of introspection, particular when touching on matters involving implicit and automatic processes, but I hope it serves a useful illustrative purpose (function!) nonetheless.

Fund sticker – evidence of my green credentials (the sticker, ironically designed to be stuck on cars, serves a nice value-expressive function), and besides “do you know how dangerous cycling in traffic is?”, and so on and so forth. Meanwhile, societal forces and constraints mean other choices (car-pooling, working at home, and so on) remain largely invisible to me.

All of these rationalisations have an individual-level focus. System and group level processes are less likely to be considered, for several reasons. First, the end-goal (avoiding effortful behaviour and the attendant physical discomfort), has individual-level relevance. Second, if I start accessing group level information, this might trigger the needs and goals of those higher levels, and that’s bad news for me. Many of my colleagues ride to work, potentially frustrating belongingness needs, and accessing my system-level rules and beliefs would remind me of my deeply-held view that I have a social responsibility to *always* make the ‘right’ decision, making it fiendishly difficult to navigate that moral gateway.

Yet I think that climate change is happening, and that humans are largely causing it (how do I know this? I don’t. But scientists are my positive referents, and probably how I self-categorise when it comes to climate change). What I think causes climate change isn’t relevant to this particular decision, and my individual-level rationalisations and justifications have done the work for me. I negotiate the moral gateway through the path of moral disengagement. But if the mental gymnastics of rationalisation start to get too taxing, and my competing needs become too frustrated (such as my self-identity as somebody who cares for the environment), and my discomfort builds and builds, I’ll probably have to take the bike (or decide that climate change is one big myth).

Every time I go through this process I reinforce my preferential accessing. Though oversimplified, I hope the example demonstrates how one can act (in this case habitually) in opposition to their expressed attitudes and values.

9.3 Theoretical Implications

One of the consequences of co-opting motivated social cognition accounts to perform my functional analysis is the absence of explicit measures of environmental attitudes or values.

This might seem a strange omission for an analysis on climate change responses, but I suggest that environmental attitudes and values are largely redundant, except when environmentalism lies at the heart of a person's identity (Kantola, Syme, & Campbell, 1984). To go one step further, I propose that many environmental values and attitudes are the outcomes, or expressions, of implicit processes – that is, for most people, environmental attitudes and values (and opinions towards environmental issues like climate change) are *subservient* to deep-seated beliefs and rules, such as system-justifying ideologies. A corollary of this thinking is that environmental 'beliefs' are not stable traits that differ from individual to individual, but are malleable.

Considering expressions about the environment as subject to rapid change opens up further possibilities. I propose that environmental values, beliefs, and norms (as they are referred to by Stern) are cultural constructions than can be strategically and selectively deployed as discursive and rhetorical tools to help justify and legitimise (both to oneself and to others) a pre-determined conclusion. This plasticity of environmental values is similar to Thompson, Ellis and Wildavsky's (1990) conception of ideas of 'nature' as socially constructed; our ideas can be squeezed into whatever configuration suits us at the time, within certain limits. Because we have competing needs and goals, we also have competing (or conflicting) sets of arguments that pertain to the environment. These different attitudes are available to a person (within a latitude of acceptance that does not threaten our internal consistency), and these different attitudes are accessed dependent on the needs and goals of the individual at the time, each potentially serving a different function. There is tension within this attitude system, resulting in shifting attitudes, context-dependency, and attitudinal ambivalence. This tension is observed through logical inconsistencies, or a conflict of accounts (e.g. "I don't believe in climate change and big-polluting countries are responsible for it anyway").

At an individual level these shifting environmental expressions function in a similar way to Bersoff's (1999) notion of a 'neutralisation': rationalisations and justifications used for performing a behaviour at odds with pre-existing values. Such an idea might also explain the low levels of correspondence evident in much environmental research between attitudes, intentions, and behaviours (Sheeran, 2002). At a societal level, such constructions

might take the form of legitimising myths, also a rationalisation for acting out of keeping with previously expressed attitudes.

An assumption in my above argument (and also within my model), is that it is *pre-formed conclusions* that are being neutralised, implying that *all* responses to climate change are directionally motivated. I argue that responses to climate change are, if not universally, then much more likely to be directionally than non-directionally motivated, due in part to the inherent complexity and intangibility of the attitude-object.⁵⁴ This argument is supported by the frequently observed conflict in accounts. The strong ideological relationships with climate change responses also suggest that directionally motivated reasoning processes are engaged. Further, associations with scientific content or with scientists themselves were far less prevalent than associations with natural disasters and politics and politicians. The work of Westen et al. (2006) suggests that political judgements and decision-making arouse ‘hot’ cognition processes, a form of directional reasoning.

9.4 Applied Implications

The results presented in this thesis reiterate findings elsewhere that a deficit-approach to climate change communication is severely limited (Evans & Durant, 1995; Kahan et al., 2012; Zia & Todd, 2010). Simply giving people more evidence, or more scientific information, will not necessarily translate into broadscale acceptance that humans are driving climate change. Communications predicated on the assumption that everyone strives for scientific accuracy when formulating their opinions are likely to miss their intended mark, for they fail to recognise that humans’ needs and goals are multiple and varied, and that opinions are formed and shaped by a myriad of competing forces. A further problem arises when one considers the results of estimating community sentiment: negative authority referents (those who we do *not* wish to identify ourselves with) seemed particularly important in shaping, informing, and bolstering the opinions of those sceptical about climate change, and those negative referents were scientific and academic sources. ‘Shouting the science more loudly’ is unlikely to sway sceptical opinion if those doing the shouting are not trusted to begin with; perversely, it might even entrench scepticism.

⁵⁴ Interestingly, in a recently conducted study no significant relationship was found between Need for Cognition (a predisposition related to a tendency for non-directionally motivated reasoning) and attitudes to climate change, although there was a positive relationship with willingness to act (Sinatra, Kardash, Taasobshirazi, & Lombardi, 2011).

Unfortunately, even if and where opinions can be swayed by scientific evidence alone, this will not necessarily translate into pro-environmental behaviour. A range of other mechanisms (rationalisations, justifications, suppression, and so on) can be employed to morally disengage from the consequences of inaction, even when the 'correct' opinions have been generated. But perhaps non-directional motivations can be *induced*. People are more likely to be non-directional in their judgements when they expect evaluations to affect their livelihood, and when they are highly involved in the subject (Kunda, 1990). Concerted efforts to frame the impacts of climate change in personally meaningful ways – such as focussing on impacts specific to the nation or locale – may be an effective means to connect climate change with personal livelihoods. The attendant anticipated affect associated with localised climate change impacts might precipitate a reasoning process whereby people are motivated to reach accurate conclusions because it is the best threat reduction method available. But such information must also avoid activating proximal and distal defences in response to threatening information, so positive outcomes need to be offered as well. This last task will be difficult given that climate change is not implicitly associated with positive outcomes. Constant coupling with positive messages and outcomes will be required over the long term.

There are other ways of designing communications to appeal to different motivations. For instance, communications that emphasise community engagement and participation as part of the solution might prime and fulfil meaning-striving and belongingness needs, particularly for those who have the 'correct' opinions, yet are not fully engaged with the issue. For high system-justifiers, exploiting the legitimising myth that engaging with climate change is 'an opportunity to be part of something bigger' need not necessarily run counter to dispositional tendencies. Previous research suggests that people high in conservatism (and other system-justifying tendencies) have higher levels of existential anxiety (Jost, 2006). This deep-seated proneness to mortality salience may even *drive* tendencies towards conservatism (Jost et al., 2003). So, somewhat perversely, promoting a hierarchy-attenuating myth might engage both those with liberal and conservative ideologies concurrently. Communications that anticipate and undermine hierarchy-enhancing myths (such as the low efficacy of national response), may also make it more cognitively difficult for people to rationalise and justify their decisions (such as inaction and opposition to policy) post-hoc.

Another characteristic of conservatism is nationalism. Results from the word-elicitation task suggest that many climate change associations have national-level relevance. Exploiting this level of relevance, including the potential benefits accrued to Australia from effective policy response (including pride and national security) might also be advantageous, similar to suggestions from research in the US (Feygina et al., 2010; Zia & Todd, 2010).

My longitudinal analysis of changes in moral engagement revealed that, as people moved *away* from acceptance of human-induced climate change, they became morally disengaged, but moves *toward* acceptance did not result in any appreciable increase in engagement. To me this suggests that ‘moral engagement’ and ‘moral disengagement’ might be distinct rather than the one bipolar construct. Strategies to *prevent disengagement* may be more beneficial in stimulating and maintaining pro-environmental behaviours than strategies designed to *increase engagement*. But there is another explanation to the different rates of change observed: that it reflects a broader cultural disengagement with climate change in general.

According to system justification theory, when enough momentum for a new system is gathered, and that emerging system starts to look inevitable, people automatically justify and support the emerging system. If adequately assuaging the threat of climate change to society entails a major shift in the prevailing economic system, then false consensus and pluralistic ignorance, in conjunction with status-quo biases, could severely hamper any required change. We know there are many determinants of opinions about climate change, and that our own opinions in turn shape our opinions of what others in our community think: our consensus estimates reflect our own thinking on the matter. But our perception of what the broader community thinks is a dynamic process: these perceptions can reinforce our own patterns of thinking, or convince us to believe differently (Shamir & Shamir, 1997). This, in combination with political and media influences, sow the ground from which pluralistic ignorance can grow. Communication of the *actual* consensus: that climate change is happening (perhaps the question of what causes it should be irrelevant in this case), and that we need to adapt accordingly, warrants extended air-play. Communicating actual consensus might be important for one group of people in particular.

In feedback-conformity studies on right-wing authoritarians, Altemeyer (2006) found that people high in right-wing authoritarianism were much more likely than others to change their opinions (including on the issues of homosexuality and religion) in line with a supposed norm. Altemeyer attributed these findings to high right-wing authoritarians' desire for conformity; to the high value placed on "being normal" (Altemeyer, 2006, p. 29). As high right-wing authoritarianism is associated with outright denial in the existence of climate change, then making the point that this opinion is one only a small minority of the population hold might be especially fruitful.

Broader cultural forces are just as important as intra-individual psychological mechanisms; individuals have to adjust their responses in accordance with changing cultural forces to ensure their needs and goals remain met. Let's revisit that first chart in Chapter 1, shown again below as Figure 45. Although we only have polling data that goes back 10 years at the most (which says something in itself), that climate change denial and scepticism were not researched (and weren't in common parlance, refer to Figure 46) is evidence that a cultural shift has happened in at least countries. It appears this cultural shift has happened in Australia. But why?

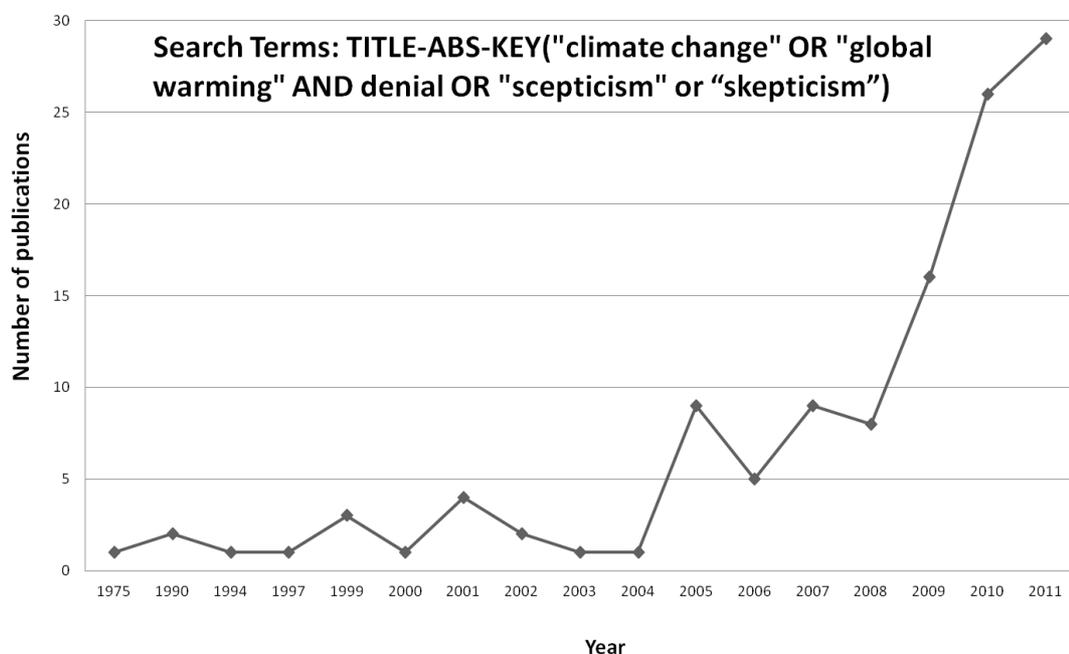


Figure 45. Scopus search results for number of research articles on climate change scepticism or denial, 1975-2011.

Interest over time ?

The number 100 represents the peak search volume

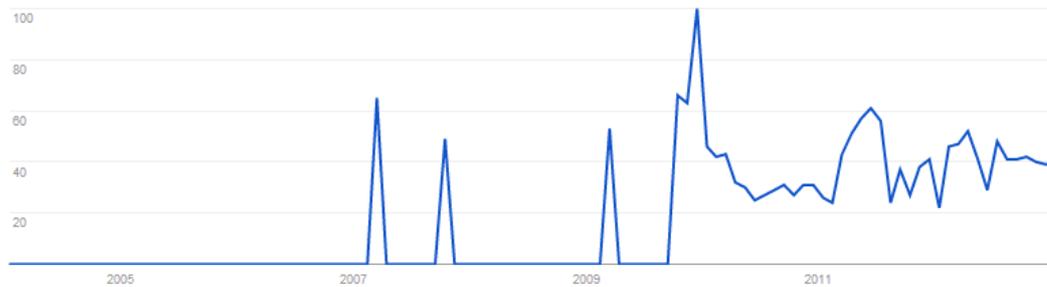
 News headlines
 Forecast ?


Figure 46. Google search patterns for “climate change denial”, 2004-2013.

Rapid consensus changes in society often occur when a perceived consensus is revealed as having little real support by individuals (a ‘conservative lag’), or where a minority is able to impose the appearance of consensus on the majority (a ‘liberal leap’) (O’Gorman, 1986). Liberal leaps⁵⁵ occur when the establishment of pluralistic ignorance allows for rapid change. Given the strong association between climate change and political orientations, it may seem peculiar that pluralistic ignorance surrounding climate change ‘denial’ should be an example of a *liberal leap*. Perhaps this peculiarity is due to the recent establishment of a new brand of conservatism that co-opts the populist, dynamic, and mobilising dimensions of tactics normally associated with social progressive movements. These tactics may use social media and other forms of mass communication, high-profile ‘grass-roots looking’ demonstrations and so on, to create the impression that the minority (but highly visible) view reflects the silent majority. Some commentators have argued that various interested parties in Australia and the US have co-opted the tactics of social progressive movements and that the domain used as its vehicle has been climate change and carbon pricing policies (Wilkinson, 2011). This sort of ‘progressive’ or ‘radical’ conservatism, motivated by the desire to maintain positions of societal privilege, respond to or against particular events or issues that bear relation to state intervention. One of these issues, it seems, is climate change (Leiserowitz et al., 2011). If this is so, it once again highlights the importance of communicating the consensus that climate change is happening, and challenging media bias that presents denial as a pervasive sentiment in the community.

⁵⁵ Here I mean liberal with a small “l”, and not the centre-right Australian political party.

In sum, framing communication about climate change at multiple levels concurrently (individual, group, and system) may prime a host of competing needs and goals (individual, interpersonal, and social and cultural needs). Under such circumstances, I suggest it becomes much more difficult to build rationalisations and justifications to meet competing needs and goals at all levels simultaneously, and hence harder to negotiate the moral gateway via disengagement. Successful change campaigns may be contingent upon appealing to all categories of needs simultaneously. Such communication should use diverse messengers and media channels in order to combat shared false ideas in the community.

9.5 Methodological and Conceptual Reflections

There is a key limitation with the approach used in this thesis: the needs, goals, and functions are inferred, rather than directly tested. Arguably, by their implicit, automatic, and often unconscious nature, functions cannot be directly tested, but must always rely on inference from observed phenomena. Nevertheless, other methods to those used here (such as discursive analysis and case history studies) would go a long way to corroborating the inferences I have made.

Self-report instruments designed to capture motivated social cognition processes have a further limitation. There is evidence that directional decision-making occurs especially under time pressure and when hasty reasoning is involved (Kunda, 1990). Online survey instruments might be a good way to uncover directional processes if respondents are rushing through the survey. But respondents might also strive for cognitive consistency, slowly deliberating about each response and revising it carefully. Even when I attempted to control for this in the workshops by careful instruction, there was evidence that people still sometimes engaged in slow, deliberative thinking and revised their selections (perhaps for self-presentational purposes). Self-report is particularly problematic for pro-environmental behaviour. If we assume that people strive for consistency, not only in questionnaire responses, but between sets of values, or between sets of values and behaviours in order to maintain a consistent self-identity, then items that rely to some degree on a subjective interpretation are problematic. For example, do you switch lights off around the home whenever possible? Perhaps for people with strong environmental identities, the

behaviours that accord with occasions where this statement rings true are more readily accessible than are behaviours inconsistent with one's identity. It should be acknowledged that these hidden reasoning processes potentially account for some of the relationships I observed.

A further limitation of my studies again concerns pro-environmental behaviours. The behaviours I tested for were, primarily, climate change mitigation behaviours. But climate *adaptation* behaviours are arguably just as, if not more, relevant to society now. At present, adaptation behaviour is under-researched at the individual level, principally because these behaviours are so hard to define. This is where Health Belief Models, such as Protection Motivation Theory, arguably have the most to offer when considering the functions of climate change responses. Devising a good metric of adaptation behaviours, and empirically testing conceptual models such as a revised health belief model incorporating social and cultural influences (such as that proposed in Swim et al., 2011), seems particularly fertile ground for a functional analysis.

9.6 Research Directions

Many questions emerge from the current research. To what extent are the functions contained in Figure 44 universal, and to what extent are they contingent upon the specific socio-political Australian context? Within Australia, how enduring are the mechanisms employed to meet these goals and needs? And how translatable are these functions to other environmental domains, such as water conservation or agricultural practices?

Future research could attempt to trace individual pathways in the conceptual model using a variety of different approaches. Such research would ground-test components of the model, and subsequent findings would enable its revision and refinement. Using more intensive approaches, such as individual case studies, might reveal more about functions than correlational studies. For instance, what about those who buck the trend? The left-wing, equity-loving climate change denier? Are there particular processes going on for these people that would otherwise go unidentified?

While I have touched on how the potential functions of individual responses relate to social and cultural processes, I have said correspondingly little about small-group processes and dyadic relationships. Further targeted testing could examine how people react to small-group consensus on climate change, for example. How do people's privately held opinions differ from their publicly expressed sentiments in the face of normative group pressures? A functional analysis might also be upscaled to organised groups and other collectives. It seems valid to assume, for instance, that certain functions are entailed in a corporation's response to climate change (beyond naked greed).

One methodological tool that would test some of the present findings more formally is the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). Establishing which personal and authority referents are most important, for whom, and in what context, would help communicators frame messages more effectively, and decide *who* the messengers should be under which circumstances. Establishing how people self-categorise when presented with different climate change stimuli would be of similar benefit. Employing the IAT would also corroborate findings that some images, or stimuli, (such as natural disasters) are associated with high arousal, while other images (such as denuded landscapes) are associated with low levels of arousal. How these arousal patterns shape our subsequent attitudes, needs, and actions should also be considered, particularly in relation to approach / avoid behaviours.

In the current research I used a single index of pro-environmental behaviours, but there are advantages to testing the drivers of different subsets of behaviours, as they may well fulfil different needs and goals. For example, socially visible behaviours (such as public protesting) may fulfil self-presentational needs, while private behaviours might satisfy intra-individual goals. There are presumably different rationalisations and justifications associated with these different sub-sets of behaviours that strategies aimed at neutralising might benefit from understanding. Future research could also incorporate a more objective measure of behaviour, and compare it with responses to more subjective measures such as the one used here. In this way we might infer how self-identity and the desire for consistency can result in the selective accessing of memory. Finally, taking part in some pro-environmental behaviours might be able to excuse our bad behaviours in other areas. This sort of 'moral licensing' has recently been shown to operate vicariously at the group

level, whereby previous moral behaviour by in-group members excuses the subsequent immoral behaviour of an in-group individual (Kouchaki, 2011). Future research should pursue the interaction of good and bad behaviours, and how these interact at individual, group, and collective levels.

The apparent centrality of moral engagement in responses to climate change suggests that this mechanism in particular warrants further investigation. Such research could establish, for instance, whether direct moral appeals *accentuate* moral disengagement, and whether this is more likely when appeals are targeted to the individual than when made at a more general level. Whether any subsequent moral disengagement assuages threats to, or bolsters, self-image could also be measured. Inclusion of a third time-point in time-series data would enable causal pathways and trends to be established with greater certainty. A third time-point would also allow for another concept – moral *re-engagement* – to be investigated.

9.7 Conclusion

The list of functions, phenomena, and motivational forces tested here is by no means exhaustive, guided as the research was by a particular disciplinary approach and previous research in the climate change domain.⁵⁶ Doubtless I unwittingly engaged in my own motivated search of rules and beliefs when establishing what to include and what not to include (but hopefully not one intended to reach a pre-formed conclusion!). It is of course impossible to eliminate such unconscious biases from the research process, but more collaborative efforts at functional analyses might help to reduce them.

Irrespective of any shortcomings, hopefully I will have convinced you that denial and scepticism about the causes of climate change is but a small piece of the puzzle in understanding the range of possible ways we respond to climate change, and why. I would be even more satisfied if I have persuaded you of (or reaffirmed to you) the importance of understanding what needs and goals are fulfilled by responses to climate change. This is not to say that what drives denial and scepticism is unimportant. Indeed, the growing popularity of ‘qualified believers’ in Australia tells us a lot about the influences of culture,

⁵⁶ See Gifford et al. (2011) for an excellent summary of the range of potential psychological drivers of climate change responses.

politics, and groups, and by extension, about the inaction of believers. All of this, I believe, has relevance to the next big collective challenge: physically adapting to the impacts of climate change in a way that doesn't compromise us psychologically. I hope the work presented here will play some part in guiding research to help us meet that challenge.

References

- Abelson, R. P. (1983). Whatever became of Consistency Theory? *Personality and Social Psychology Bulletin*, *9*, 37–54. doi:10.1177/0146167283091006
- Adorno, T. W., Frenkel-Brunswik, E., Levinson, D. J., & Sanford, R. N. (1950). *The authoritarian personality*. Oxford: Harpers.
- Allison, S. T., Messick, D. T., & Goethals, G. (1989). On being better but not smarter than others: The Muhammad Ali effect. *Social Cognition*, *7*, 275–296. doi:10.1521/soco.1989.7.3.275
- Allport, F. (1937). Teleonomic description in the study of personality. *Journal of Personality*, *5*, 202–214. doi:10.1111/j.1467-6494.1937.tb02219.x
- Altemeyer, B. (2006). *The authoritarians*. Retrieved from <http://members.shaw.ca/jeanaltemeyer/drbob/TheAuthoritarians.pdf>
- Altemeyer, B. (1988). *Enemies of freedom: Understanding right-wing authoritarianism*. San Francisco: Jossey-Bass.
- Anderson, M. C., Ochsner, K. N., Kuhl, B., Cooper, J., Robertson, E., Gabrieli, S. W.,...Gabrieli J. D. E. (2004). Neural systems underlying the suppression of unwanted memories. *Science*, *303*(5655), 232–5. doi:10.1126/science.1089504
- Aquino, K., Reedii, A., Thau, S., & Freeman, D. (2007). A grotesque and dark beauty: How moral identity and mechanisms of moral disengagement influence cognitive and emotional reactions to war. *Journal of Experimental Social Psychology*, *43*, 385–392. doi:10.1016/j.jesp.2006.05.013
- Australian Government. (2011). *Clean energy future: An overview of the clean energy legislative package*. Retrieved from <http://www.cleanenergyfuture.gov.au>
- Bacon, W. (2011). *A sceptical climate: Media coverage of climate change in Australia. Part 1- Climate Change Policy* (Report No. 978-0-9870682-0-0). Sydney: The Australian Centre for Independent Journalism, University of Sydney.
- Baer, P., & Risbey, J. S. (2009). Uncertainty and assessment of the issues posed by urgent climate change. An editorial comment. *Climatic Change*, *92*, 31–36. doi:10.1007/s10584-008-9529-3
- Bandura, A. (1990). Selective activation and disengagement of moral control. *Journal of Social Issues*, *46*, 27–46. doi:10.1111/j.1540-4560.1990.tb00270.x
- Bandura, A. (1991). Social cognitive theory of moral thought and action. In W. M. Kurtines & L. Gewirtz (eds.), *Handbook of moral behavior and development* (Vol. 1, pp. 1–46). Hillsdale, NJ: Erlbaum.

- Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on Psychological Science, 1*, 164–179. Retrieved from <http://pps.sagepub.com/content/1/2/164.short>
- Bandura, A. (2007). Impeding ecological sustainability through selective moral disengagement. *International Journal of Innovation and Sustainable Development, 2*(1), 8. doi:10.1504/IJISD.2007.016056
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–82. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/3806354>
- Bates, B. C., & Hughes, G. (2009). Adaptation measures for metropolitan water supply for Perth, Western Australia. In F. Ludwig, K. Pavel, H. Schaik, & M. van der Walk (eds.), *Climate change adaptation in the water sector*. London: Earthscan/James & James.
- Becker, E. (1973). *The denial of death*. New York: Free Press.
- Bersoff, D. M. (1999). Why good people sometimes do bad things: Motivated reasoning and unethical behavior. *Personality and Social Psychology Bulletin, 25*, 28–39. doi:10.1177/0146167299025001003
- Botvin, G., Botvin, E., Baker, E., Dusenbury, L., & Goldberg, C. (1992). The false consensus effect: Predicting adolescents' tobacco use from normative expectations. *Psychological Reports, 70*, 171–178.
- Boykoff, M. T. (2007). From convergence to contention: United States mass media representations of anthropogenic climate change science. *Transactions of the Institute of British Geographers, 4*, 477–489. doi:10.1111/j.1475-5661.2007.00270.x
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 37–41.
- Bray, D. (2010). The scientific consensus of climate change revisited. *Environmental Science & Policy, 13*, 340–350. doi:10.1016/j.envsci.2010.04.001
- Budescu, D. V, Broomell, S., & Por, H.-H. (2009). Improving communication of uncertainty in the reports of the intergovernmental panel on climate change. *Psychological Science, 20*, 299–308. doi:10.1111/j.1467-9280.2009.02284.x
- Buys, L., Aird, R., Van Megen, K., Miller, E., & Sommerfeld, J. (2012). Perceptions of climate change and trust in information providers in rural Australia. *Public Understanding of Science*. Advance online publication. doi:10.1177/0963662512449948
- Byrne, S., & Hart, P. S. (2009). The “boomerang” effect: A synthesis of findings and a preliminary theoretical framework. In C. Beck (ed.), *Communication Yearbook 33* (pp. 3–38). NJ: Lawrence Erlbaum.
- Cabecinhas, R., Lazaro, A., & Carvalho, A. (2008). Media uses and social representations of climate change. In A. Carvalho (ed.), *Communicating climate change: Discourses*,

mediations and perceptions (pp. 170–189). Braga: Centro de Estudos de Comunicação e Sociedade, Universidade do Minho. Retrieved from http://lasics.uminho.pt/ojs/index.php/climate_change/article/view/421

- Carter, R. M. (2007). *The myth of dangerous human-caused climate change*. Paper presented at the AusIMM New Leaders' Conference Brisbane, Queensland.
- Chiang, S. Y. (2010). "Well, I'm a lot of things, but I'm sure not a bigot': Positive self-presentation in confrontational discourse on racism. *Discourse & Society*, 21, 273–294. doi:10.1177/0957926509360653
- Clary, E. G., Snyder, M., Ridge, R. D., Copeland, J., Stukas, A. A., Haugen, J., & Miene, P. (1998). Understanding and assessing the motivations of volunteers: A functional approach. *Journal of Personality and Social Psychology*, 74, 1516–30. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9654757>
- Cohen, S. (2001). *States of denial: Knowing about atrocities and suffering*. Cambridge: Polity Press.
- Cooper, J. (2012). Cognitive dissonance theory. In P. A. M. Van Lange, A. W. Kruglanski, & T. Higgins (eds.), *Handbook of theories of social psychology* (Vol. 1, pp 377-397). London: Sage.
- Cooper, J., & Fazio, R. H. (1984). A new look at dissonance theory. In L. Berkowitz (ed.), *Advances in experimental social psychology* (17th ed., pp. 441–445). New York: Academic Press.
- Corbett, J. B., & Durfee, J. L. (2004). Testing public (un)certainly of science: Media representations of global warming. *Science Communication*, 26(2), 129–151. doi:10.1177/1075547004270234
- Crandall, C. S., & Beasley, R. (2001). A perceptual theory of legitimacy: Politics, prejudice, social institutions and moral value. In J. T. Jost & B. Major (eds.), *The psychology of legitimacy*. Cambridge: Cambridge University Press.
- Crompton, T., & Kasser, T. (2009). *Meeting environmental challenges: The role of human identity*. (Report No. 978-1-900322-64-5). Surrey: WWF-UK.
- CSIRO. (2011). Climate Change: Science and Solutions for Australia. In H. Cleugh, M. Smith, & M. Battaglia (Eds.) *Atmospheric Research*. Collingwood: CSIRO Publishing.
- Davies, S., & Hossain, N. (1996). Livelihood adaptation, public action and civil society: A review of the literature (IDS Working Paper No. 57). Sussex: Institute of Development Studies.
- De la Haye, A. (2000). A methodological note about the measurement of the false-consensus effect. *European Journal of Social Psychology*, 30, 569–581. doi:0.1002/1099-0992(200007/08)30:4<569::AID-EJSP8>3.0.CO;2-V

- Della Fave, R. (1980). The meek shall not inherit the Earth: Self-evaluation and the legitimacy of stratification. *American Sociological Review*, *45*, 955–971. Retrieved from <http://asr.sagepub.com/>
- Dennett, D. (1991). *Consciousness explained*. New York: Little, Brown & Company.
- Detert, J. R., Treviño, L. K., & Sweitzer, V. L. (2008). Moral disengagement in ethical decision making: a study of antecedents and outcomes. *The Journal of Applied Psychology*, *93*, 374–91. doi:10.1037/0021-9010.93.2.374
- Deutsch, R., & Strack, F. (2010). Building blocks of social behavior: Reflective and impulsive processes. In B. Gawronski & B. K. Payne (eds.), *Handbook of implicit social cognition* (pp. 62–79). New York: Guilford.
- De Vaus, D.A. *Surveys in social research*. Sydney: Allen & Unwin.
- Devine-Wright, P. (2009). Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action. *Journal of Community & Applied Social Psychology*, *19*, 426-441. doi:10.1002/casp
- Dickinson, J. (2009). The people paradox: self-esteem striving, immortality ideologies, and human response to climate change. *Ecology and Society*, *14*, 34. Retrieved from <http://www.ecologyandsociety.org/vol14/iss1/art34/ES-2009-2849.pdf>
- Did you know Gillard and Abbott agree on climate change? (2012, June 8). *The Sydney Morning Herald*. Retrieved from <http://www.smh.com.au/opinion/editorial/did-you-know-gillard-and-abbott-agree-on-climate-change-20120707-21nsq.html>
- Dietz, T., Ostrom, E., & Stern, P. (2003). The struggle to govern the commons. *Science*, *302*(5652), 1907–12. doi:10.1126/science.1091015
- Doise, W., & Mapstone, E. (1986). *Levels of explanation in social psychology: European monographs in social psychology*. New York: Cambridge University Press.
- Doran, P., & Zimmerman, M. (2009). Examining the scientific consensus on climate change. *Eos, Transactions American Geophysical Union*, *90*(3), 22-23. doi:10.1029/2009EO030002
- Doyle, J. (2007). Picturing the clima(c)tic: Greenpeace and the representational politics of climate change communication. *Science as Culture*, *16*, 129–150. doi:10.1080/09505430701368938
- Duckitt, J., & Sibley, C. G. (2009). A dual-process motivational model of ideology, politics, and prejudice. *Psychological Inquiry*, *20*, 98–109. doi:10.1080/10478400903028540
- Dunning, D. (1999). A newer look: Motivated social cognition and the schematic of social concepts representation. *Psychological Inquiry*, *10*, 1–11.
- Eldaief, M. C., Deckersbach, T., Carlson, L. E., Beucke, J. C., & Dougherty, D. D. (2012). Emotional and cognitive stimuli differentially engage the default network during

- inductive reasoning. *Social Cognitive and Affective Neuroscience*, 7, 380-392.
doi:10.1093/scan/nsr003
- Evans, G., & Durant, J. (1995). The relationship between knowledge and attitudes in the public understanding of science in Britain. *Public Understanding of Science*, 4, 57–74.
doi:10.1088/0963-6625/4/1/004
- Fazio, R. H., Sanbonmatsu, D. M., Poweu, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality*, 50, 229–238.
- Feldman Barrett, L., & Russell, J. A. (1998). Independence and bipolarity in the structure of current affect. *Journal of Personality and Social Psychology*, 74, 967–984.
doi:10.1037//0022-3514.74.4.967
- Feldman Barrett, L., & Russell, J. A. (1999). The structure of current affect: Controversies and emerging consensus. *Current Directions in Psychological Science*, 8, 10–14.
doi:10.1111/1467-8721.00003
- Feinberg, M., & Willer, R. (2011). Apocalypse soon? Dire messages reduce belief in global warming by contradicting just-world beliefs. *Psychological Science*, 22, 34–8.
doi:10.1177/0956797610391911
- Ferguson, M. A., & Branscombe, N. R. (2010). Collective guilt mediates the effect of beliefs about global warming on willingness to engage in mitigation behavior. *Journal of Environmental Psychology*, 30, 135–142. doi:10.1016/j.jenvp.2009.11.010
- Feygina, I., Jost, J. T., & Goldsmith, R. E. (2010). System justification, the denial of global warming, and the possibility of “system-sanctioned change”. *Personality & Social Psychology Bulletin*, 36, 326–38. doi:10.1177/0146167209351435
- Fielding, K. S., & Head, B. W. (2012). Determinants of young Australians’ environmental actions: The role of responsibility attributions, locus of control, knowledge and attitudes. *Environmental Education Research*, 18, 171–186.
doi:10.1080/13504622.2011.592936
- Fischer, R., Hanke, K., & Sibley, C. G. (2012). Cultural and institutional determinants of Social Dominance Orientation: A cross-cultural meta-analysis of 27 societies. *Political Psychology*, 33, 437–467. doi:10.1111/j.1467-9221.2012.00884.x
- Frumkin, H., Hess, J., Luber, G., Malilay, J., & McGeehin, M. (2008). Climate change: the public health response. *American Journal of Public Health*, 98, 435–45.
doi:10.2105/AJPH.2007.119362
- Garnaut, R. (2008). *The Garnaut climate change review: Final report* (Report No. 9780521714447) Melbourne: Cambridge University Press.
- Gifford, R., Kormos, C., & McIntyre, A. (2011). Behavioral dimensions of climate change: Drivers, responses, barriers, and interventions. *Wiley Interdisciplinary Reviews: Climate Change*, 2, 801–827. doi:10.1002/wcc.143

- Gillard, J. (2011, March 24). Extreme views must not decide carbon tax. *Sydney Morning Herald*. Retrieved from <http://www.smh.com.au/opinion/politics/extreme-views-must-not-decide-carbon-tax-20110323-1c6ky.html>
- Glasson, B. (2011). Text, fantasy and the political: A two-track analysis of climate-change politics. *6th ECPR General Conference, University of Iceland, 25-27 August 2011*. Retrieved from <http://www.ecprnet.eu/MyECPR/proposals/reykjavik/uploads/papers/4028.pdf>
- Goldstein, N. J., Cialdini, R. B., & Griskevicius, V. (2008). A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research, 35*, 472–482. doi:10.1086/586910
- Granberg, D., Jefferson, N. L., Brent, E. E., & King, M. (1981). Membership group, reference group, and the attribution of attitudes to groups. *Journal of Personality and Social Psychology, 40*, 833–842. doi:10.1037//0022-3514.40.5.833
- Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The causes and consequences of a need for self-esteem: A terror management theory. In R. F. Baumeister (ed.), *Public self and private self*. New York: Springer-Verlag.
- Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., & Kirkland, S. (1990). Evidence for terror management theory II: The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality, 58*, 308–318. doi:10.1037/0022-3514.58.2.308
- Greenhill, M., Leviston, Z., Leonard, R., & Walker, I. (in press). Assessing climate change beliefs: Response effects of question wording and response alternatives. *Public Understanding of Science, 1–19*, Advance online publication, doi:10.1177/0963662513480117
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: the implicit association test. *Journal of Personality and Social Psychology, 74*, 1464–80. doi:10.1037/0022-3514.74.6.1464
- Gross, S. R., & Miller, N. (1997). The “golden section” and bias in perceptions of social consensus. *Personality and Social Psychology Review, 1*, 241–271. doi:10.1207/s15327957pspr0103_4
- Grothmann, T., & Patt, A. (2005). Adaptive capacity and human cognition: The process of individual adaptation to climate change. *Global Environmental Change, 15*, 199–213. doi:10.1016/j.gloenvcha.2005.01.002
- Guglielmo, S., Monroe, A.E., & Malle, B.F. (2009). At the heart of morality lies folk psychology. *Inquiry, 52*, 449-466. doi: 10.1080/00201740903302600
- Gunther, A. C., Christen, C. T., Liebhart, J. L., & Chih-tun Cha, S. (2001). Congenial public, contrary press, and biased estimates of the climate of opinion. *Public Opinion Quarterly, 65*, 295–320. doi:10.1086/322846

- Hamilton, C., & Kasser, T. (2009). Psychological adaptation to the threats and stresses of a four degree world. Paper presented at Four degrees and Beyond conference, Oxford University. Retrieved from <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Psychological+Adaptation+to+the+Threats+and+Stresses+of+a+Four+Degree+World#1>
- Hansen, J., Winzeler, S., & Topolinski, S. (2010). When the death makes you smoke: A terror management perspective on the effectiveness of cigarette on-pack warnings. *Journal of Experimental Social Psychology, 46*, 226–228. doi:10.1016/j.jesp.2009.09.007
- Harmon-Jones, E., Sigelman, J. D., Bohlig, A., & Harmon-Jones, C. (2003). Anger, coping, and frontal cortical activity: The effect of coping potential on anger-induced left frontal activity. *Cognition and Emotion, 17*, 1–24. doi:10.1080/02699930143000635
- Hart, P. S., & Nisbet, E. C. (2011). Boomerang effects in science communication: How motivated reasoning and identity cues amplify opinion polarization about climate mitigation policies. *Communication Research, 39*, 701–723. doi:10.1177/0093650211416646
- Heaven, P. C. L. (1984). Predicting authoritarian behaviour: Analysis of three measures. *Personality and Individual Differences, 5*, 251–253. doi:10.1016/0191-8869(84)90060-6
- Herek, G. M. (1987). Can functions be measured? A new perspective on the functional approach to attitudes. *Social Psychology Quarterly, 50*, 285–303. Retrieved from <http://www.jstor.org/stable/10.2307/2786814>
- Hine, D., & Gifford, R. (1991). Fear appeals, individual differences, and environmental concern. *The Journal of Environmental Education, 23*, 36–41. doi:10.1080/00958964.1991.9943068
- Hobson, K., & Niemeyer, S. (2012). “What sceptics believe”: The effects of information and deliberation on climate change scepticism. Public Understanding of Science. Advance online publication. doi:10.1177/0963662511430459
- Hogg, M. (2007). Uncertainty-Identity Theory. In M. P. Zanna (ed.) *Advances in Experimental Social Psychology*, (Vol. 39, pp. 69–126). New York: Academic Press.
- Howarth, N. A. A., & Foxall, A. (2010). The veil of Kyoto and the politics of greenhouse gas mitigation in Australia. *Political Geography, 29*, 167–176. doi:10.1016/j.polgeo.2010.03.001
- Huber, M., & Knutti, R. (2011). Anthropogenic and natural warming inferred from changes in Earth’s energy balance. *Nature Geoscience, 5*(1), 31–36. doi:10.1038/ngeo1327
- IPCC. (2007). *Climate change 2007: The physical science basis : contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press. Retrieved from <http://books.google.com/books?hl=en&lr=&id=8-m8nXB8GB4C&pgis=1>

- Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. London: Earthscan.
- Janz, N. K., & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly*, *11*, 1–47. doi:10.1177/109019818401100101
- Jessop, D. C., & Wade, J. (2008). Fear appeals and binge drinking: a terror management theory perspective. *British Journal of Health Psychology*, *13*, 773–88. doi:10.1348/135910707X272790
- Jost, J. T. (2006). The end of the end of ideology. *The American Psychologist*, *61*, 651–70. doi:10.1037/0003-066X.61.7.651
- Jost, J. T., & Banaji, M. (1994). The role of stereotyping in system-justification and the production of false consciousness. *British Journal of Social Psychology*, *1*, 1–27. doi:10.1111/j.2044-8309.1994.tb01008.x
- Jost, J. T., Banaji, M., & Nosek, B. A. (2004). A decade of System Justification Theory : Accumulated evidence of conscious and unconscious bolstering of the status quo. *Political Psychology*, *25*, 881–919. doi:10.1111/j.1467-9221.2004.00402.x
- Jost, J. T., Chaikalas-Petritsis, V., Abrams, D., Sidanius, J., Van der Toorn, J., & Bratt, C. (2012). Why men (and women) do and don't rebel: Effects of system justification on willingness to protest. *Personality & Social Psychology Bulletin*, *38*, 197–208. doi:10.1177/0146167211422544
- Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003). Political conservatism as motivated social cognition. *Psychological Bulletin*, *129*, 339–375. doi:10.1037/0033-2909.129.3.339
- Jost, J. T., & Hunyady, O. (2003). The psychology of system justification and the palliative function of ideology. *European Review of Social Psychology*, *13*, 37–41. doi:10.1080/10463280240000046
- Jost, J. T., & Hunyady, O. (2005). Antecedents and consequences of system-justifying ideologies. *Current Directions in Psychological Science*, *14*, 260–265. doi:10.1111/j.0963-7214.2005.00377.x
- Jost, J. T., Nosek, B. A., & Gosling, S. D. (2008). Ideology: Its resurgence in social, personality, and political psychology. *Perspectives on Psychological Science*, *3*, 126–136. doi:10.1111/j.1745-6916.2008.00070.x
- Jost, J. T., & Thompson, E. P. (2000). Group-based dominance and opposition to equality as independent predictors of self-esteem, ethnocentrism, and social policy attitudes among African Americans and European Americans. *Journal of Experimental Social Psychology*, *36*, 209–232. doi:10.1006/jesp.1999.1403

- Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*, *2*(6), 1–4. doi:10.1038/nclimate1547
- Kaiser, F. G., & Fuhrer, U. (2003). Ecological behavior's dependency on different forms of knowledge. *Applied Psychology*, *52*, 598–613. doi:10.1111/1464-0597.00153
- Kantola, S. J., Syme, G. J., & Campbell, N. a. (1984). Cognitive dissonance and energy conservation. *Journal of Applied Psychology*, *69*, 416–421. doi:10.1037/0021-9010.69.3.416
- Kasperson, R., Renn, O., Slovic, P., & Brown, H. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis*, *8*, 177–187. doi:10.1111/j.1539-6924.1988.tb01168.x
- Kasser, T., & Sheldon, K. M. (2000). Of wealth and death: Materialism, mortality salience, and consumption behavior. *Psychological Science*, *11*, 348–351. doi:10.1111/1467-9280.00269
- Katz, D. (1960). The functional approach to the study of attitudes. *Public Opinion Quarterly*, *24*, 163-204. doi:10.1086/266945
- Kay, A. C., Jimenez, M. C., & Jost, J. T. (2002). Sour grapes, sweet lemons, and the anticipatory rationalization of the status quo. *Personality and Social Psychology Bulletin*, *28*, 1300–1312. doi:10.1177/01461672022812014
- Keltner, D., & Haidt, J. (1999). Social functions of emotions at four levels of analysis. *Cognition & Emotion*, *13*, 505–522. doi:10.1080/026999399379168
- Kenny, D. A. (2005). Cross-lagged panel design. In B. S. Everitt & D. C. Howell (Eds.), *Encyclopedia of Statistics in Behavioral Science* (Vol. 1 pp. 450-451). Chichester: John Wiley & Sons.
- Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro- environmental behavior? *Environmental Education Research*, *8*, 239–260. doi:10.1080/1350462022014540
- Koltko-Rivera, M. E. (2004). The psychology of worldviews. *Review of General Psychology*, *8*, 3–58. doi:10.1037/1089-2680.8.1.3
- Koole, S. L., & Van den Berg, A. E. (2005). Lost in the wilderness: Terror management, action orientation, and nature evaluation. *Journal of Personality and Social Psychology*, *88*, 1014–28. doi:10.1037/0022-3514.88.6.1014
- Kouchaki, M. (2011). Vicarious moral licensing: the influence of others' past moral actions on moral behavior. *Journal of Personality and Social Psychology*, *101*, 702–15. doi:10.1037/a0024552
- Kruglanski, A. W. (1980). Lay epistemology – process and contents: Another look at Attribution Theory. *Psychological Review*, *87*, 70–87. doi:10.1037/0033-295X.87.1.70

- Kruglanski, A. W. (1999). Motivation, cognition, and reality: Three memos for the next generation of research. *Psychological Inquiry*, *10*, 54–58.
doi:10.1207/s15327965pli1001_8
- Kruglanski, A. W., & Ajzen, I. (1983). Bias and error in human judgment. *European Journal of Social Psychology*, *13*, 1–44. doi:10.1002/ejsp.2420130102
- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, *108*, 480–98.
doi:10.1037/0033-2909.108.3.480
- Kurz, T., Augoustinos, M., & Crabb, S. (2010). Contesting the “national interest” and maintaining “our lifestyle”: A discursive analysis of political rhetoric around climate change. *The British Journal of Social Psychology*, *49*, 601–25.
doi:10.1348/014466609X481173
- Lahsen, M. (2008). Experiences of modernity in the greenhouse: A cultural analysis of a physicist “trio” supporting the backlash against global warming. *Global Environmental Change*, *18*, 204–219. doi:10.1016/j.gloenvcha.2007.10.001
- Lee, J. J., & Cameron, T. A. (2008). Popular support for climate change mitigation: Evidence from a general population mail survey. *Environmental and Resource Economics*, *41*, 223–248. doi:10.1007/s10640-007-9189-1
- Leiserowitz, A. A. (2006). Climate change risk perception and policy preferences: The role of affect, imagery, and values. *Climatic Change*, *77*, 45–72. doi:10.1007/s10584-006-9059-9
- Leiserowitz, A. A., Maibach, E., & Roser-Renouf, C. (2010). *Climate change in the American mind: Americans’ global warming beliefs and attitudes in January 2010 on climate change*. New Haven CT: Yale Project on Climate Change. Retrieved from <http://e360.yale.edu/images/digest/AmericansGlobalWarmingBeliefs2010.pdf>
- Leiserowitz, A. A., Maibach, E., Roser-Renouf, C., & Hmielowski, J. D. (2011). *Politics & global warming: Democrats, republicans, independents, and the Tea Party*. New Haven, CT: Yale Project on Climate Change. doi:10.2307/3974458
- Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion*. New York: Plenum Press.
- Lertzman, R. (2010). Psychoanalysis, culture, society and our biotic relations: Introducing an ongoing theme on environment and sustainability. *Psychoanalysis, Culture & Society*, *15*, 113–116. doi:10.1057/pcs.2010.10
- Leviston, Z., Leitch, A., Greenhill, M., Leonard, R., & Walker, I. (2011). *Australians’ views of climate change*. Canberra: CSIRO. Retrieved from <http://www.garnautreview.org.au/update-2011/commissioned-work/australians-view-of-climate-change.htm>

- Leviston, Z., Price, J. C., & Bates, L. E. (2011). Key influences on the adoption of improved land management practice in rural Australia: The role of attitudes, values and situation. *Rural Society, 20*, 142–159. doi:10.5172/rsj.20.2.142
- Leviston, Z., & Walker, I. (2011). *Second annual survey of Australian attitudes to climate change: Interim report*. Perth: CSIRO. Retrieved from <http://www.csiro.au/en/Outcomes/Climate/Adapting/annual-climate-change-attitudes-survey-2011.aspx>
- Leviston, Z., & Walker, I. (2010). *Baseline survey of Australian attitudes to climate change: Preliminary report*. Perth: CSIRO. Retrieved from <http://www.csiro.au/files/files/p102a.pdf>
- Li, Y., Johnson, E. J., & Zaval, L. (2011). Local warming: daily temperature change influences belief in global warming. *Psychological Science, 22*, 454–9. doi:10.1177/0956797611400913
- Lorenzoni, I., Leiserowitz, A. A., & Doria, M. (2006). Cross-national comparisons of image associations with “global warming” and “climate change” among laypeople in the United States of America and Great Britain. *Journal of Risk Research, 9*, 265–281. doi:10.1080/13669870600613658
- Lowe, T. (2006). *Is this climate porn? How does climate change communication affect our perceptions and behaviour* (Working Paper 98). Norwich: Tyndall Center for Climate Change Research Working. Retrieved from <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Is+this+climate+porn+?+How+does+climate+change+communication+affect+our+perceptions+and+behaviour+?#0>
- Macneil, M. K., & Sherif, M. (1976). Norm change over subject generations as a function of arbitrariness of prescribed norms. *Journal of Personality and Social Psychology, 34*, 762–773. Retrieved from <http://www.apa.org/pubs/journals/psp/index.aspx>
- Maiteny, P. (2000). The psychodynamics of meaning and action for a sustainable future. *Futures, 32*, 339–360. doi:10.1016/S0016-3287(99)00101-9
- Manne, R. (2011). Bad news: Murdoch’s Australian and the shaping of the nation. *Quarterly Essay, 43*, 1–119. Retrieved from <http://www.quarterlyessay.com>
- Manzo, K. (2010). Beyond polar bears? Re-envisioning climate change. *Meteorological Applications, 17*, 196–208. doi:10.1002/met.193
- Marks, G., & Miller, N. (1987). Ten years of research on the false-consensus effect: An empirical and theoretical review. *Psychological Bulletin, 102*. doi:10.1037//0033-2909.102.1.72
- McCright, A. M., & Dunlap, R. E. (2011). Cool dudes: The denial of climate change among conservative white males in the United States. *Global Environmental Change, 21*, 1163–1172. doi:10.1016/j.gloenvcha.2011.06.003

- McCright, A. M., & Dunlap, R. E. (2011). The politicization of climate change and polarization in the American public's views of global warming, 2001-2010. *The Sociological Quarterly*, *52*, 155–194. doi: 10.1111/j.1533-8525.2011.01198.x
- McGuire, W. J., & McGuire, C. V. (1991). The content, structure, and operation of thought systems. In R. S. Wyer & T. K. Srull (eds.), *Advances in social cognition* (4th ed., pp. 1–78). Hillsdale, NJ: Lawrence Erlbaum.
- Meijnders, A. L., Midden, C. J., & Wilke, H. A. (2001). Role of negative emotion in communication about CO2 risks. *Risk Analysis*, *21*, 955–66. doi:10.1111/0272-4332.215164
- Merton, R. K. (1957). *Social theory and social structure*. New York: Free Press.
- Moloney, G., Leviston, Z., Lynam, T., Price, J., Stone-Jovicitch, S., & Blair, D. (2013). *Using social representations theory to make sense of climate change: Crossing the great divide. What scientists and non-scientists in Australia think*. Manuscript submitted for publication.
- Monin, B., & Norton, M. I. (2003). Perceptions of a fluid consensus: Uniqueness bias, false consensus, false polarization, and pluralistic ignorance in a water conservation crisis. *Personality & Social Psychology Bulletin*, *29*, 559–567. doi:10.1177/0146167203251523
- Monin, B., Sawyer, P. J., & Marquez, M. J. (2008). The rejection of moral rebels: resenting those who do the right thing. *Journal of Personality and Social Psychology*, *95*, 76–93. doi:10.1037/0022-3514.95.1.76
- Moore, C. (2007). Moral disengagement in processes of organizational corruption. *Journal of Business Ethics*, *80*, 129–139. doi:10.1007/s10551-007-9447-8
- Morrison, K. R., & Matthes, J. (2011). Socially motivated projection: Need to belong increases perceived opinion consensus on important issues. *European Journal of Social Psychology*, *41*, 707–719. doi:10.1002/ejsp.797
- Moscovici, S. (1988). Notes towards a description of social representations. *European Journal of Social Psychology*, *18*, 211–250. doi:10.1002/ejsp.2420180303
- Mullen, B. (1985). The false consensus effect: A meta-analysis of 115 hypothesis tests. *Journal of Experimental Social Psychology*, *21*, 262–283. doi:10.1016/0022-1031(85)90020-4
- Mutz, D. C. (2006). *How the mass media divide us*. (Report No. 978-0-8157-6082-5). Washington D.C.: Brookings Institution Press. Retrieved from http://repository.upenn.edu/asc_papers/126/
- Navarrete, C. D., Kurzban, R., Fessler, D. M. T., & Kirkpatrick, L. A. (2004). Anxiety and intergroup bias: Terror management or coalitional psychology? *Group Processes & Intergroup Relations*, *7*, 370–397. doi:10.1177/1368430204046144

- Newton, N. C., Havard, A., & Teesson, M. (2012). The association between moral disengagement, psychological distress, resistive self-regulatory efficacy and alcohol and cannabis use among adolescents in Sydney, Australia. *Addiction Research & Theory, 20*. doi:10.3109/16066359.2011.614976
- Nicholls, N. (2005). Climate and culture connections in Australia. *Australian Meteorological Magazine, 54*, 309–319. Retrieved from <http://www.bom.gov.au/amm/>
- Niemeyer, S., Petts, J., & Hobson, K. (2005). Rapid climate change and society: assessing responses and thresholds. *Risk Analysis, 25*, 1443–56. doi:10.1111/j.1539-6924.2005.00691.x
- Noelle-Nuemann, E. (1993). *The spiral of silence* (2nd ed.). Chicago: University of Chicago Press.
- Norgaard, K. (2006). “People want to protect themselves a little bit”: Emotions, denial, and social movement nonparticipation. *Sociological Inquiry, 76*, 295–429. doi:10.1111/j.1475-682X.2006.00160.x
- Norgaard, K. (2011). *Living in denial: Climate change, emotions, and everyday life*. Cambridge: The MIT Press.
- Opatow, S., & Weiss, L. (2000). New ways of thinking about environmentalism: Denial and the process of moral exclusion in environmental conflict, *Journal of Social Issues, 56*, 475–490. doi:10.1111/0022-4537.00179
- Oreskes, N. (2004). The scientific consensus on climate change. *Science, 306*(5702), 1686. doi:10.1126/science.1103618
- Oreskes, N., & Conway, E. M. (2010). Defeating the merchants of doubt. *Nature, 465*(7299), 686–7. doi:10.1038/465686a
- O’Gorman, H. J. (1986). The discovery of pluralistic ignorance: An ironic lesson. *Journal of the History of the Behavioral Sciences, 22*, 333–347. doi:10.1002/1520-6696(198610)22:4<333::AID-JHBS2300220405>3.0.CO;2-X
- O’Neill, S. J., & Hulme, M. (2009). An iconic approach for representing climate change. *Global Environmental Change, 19*(4), 402–410. doi:10.1016/j.gloenvcha.2009.07.004
- O’Neill, S., & Nicholson-Cole, S. (2009). “Fear won’t do it”: Promoting positive engagement with climate change through visual and iconic representations. *Science Communication, 30*, 355–379. doi:10.1177/1075547008329201
- Paciello, M., Fida, R., Tramontano, C., Lupinetti, C., & Caprara, G. V. (2008). Stability and change of moral disengagement and its impact on aggression and violence in late adolescence. *Child Development, 79*, 1288–309. doi:10.1111/j.1467-8624.2008.01189.x
- Pareto, V. (1963). *The mind and society: A treatise on general sociology*. New York: Dover.

- Parnell, R. (2005). Informing the development of domestic energy efficiency initiatives: An everyday householder-centered framework. *Environment and Behavior, 37*, 787–807. doi:10.1177/0013916504274008
- Paulhus, D. L., & Levitt, K. (1987). Desirable responding triggered by affect: Automatic egotism? *Journal of Personality and Social Psychology, 52*, 245–259. doi:10.1037/0022-3514.52.2.245
- Perloff, L. S., & Fetzer, B. K. (1986). Self-other judgments and perceived vulnerability to victimization. *Journal of Personality and Social Psychology, 50*, 502–510. doi:10.1037/0022-3514.50.3.502
- Phillips, S. (2012, August 15). Climate sceptics shifting their views. *Australian Broadcasting Corporation*. Retrieved from <http://www.abc.net.au/environment/articles/2012/08/15/3568554.htm>
- Plimer, I. (2009). *Heaven and earth: Global warming: the missing science*. London: Quartet Books.
- Polman, E., & Ruttan, R. L. (2012). Effects of anger, guilt, and envy on moral hypocrisy. *Personality & Social Psychology Bulletin, 38*, 129-139. doi:10.1177/0146167211422365
- Poortinga, W., Spence, A., Whitmarsh, L., Capstick, S., & Pidgeon, N. F. (2011). Uncertain climate: An investigation into public scepticism about anthropogenic climate change. *Global Environmental Change, 21*, 1015–1024. doi:10.1016/j.gloenvcha.2011.03.001
- Potter, J., & Wetherell, M. (1987). *Discourse and social psychology: Beyond attitudes and behaviour*. London: Sage.
- Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology, 67*(4), 741. American Psychological Association. doi:10.1037/0022-3514.67.4.741
- Prehn, K., & Heekeren, H. R. (2009). Moral judgment and the brain: A functional approach to the question of emotion and cognition in moral judgment integrating psychology, neuroscience and evolutionary biology. In J. Verplaetse, J. Schrijver, S. Vanneste, & J. Braeckman (Eds.), *The Moral Brain* (pp. 129–154). Netherlands: Springer.
- Prentice, D., & Miller, D. (1996). Pluralistic ignorance and the perpetuation of social norms by unwitting actors. *Advances in Experimental Social Psychology, 28*, 161–209. doi:10.1016/S0065-2601(08)60238-5
- Preston, B., & Stafford-Smith, M. (2009). *Framing vulnerability and adaptive capacity assessment: Discussion paper* (CSIRO Climate Adaptation Flagship Working paper No. 2). Canberra: CSIRO. Retrieved from <http://www.csiro.edu.au/files/files/ppgt.pdf>

- Randall, R. (2009). Loss and climate change: The cost of parallel narratives. *Ecopsychology*, 1, 118–129. doi:10.1089/eco.2009.0034
- Real World Libertarian. (2009, December 10). Kevin Rudd, climate change hypocrite [Web log post]. Retrieved from <http://jimunro.blogspot.com.au/2009/12/kevin-rudd-climate-change-hypocrite.html>
- Redlawsk, D. P. (2002). Hot cognition or cool consideration? Testing the effects of motivated reasoning on political decision making. *The Journal of Politics*, 64, 1021–1044.
- Reser, J. P., Bradley, G., Glendon, I., Ellul, M., & Callaghan, R. (2012). *Public risk perceptions, understandings and responses to climate change in Australia and Great Britain: Final report*. (NCCARF Publication No. 17/12). Gold Coast: National Climate Change Adaptation Research Facility. Retrieved from [http://observgo.quebec.ca/observgo/fichiers/17943_18-04-2011-2_30pm\(1\).pdf](http://observgo.quebec.ca/observgo/fichiers/17943_18-04-2011-2_30pm(1).pdf)
- Riley, E. (2011, July 13). How the carbon tax made me a Liberal. *The Drum, ABC*. Retrieved from <http://www.abc.net.au/unleashed/2792066.html>
- Robin, C. (2011). *The reactionary mind: Conservatism from Edmund Burke to Sarah Palin*. Oxford: Oxford University Press.
- Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. T. Cacioppo & R. E. Petty (Eds.), *Social psychophysiology: A source book* (pp. 153–76). New York: Guilford Press.
- Rokeach, M. (1973). *The nature of human values*. New York: John Wiley.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. New Jersey: Princeton University Press.
- Roser-Renouf, C., & Nisbet, M. (2008). The measurement of key behavioral science constructs in climate change research. *International Journal of Sustainability*, 3, 37–95. doi:10.1.1.169.8008
- Ross, L., Greene, D., & House, P. (1977). The “False Consensus Effect”: An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology*, 13, 279–301. doi:10.1016/0022-1031(77)90049-X
- Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39, 1161–1178.
- Sanders, G. S., & Mullen, B. (1983). Accuracy in perceptions of consensus: Differential tendencies of people with majority and minority positions. *European Journal of Personality*, 13, 57–70. doi:10.1002/ejsp.2420130104
- Scher, S. J., & Cooper, J. (1989). Motivational basis of dissonance: The singular role of behavioral consequences. *Journal of Personality and Social Psychology*, 56, 899–906. doi:10.1037/0022-3514.56.6.899

- Schweizer, P. (2006, July 12). Gore isn't quite as green as he's led the world to believe. *USA Today*. Retrieved from http://www.usatoday.com/news/opinion/editorials/2006-08-09-gore-green_x.htm
- Scruggs, L., & Benegal, S. (2012). Declining public concern about climate change: Can we blame the great recession? *Global Environmental Change*, *22*, 505-515. doi:10.1016/j.gloenvcha.2012.01.002
- Seabright, M. A. (2010). The role of the affect heuristic in moral reactions to climate change. *Journal of Global Ethics*, *6*, 5–15. doi:10.1080/17449621003701410
- Shamir, J., & Shamir, M. (1997). Pluralistic ignorance across issues and over time: Information cues and biases. *Public Opinion Quarterly*, *61*, 227–260. doi:10.2307/2749551
- Shavitt, S. (1989). Operationalizing functional theory of attitude. In A. R. Pratkanis, S. J. Breckler, & A. G. Greenwald (Eds.), *Attitude structure and function*. Hillsdale, NJ: Lawrence Erlbaum.
- Sheeran, P. (2002). Intention — behavior relations: A conceptual and empirical review. *European Review of Social Psychology*, *12*, 1–36. doi:10.1080/14792772143000003
- Shepherd, S., & Kay, A. C. (2012). On the perpetuation of ignorance: System dependence, system justification, and the motivated avoidance of sociopolitical information. *Journal of Personality and Social Psychology*, *102*, 264-280. doi:10.1037/a0026272
- Sidanius, J., & Pratto, F. (1999). *Social dominance*. Cambridge: Cambridge University Press.
- Sidanius, J., & Pratto, F. (2012). Social dominance theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology*. (Vol.2. pp. 418–438). Los Angeles: Sage.
- Sinatra, G. M., Kardash, C. M., Taasobshirazi, G., & Lombardi, D. (2011). Promoting attitude change and expressed willingness to take action toward climate change in college students. *Instructional Science*, *40*, 1–17. doi:10.1007/s11251-011-9166-5
- Smith, M., Bruner, J., & White, R. (1956). *Opinions and personality*. New York: Wiley.
- Smith, T. F., Thomsen, D. C., & Keys, N. (2011). The Australian experience. In J. D. Ford & L. Berrang-Ford (Eds.), *Climate change in developed nations* (Vol. 42). Dordrecht: Springer Netherlands. doi:10.1007/978-94-007-0567-8
- Snyder, M. (1993). Basic research and practical problems: The promise of a “functional” personality and social psychology. *Personality and Social Psychology Bulletin*, *19*, 251–264. doi:10.1177/0146167293193001
- Solomon, S., Greenberg, J., & Pyszczynski, T. (1991). A terror management theory of social behavior: The psychological functions of self-esteem and cultural worldviews. In M. Zanna (Ed.) *Advances in Experimental Social Psychology*, (Vol. 24. pp. 93–159). San Diego: Academic Press.

- Spence, A., & Pidgeon, N. (2010). Framing and communicating climate change: The effects of distance and outcome frame manipulations. *Global Environmental Change, 20*, 656–667. doi:10.1016/j.gloenvcha.2010.07.002
- Spencer, R. W. (2010). *The great global warming blunder: How mother nature fooled the world's top climate scientists*. New York: Encounter Books.
- Stamm, K. R., Clark, F., & Eblacas, P. R. (2009). Mass communication and public understanding of environmental problems: The case of global warming. *Public Understanding of Science, 9*, 219–237. doi:10.1088/0963-6625/9/3/302
- Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (21st ed., pp. 261–302). New York: Academic Press.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*(3), 309–317. Elsevier Ltd. doi:10.1016/j.jenvp.2008.10.004
- Stenner, K. (2009). Three kinds of “conservatism”. *Psychological Inquiry, 20*, 142–159. doi:10.1080/10478400903028615
- Sterman, J. D., & Sweeney, L. B. (2007). Understanding public complacency about climate change: Adults’ mental models of climate change violate conservation of matter. *Climatic Change, 80*, 213–238. doi:10.1007/s10584-006-9107-5
- Stern, P. (1992). Psychological dimensions of global environmental change. *Global Environmental Change, 43*, 269–302. doi:10.1146/annurev.ps.43.020192.001413
- Stern, P. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*, 407–424. doi:10.1111/0022-4537.00175
- Stern, P., Dietz, T., & Abel, T. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human ecology, 6*(2), 81–97. Retrieved from <http://www.humanecologyreview.org>
- Stern, P., Kalof, L., & Dietz, T. (1995). Values, beliefs, and proenvironmental action: Attitude formation toward emergent attitude objects. *Journal of Applied Social Psychology, 25*, 1611–1636. doi:10.1111/j.1559-1816.1995.tb02636.x
- Stone, J., & Cooper, J. (2001). A self-standards model of cognitive dissonance. *Journal of Experimental Social Psychology, 37*, 228–243. doi:10.1006/jesp.2000.1446
- Stukas, A. A., Worth, K. A., Clary, E. G., & Snyder, M. (2007). The matching of motivations to affordances in the volunteer environment: An index for assessing the impact of multiple matches on volunteer outcomes. *Nonprofit and Voluntary Sector Quarterly, 38*, 5–28. doi:10.1177/0899764008314810
- Sullivan, D., Landau, M.J., & Rothschild, Z.K. (2010). An existential function of enemyship: Evidence that people attribute influence to personal and political enemies to

- compensate for threats to control. *Journal of Personality and Social Psychology*, *98*, 434-449. doi: 10.1037/a0017457
- Suls, J., Wan, C. K., & Sanders, G. S. (1988). False consensus and false uniqueness in estimating the prevalence of health-protective behaviors. *Journal of Applied Social Psychology*, *18*, 66–79. doi:10.1111/j.1559-1816.1988.tb00006.x
- Suri, K., & Lofgren, H. (2010). Uncertain verdict: the 2010 federal election in Australia. *Economic and Political Weekly*, *45*, 26–31. Retrieved from <http://www.deakin.edu.au/dro/view/DU:30032283>
- Swim, J. K., Clayton, S., Doherty, T. J., Gifford, R., Howard, G., Reser, J. P., Stern, P., et al. (2009). Psychology and global climate change: Addressing a multi-faceted phenomenon and set of challenges. *American Psychological Association, Washington* (pp. 1–230). Retrieved from <http://www.apa.org/science/about/publications/climate-change.pdf>
- Swim, J. K., Stern, P., Doherty, T. J., Clayton, S., Reser, J. P., Weber, E. U., Gifford, R., et al. (2011). Psychology's contributions to understanding and addressing global climate change. *The American Psychologist*, *66*, 241–50. doi:10.1037/a0023220
- Szalay, L. B. (1978). *Subjective meaning and culture: An assessment through word associations*. Hillsdale, NJ: Lawrence Erlbaum.
- Tajfel, H., & Turner, J. (1986). The social identity theory of intergroup relations. In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relations* (pp. 7–24). Monterey, CA: Brooks/Cole.
- Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, *103*, 193–210. doi:10.1037/0033-2909.103.2.193
- Tetlock, P. E. (1981). The influence of self-presentation goals on attributional reports. *Social Psychology Quarterly*, *44*, 300–311. Retrieved from <http://www.jstor.org/stable/3033899>
- Tetlock, P. E., & Kim, J. I. (1987). Accountability and judgment processes in a personality prediction task. *Journal of Personality and Social Psychology*, *52*, 700–9. doi:10.1037/0022-3514.52.4.700
- The incredible shrinking man. (2010, April 29). *Herald Sun*. Retrieved from <http://www.heraldsun.com.au/opinion/the-incredible-shrinking-man/story-e6frfhqo-1225859609639>
- Thøgersen, J. (2004). A cognitive dissonance interpretation of consistencies and inconsistencies in environmentally responsible behavior. *Journal of Environmental Psychology*, *24*, 93–103. doi:10.1016/S0272-4944(03)00039-2

- Thøgersen, J., & Crompton, T. (2009). Simple and painless? The limitations of spillover in environmental campaigning. *Journal of Consumer Policy*, *32*, 141–163. doi:10.1007/s10603-009-9101-1
- Thompson, M., Ellis, R., & Wildavsky, A. (1990). *Cultural theory*. Oxford: Westview Press.
- Tranter, B. (2011). Political divisions over climate change and environmental issues in Australia. *Environmental Politics*, *20*, 78–96. doi:10.1080/09644016.2011.538167
- Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological Review*, *110*, 403–421. doi:10.1037/0033-295X.110.3.403
- Turner, J., Hogg, M., Oakes, P., Reicher, S., & Wetherell, M. (1987). *Rediscovering the social group: A self-categorization theory*. Cambridge, MA: Basil Blackwell.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, *5*, 207–232. doi:10.1016/0010-0285(73)90033-9
- Uhlmann, C. (Reporter). (2010, April 27). ETS postponed by Rudd Government (Episode). In S. Neighbour (Executive Producer), *7:30 Report*. Canberra: Australian Broadcasting Corporation. Retrieved from <http://www.abc.net.au/7.30/content/2010/s2884108.htm>
- Uzzell, D. (2008). Challenging assumptions in the psychology of climate change. *In Psych: The Bulletin of the Australian Psychological Society*, *30*, 10–13. Retrieved from <http://www.globaldialoguefoundation.org/files/63.pdf>
- Valdesolo, P., & DeSteno, D. (2007). Moral hypocrisy: Social groups and the flexibility of virtue. *Psychological Science*, *18*, 689–90. doi:10.1111/j.1467-9280.2007.01961.x
- Van Dijk, E., Van Kleef, G. a, Steinel, W., & Van Beest, I. (2008). A social functional approach to emotions in bargaining: when communicating anger pays and when it backfires. *Journal of Personality and Social Psychology*, *94*, 600–14. doi:10.1037/0022-3514.94.4.600
- Verweij, M., Douglas, M., Ellis, R., Engel, C., Hendriks, F., Lohmann, S., Ney, S., et al. (2006). Clumsy solutions for a complex world: The case of climate change. *Public Administration*, *84*, 817–843. doi:10.1111/j.1540-8159.2005.09566.x-i1
- Vess, M., & Arndt, J. (2008). The nature of death and the death of nature: The impact of mortality salience on environmental concern. *Journal of Research in Personality*, *42*, 1376–1380. doi:10.1016/j.jrp.2008.04.007
- Viscusi, W. K., & Zeckhauser, R. J. (2006). The perception and valuation of the risks of climate change: A rational and behavioral blend. *Climatic Change*, *77*, 151–177. doi:10.1007/s10584-006-9075-9
- Wake up 2 the lies. (2012). Green hypocrisy: Climategate’s Prof Phil Jones flew 20,000 miles to lecture about global warming [Web log post]. Retrieved May 31, 2012, from

<http://www.wakeup2thelies.com/2012/02/06/green-hypocrisy-climategates-prof-phil-jones-flew-20000-miles-to-lecture-about-global-warming/>

- Wakslak, C. J., Jost, J. T., Tyler, T. R., & Chen, E. S. (2007). Moral outrage mediates the dampening effect of system justification on support for redistributive social policies. *Psychological Science, 18*, 267–74. doi:10.1111/j.1467-9280.2007.01887.x
- Watt, S. E., & Larkin, C. (2010). Prejudiced people perceive more community support for their views: The role of own, media, and peer attitudes in perceived consensus. *Journal of Applied Social Psychology, 40*, 710–731. doi:10.1111/j.1559-1816.2010.00594.x
- Weber, E. U. (2006). Experience-based and description-based perceptions of long-term risk: Why global warming does not scare us (yet). *Climatic Change, 77*, 103–120. doi:10.1007/s10584-006-9060-3
- Westen, D., Blagov, P. S., Harenski, K., Kilts, C., & Hamann, S. (2006). Neural bases of motivated reasoning: An fMRI study of emotional constraints on partisan political judgment in the 2004 U.S. Presidential election. *Journal of Cognitive Neuroscience, 18*, 1947–58. doi:10.1162/jocn.2006.18.11.1947
- Whitmarsh, L. (2009). Behavioural responses to climate change: Asymmetry of intentions and impacts. *Journal of Environmental Psychology, 29*, 13–23. doi:10.1016/j.jenvp.2008.05.003
- Whitmarsh, L. (2011). Scepticism and uncertainty about climate change: Dimensions, determinants and change over time. *Global Environmental Change, 21*, 690–700. doi:10.1016/j.gloenvcha.2011.01.016
- Wilkinson, M. (Reporter). (2011). The carbon war [Episode]. In D. Masters (Producer), *Four Corners*. Canberra: Australian Broadcasting Corporation.
- Wojcieszak, M. E. (2011). Computer-mediated false consensus: Radical online groups, social networks and news media. *Mass Communication and Society, 14*, 527-546. doi:10.1080/15205436.2010.513795
- Wojcieszak, M. E., & Price, V. (2009). What underlies the false consensus effect? How personal opinion and disagreement affect perception of public opinion. *International Journal of Public Opinion Research, 21*, 25–46. doi:10.1093/ijpor/edp001
- Ybarra, O., Chan, E., & Park, D. (2001). Young and old adults' concerns about morality and competence. *Motivation and Emotion, 25*, 85-100. doi:10.1023/A:1010633908298
- Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist, 35*, 151–175.
- Zia, a., & Todd, a. M. (2010). Evaluating the effects of ideology on public understanding of climate change science: How to improve communication across ideological divides? *Public Understanding of Science, 19*, 743–761. doi:10.1177/0963662509357871

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APPENDIX A: SUMMARY OF SURVEY MEASURES

Table 45. List of survey measures used and the data chapters in which they appear

Measure	Measure type/description	Ch4	Ch5	Ch6	Ch7	Ch8
Respondent demographics	Categorical measures of age, gender, individual income, and location	X			X	X
Belief in climate change	One dichotomous item	X				
Opinion-type about climate change	One item with four response categories	X	X	X	X	X
Pro-environmental behaviour	Aggregated scale of 16 behaviour items (alpha = .84)	X	X	X		
Self-referent attitudes	Ten separate attitudinal items	X				
Social attitudes	Eight separate Likert scale items	X				
Emotional responses	Twelve separate descriptor items	X	X	X		
Negative arousal	Scale of four emotion items (alpha = .80)	X			X	
Positive arousal	Scale of three emotion items (alpha = .76)	X				
Depressed	Scale of four emotion items (alpha = .66)	X				
Annoyed	Scale of four emotion items (alpha = .71)	X	X			
Political preference	Voting behaviour in last federal election	X				
Self descriptions	Sixteen separate descriptor items guiding views on climate change	X				
Ratings of responsibility for causing climate change	Separate Likert scale items for responsibility accorded to 7 groups and to individuals		X			
Ratings of responsibility for responding to climate change	Separate Likert scale items for responsibility accorded to 7 groups and to individuals		X	X		
Disparity in responsibility ratings	Aggregated and averaged group responsibility scores subtracted from individual responsibility scores		X			

Measure	Measure type/description	Ch4	Ch5	Ch6	Ch7	Ch8
Moral (Dis)engagement	Scale of two Likert scale items (alpha = .77)		X	X	X	
Individual Efficacy	Scale of two Likert scale items (alpha = .74)		X	X		
Negative Social Attitudes	Three separate Likert scale items		X			
Certainty in Anthropogenic Climate Change	Sliding 1-100 scale		X		X	
Changes in Opinion-Type	Changes over time in individual responses to categorical Opinion item		X	X		
False consensus in opinion	Estimated community consensus with the respondent's own opinion-type			X		
Trust in friends and family	Trust in friends and family and four other information groups on a 5-point scale			X		
Economic System Justification	Scale of 17 items (alpha = .77)				X	
Right-Wing Authoritarianism	Scale of six items (alpha = .74)				X	
Social Dominance Orientation	Scale of eight items (alpha = .87)				X	
Policy Support	Two (split-sample design) separate Likert scale items				X	
Voting Intentions	Intended voting behaviour in next federal election				X	
Household and Personal Income	Personal income level per week; household income per year				X	
Moral Justifications and Legitimising Myths	Four separate negatively worded Social Attitude Likert scale items; Three separate worded Social Attitude Likert scale items				X	
Associations	Word-elicitation task recording up to three image and person association responses					X
Affective Evaluations	Bipolar scale measuring the affective valuations of each association					X

APPENDIX B: T1 AND T2 NATIONAL SURVEYS



Thank you for agreeing to take part in this 30 minute survey. This research is being conducted on behalf of the CSIRO.

We want to understand the thoughts and opinions of people from all over Australia about climate change. The information will be used to monitor how Australians' views about climate change may alter over time.

Participation in this survey is voluntary and you are free to withdraw at any time without penalty. Your responses and personal information will be kept confidential. You are free to stop the survey at any time, and you may choose not to answer some questions. Should you choose to stop the survey, the information you have given us will be discarded. If you have any questions, concerns or complaints about this survey, please contact project officer Ms. Zoe Leviston on (08) 9333 6169 or the CSIRO Ethics Officer at csshrec@csiro.au. This study has received ethical approval from the CSIRO Human Research Ethics Committee.

We hope you enjoy taking part in our survey.

Sincerely,
The Research Team



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Q6. Which of the following objects or statements do you have a positive or negative feeling towards?

	1 Very negative	2	3	4	5	6	7 Very positive
Some groups of people are simply inferior to others	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's OK if some groups have more of a life chance than others	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To get ahead in life, it is sometimes necessary to step on other groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inferior groups should stay in their place	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Group equality should be our ideal	<input type="radio"/>	<input type="radio"/>					
We should do what we can to equalise conditions for different groups	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>				
Increased social equality	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We would have fewer problems if we treated people more equally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>



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Figure 47. Examples of what on-line participants saw on their computer screens.

Complete question-list from T1 National survey (undertaken in July-August 2010)

Introduction

*Dear participant,
Thank you for agreeing to take part in this 30-minute survey.*

This research is being conducted on behalf of the CSIRO. We want to understand the thoughts and opinions of people from all over Australia about climate change. The information will be used to monitor how Australian's views about climate change change over time.

Participation in this survey is voluntary and you are free to withdraw at any time without penalty. Your responses and personal information will be kept confidential. You are free to stop the survey at any time, and you may choose not to answer some questions. Should you choose to stop the survey, the information you have given us will be discarded. If you have any questions, concerns or complaints about the survey, please contact project officer Ms. Zoe Leviston on (08) 9333 6169 or the CSIRO Ethics Officer, Cathy Pitkin, on (07) 3214 2905. This study has received ethical approval from the CSIRO Human Research Ethics Committee.

We hope you enjoy taking part in our survey

*Sincerely,
The Research Team*

Do you consent to take part in this survey? YES NO

We would like to start by asking you a series of questions about some of the other things you think about when you think about climate change

[FOR QUESTION 1: SPLIT SAMPLE. 50% respondents answer Q1a; 50% respondents answer Q1b – Pair with Q2a and Q2b]

1.

A. What are the first three words that come to mind when you think of climate change?

B. What are the first three images that come to mind when you think of climate change?

2.

A. Using the following scale, how would you rate each of the three words

-5	-4	-3	-2	-1	0	1	2	3	4	+5
Very Negative					Neutral					Very Positive

First word _____

Second word _____

Third word _____

B. Using the following scale, how would you rate each of the three images

-5	-4	-3	-2	-1	0	1	2	3	4	+5
Very Negative					Neutral					Very Positive

First image _____

Second image _____

Third image _____

3. Which three people do you think of first when you think of climate change?

4. Using the following scale, how would you rate each of these people in relation to climate change?

-5	-4	-3	-2	-1	0	1	2	3	4	+5
Very Negative					Neutral					Very Positive

First person _____

Second person _____

Third person _____

We would now like to ask you some general questions about what you think about climate change. Don't spend too long answering each question; just go with your initial thoughts.

5. Do you think that climate change is happening?

- Yes
- No

[FOR QUESTION 6: SPLIT SAMPLE. 50% respondents answer Q6a; 50% respondents answer Q6b]

6.

a. How sure are you that climate change is happening? *Tick one box only*

- Extremely sure
- Very sure
- Somewhat sure
- Not at all sure

b. How sure are you that global warming is happening? *Tick one box only*

- Extremely sure
- Very sure
- Somewhat sure
- Not at all sure

7. Given what you know, which of the following statements best describes your thoughts about climate change? *Tick one box only*

- I don't think that climate change is happening
- I have no idea whether climate change is happening or not
- I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures
- I think that climate change is happening, and I think that humans are largely causing it

8. Try and guess the percentage of Australians who would think the following ways about climate change (HINT: the numbers you place beside all four boxes should add up to 100)

Don't think that climate change is happening _____

Have no idea whether climate change is happening or not _____

Think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures _____

Think that climate change is happening, and think that humans are largely causing it _____

9. Over the past year, have you become more or less sure that climate change is happening? *Tick one box only*

- Much more sure
- Somewhat more sure
- Neither more or less sure
- Somewhat less sure
- Much less sure

10. How worried are you about climate change? *Tick one box only*

- Very worried
- Somewhat worried
- Not very worried
- Not at all worried

11. How much do you think climate change will harm you personally? *Tick one box only*

- A great deal
- A moderate amount
- Only a little
- Not at all
- Don't know

12. How important is the issue of climate change to you personally?

- Extremely important
- Very important
- Somewhat important
- Not too important
- Not at all important

13. How much have you personally experienced the effects of climate change? *Tick one box only*

- A great deal
- A moderate amount
- A little
- Not at all

14. Which of the following best describes your thoughts about climate change? *Tick one box only*

- I don't think it's real and I don't think it's important;
- I doubt it's real but I think it's an important issue;
- I think it's probably real but I'm not really interested in it
- I think it's real and I feel it's important

15. If you had to sum up your position on climate change in one word, what would it be?

16. Using the scale below, how much do you trust the following organisations or people to tell you the truth about climate change?

1	2	3	4	5
Distrust a lot				Trust a lot

- Consumer organisations _____
- Environmental organisations _____
- University scientists _____
- Government scientists _____
- Industry scientists _____
- Environmental group scientists _____
- People from your community _____
- Friends and family _____
- Doctors _____
- Government _____
- Local authorities _____
- Oil companies _____
- Car companies _____

17. Using the scale below, how much do you think each of the following groups is responsible for doing something about climate change?

1	2	3	4	5
Not at all responsible		Partly responsible		Highly responsible

- Normal individuals _____
- Local governments _____
- State governments _____
- The Federal government _____
- Global organisations such as the United Nations _____
- Wealthy countries _____
- Big polluting countries _____
- Multi-national corporations _____

18. Using the scale below, how much do you think each of the following groups is responsible for *causing* climate change?

1	2	3	4	5
Not at all responsible		Partly responsible		Highly responsible

- Normal individuals _____
- Local governments _____
- State governments _____
- The Federal government _____
- Global organisations such as the United Nations _____
- Wealthy countries _____
- Big polluting countries _____
- Multi-national corporations _____

19. Using the scale below, please indicate how much you agree or disagree with the following statements

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

Having a car gives someone more freedom than not having a car _____

Realistically, nothing will be done about climate change until it's too late _____

The impacts of climate change on people's lives are huge _____

I think climate change will affect me personally _____

The impacts of climate change are really beyond my control _____

I enjoy buying things _____

Climate change may mean that wealth and resources end up being distributed more fairly _____

It gives me more satisfaction to try and make things last than to buy new things _____

I don't believe in climate change _____

Doing something about climate change is an opportunity to be part of something bigger than ourselves _____

I would prefer not to be charged more for my energy bills _____

I have stopped listening to people go on about climate change because I am tired of hearing about the topic _____

Individuals can make a difference to climate change _____

People should be entitled to buy things they've worked hard to earn _____

The thought of climate change scares me _____

Eating less meat would save me money _____

Climate change will foster greater community spirit and connectedness _____

The impacts of climate change are inevitable now so there's not much point worrying about it _____

I don't have the information I need to reduce the impact of climate change _____

A lot of household waste that is put into recycling bins ends up in landfill _____

Climate change will result in financial hardship for many people _____

Using a car less often would be better for my health _____

Responding to climate change will cost Australia a lot of money _____

- People should pay more for the natural resources that they use _____
- There's nothing Australia can do about climate change that will make a meaningful difference _____
- For most of the things I do, it would be more convenient for me to drive than to walk, ride, or take public transport _____
- There are meaningful things I can do to reduce the impact of climate change _____
- People should be accountable to the whole of society for their behaviours _____
- I don't like being morally judged for my private behaviours _____
- I don't have enough money to do things that would reduce the impact of climate change _____
- Attempting to respond to climate change will cost the country too much money _____
- People should stop and ask themselves "do I really need this?" before they buy new things _____
- I don't have enough time to do things that would reduce the impact of climate change _____
- I try not to think about climate change _____
- Meat is an important part of my diet _____
- I would save money if I used my car less _____
- Climate change will mean better weather in some parts of the world _____
- Trying to do something about climate change will mean a lot of people lose their jobs _____
- The whole climate change issue could turn out to be one gigantic mistake by scientists _____
- I feel a moral duty to do something about climate change _____
- The challenge of climate change will provide people with a sense of purpose _____
- People should try and reuse or recycle everything they can _____

20. Which of the following statements best matches your view:

The environment is fragile and will only be protected if there are large changes in human behaviour and society

The environment can be managed by the government and experts if there are clear rules about what is allowed

The environment can adapt to changes and technology will solve environmental problems eventually

The environment is unpredictable and we can't control what happens

21. Using the scale below, rate how much each word or phrase reflects your view on climate change?

-5	-4	-3	-2	-1	0	1	2	3	4	+5
Not at all like my view					Neutral					Exactly like my view

- Uninterested _____
- Cautious _____
- Considerate _____
- Uninformed _____
- Sceptical _____
- Undecided _____
- Passionate _____
- An Activist _____
- Informed _____
- Gullible _____
- I don't believe everything I hear _____
- Moral _____
- Denying _____
- Immoral _____
- Selfish _____
- Powerless _____

22. Which of the following *least* describes you and your standpoint on climate change? (*tick one box only*)

- Uninterested
- Uninformed
- An Activist
- Gullible
- Sceptical
- Denying
- Immoral
- Selfish
- Powerless

23. If your close friends and family could sum up your attitude to climate change, it would most likely be...
(*tick one box only*)

- Considerate
- Passionate
- Sceptical
- Cautious
- Informed
- Moral
- In two minds
- I don't believe everything I hear

24. Using the scale below, how does the issue of climate change make you feel?

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

- Angry _____
- Ashamed _____
- Guilty _____
- Fearful _____
- Hopeful _____
- Powerless _____
- Joyful _____
- Confused _____
- Despairing _____
- Excited _____
- Bored _____
- Irritated _____

25. Using the scale below, please rate how much you agree with each statement

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

Climate change is all about...

Power _____

Money _____

Politics _____

The Environment _____

Scientists _____

Energy corporations _____

Future generations _____

26. Where do you get most of your information about climate change from?

27. We are now going to ask you some questions about some of the things you do. There are no right or wrong answers! For each of the activities below, we would like to know if you take the action mainly for environmental reasons, or mainly for other reasons such as convenience, time, money, and so on. If you do an action for both environmental and other reasons, please select the strongest reason.

	Mostly for environmental reasons	Mostly for other reasons	I don't do this
I usually walk/cycle/carpool/take public transport to work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Most of my cleaning products are environmentally friendly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have a vegetarian (or vegan) diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have switched to products that are more environmentally friendly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have a front-loading washing machine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I live within 5 kilometres of my workplace			
Where possible, I buy products that are made locally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have contacted a government member about climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have reduced the amount of gas and/or electricity I use around the house	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have taken part in a political campaign about an environmental issue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have reduced the amount of water I use around the house and garden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I grow a lot of my own vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I try to buy products that are second-hand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I recycle my household waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I switch lights off around the house whenever possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I will usually try to fix things rather than replace them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am on Green Power electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Finally, we would like to ask you a few questions about yourself

28. What is your year of birth? _____

29. What is your sex?

Female

Male

30. What is the total income (including all wages and government benefits) that you personally receive?

- \$2000 or more per week (\$104,000 a year)
- \$1,600 - \$1,999 a week (\$83,200 - \$103,999 a year)
- \$1,300 - \$1,599 a week (\$67,600 - \$83,199 a year)
- \$1,000 - \$1,299 a week (\$52,000 - \$67,599 a year)
- \$800 - \$999 a week (\$41,600 - \$51,999 a year)
- \$600 - \$799 a week (\$32,000 - \$41,599 a year)
- \$400 - \$599 a week (\$20,800 - \$31,199 a year)
- \$250 - \$399 a week (\$13,000 - \$20,799 a year)
- \$150 - \$249 a week (\$7,800 - \$12,999 a year)
- \$1- \$149 a week (\$1 - \$7,799 a year)
- Nil income
- Negative income
- Prefer not to respond

31. What is your household's gross annual income before tax?

- | | |
|--|---|
| <input type="checkbox"/> Less than \$30,000 | <input type="checkbox"/> \$30,000 - \$59,999 |
| <input type="checkbox"/> \$60,000 - \$89,999 | <input type="checkbox"/> \$90,000 - \$119,999 |
| <input type="checkbox"/> \$120,000 - \$149,999 | <input type="checkbox"/> More than \$150,000 |
| <input type="checkbox"/> Prefer not to respond | |

32. How many people usually live in your home?

Adults _____
Children _____

Age of children _____

33. What is your usual occupation?

34. Cultural background

35. Which of the following best describes your religion?

- Atheist
- Agnostic
- No religion
- Catholic
- Anglican (Church of England)
- Uniting Church
- Presbyterian
- Greek Orthodox
- Buddhism
- Baptist
- Islam
- Lutheran
- Other – please specify: _____

36. Which of the following best describes the area in which you live?

- Capital city
- Regional town
- Rural town
- Other – please specify: _____

37. What is your postcode?

38. Which State or Territory do you live in?

- Australian Capital Territory
- New South Wales
- Northern Territory
- Queensland
- South Australia
- Victoria
- Western Australia

39. Which political party are you most likely to vote for in the next federal election?

- Labor Party
- Liberal Party
- National Party
- Greens Party
- Independent
- Family First
- Other – please specify: _____
- I have no idea!

40. What is the highest level of education you have attained?

- Some of primary school
- Completed primary school
- Some of high school / tertiary school
- Completed tertiary school
- Some of trade / TAFE qualification
- Completed trade / TAFE qualification
- Some of undergraduate degree
- Completed undergraduate degree
- Some of postgraduate qualification
- Completed postgraduate qualification

41. This questionnaire is part of a multi-year research program being undertaken by the CSIRO. Would you be interested in participating in future phases of the project? (*saying 'yes' does not commit you future participation, it only indicates that you may be interested*)

- Yes, I may be interested
- No, I am not interested

THANK YOU FOR TAKING THE TIME TO COMPLETE THE SURVEY. IF YOU HAVE ANY COMMENTS TO MAKE, EITHER ON THE SURVEY OR ON CLIMATE CHANGE, PLEASE ENTER THEM IN THE BOX PROVIDED BELOW.

Comments

Complete question-list from T2 National survey (undertaken in July-August 2011)

Introduction

*Dear participant,
Thank you for agreeing to take part in this 30-minute survey.*

This research is being conducted on behalf of the CSIRO. We want to understand the thoughts and opinions of people from all over Australia about climate change. The information will be used to monitor how Australian's views about climate change change over time.

Participation in this survey is voluntary and you are free to withdraw at any time without penalty. Your responses and personal information will be kept confidential. You are free to stop the survey at any time, and you may choose not to answer some questions. Should you choose to stop the survey, the information you have given us will be discarded. If you have any questions, concerns or complaints about the survey, please contact project officer Ms. Zoe Leviston on (08) 9333 6169 or the CSIRO Ethics Officer at csshrec@csiro.au. This study has received ethical approval from the CSIRO Human Research Ethics Committee.

We hope you enjoy taking part in our survey

*Sincerely,
The Research Team*

Do you consent to take part in this survey? YES NO

We would like to start by asking you a few questions about yourself

1. Below are five statements that you may agree or disagree with. Using the scale below indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly Agree

In most ways my life is close to my ideal. _____

The conditions of my life are excellent. _____

I am satisfied with my life. _____

So far I have gotten the important things I want in life. _____

If I could live my life over, I would change almost nothing. _____

2. The following sets of questions are about your participation in the community. Please circle the most appropriate response

Do you help out a local group as a volunteer?

1	2	3	4
No not at all			Yes often (at least once a week)

Have you attended a local community event in the past 6 months (eg, church fete, school concert, craft exhibition)?

1	2	3	4
No not at all			Yes several (at least 3)

Are you an active member of a local organisation or club (eg, sport, craft, social club)?

1	2	3	4
No not at all			Yes several (at least 3)

In the past 3 years, have you ever joined a local community action to deal with an emergency?

1	2	3	4
No not at all			Yes frequently (at least 5 times)

3. Do you rely on the following sources for information about news and current events?

	YES	NO
National newspapers	<input type="checkbox"/>	<input type="checkbox"/>
State newspapers	<input type="checkbox"/>	<input type="checkbox"/>
Local or community newspapers	<input type="checkbox"/>	<input type="checkbox"/>
Specialist magazines and journals	<input type="checkbox"/>	<input type="checkbox"/>
Internet news sites	<input type="checkbox"/>	<input type="checkbox"/>
Independent blog sites	<input type="checkbox"/>	<input type="checkbox"/>
Issue-based internet sites and chat rooms	<input type="checkbox"/>	<input type="checkbox"/>
Social media and networking sites	<input type="checkbox"/>	<input type="checkbox"/>
Televised news programs on commercial stations	<input type="checkbox"/>	<input type="checkbox"/>
Televised news programs on non-commercial stations	<input type="checkbox"/>	<input type="checkbox"/>
Televised current affair programs on commercial stations	<input type="checkbox"/>	<input type="checkbox"/>
Televised current affair programs on non-commercial stations	<input type="checkbox"/>	<input type="checkbox"/>
Televised science programs	<input type="checkbox"/>	<input type="checkbox"/>
Morning TV shows	<input type="checkbox"/>	<input type="checkbox"/>
Commercial radio	<input type="checkbox"/>	<input type="checkbox"/>
Community or non-commercial radio	<input type="checkbox"/>	<input type="checkbox"/>

4. From which three sources do you get most of your information about news and current affairs?

5. To what extent do you agree or disagree with the following statements

1	2	3	4	5	6	7	8	9
Strongly Disagree		Disagree		Neither agree nor disagree		Agree		Strongly Agree

- If people work hard, they almost always get what they want _____
- Laws of nature are responsible for differences in wealth in society _____
- It is virtually impossible to eliminate poverty _____
- Most people who don't get ahead in our society should not blame the system; they have only themselves to blame _____
- Social class differences reflect differences in the natural order of things _____
- There will always be poor people, because there will never be enough jobs for everybody _____
- If people wanted to change the economic system to make things equal, they could _____
- It is unfair to have an economic system which produces extreme wealth and extreme poverty at the same time _____
- There are no inherent differences between rich and poor; it is purely a matter of the circumstances into which you are born _____
- The existence of widespread economic differences does not mean that they are inevitable _____
- There are many reasons to think that the economic system is unfair _____
- Poor people are not essentially different from rich people _____
- Equal distribution of resources is a possibility for our society _____
- Economic differences in the society reflect an illegitimate distribution of resources _____
- Economic positions are legitimate reflections of people's achievements _____
- Equal distribution of resources is unnatural _____
- There is no point in trying to make incomes more equal _____

6. Using the scale below, to what extent do you agree with the following statements?

1	2	3	4	5
Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree

Our customs and national heritage are the things that have made us great, and certain people should be made to show greater respect for them _____

Our prisons are a shocking disgrace. Criminals are unfortunate people who deserve much better care, instead of so much punishment _____

Obedience and respect for authority are the most important virtues children should learn _____

Organisations like the army have a pretty unhealthy effect upon men because they require strict obedience of commands from supervisors _____

The courts are right in being easy on drug offenders. Punishment would not do any good in cases like these _____

Being kind to bludgers or criminals will only encourage them to take advantage of your weakness, so it's best to use a firm, tough hand when dealing with them _____

7. Using the scale below, to what extent do you agree with the following statements?

1	2	3	4	5
Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree

Even after I've made up my mind about something, I am always eager to consider a different opinion _____

I don't like situations that are uncertain _____

I feel uncomfortable when I don't understand the reason why an event occurred in my life _____

When considering most conflict situations, I can usually see how both sides could be right _____

When thinking about a problem, I consider as many different opinions on the issue as possible _____

I dislike it when a person's statement could mean many different things _____

It's annoying to listen to someone who can not seem to make up his or her mind _____

I feel uncomfortable when someone's meaning or intention is unclear to me _____

I always see many possible solutions to the problems I face _____

I don't usually consult many different opinions before forming my own view _____

8. Which of the following objects or statements do you have a positive or negative feeling towards?

1	2	3	4	5	6	7
Very Negative						Very Positive

Some groups of people are simply inferior to others _____

It's OK if some groups have more of a life chance than others _____

To get ahead in life, it is sometimes necessary to step on other groups _____

Inferior groups should stay in their place _____

Group equality should be our ideal _____

We should do what we can to equalise conditions for different groups _____

Increased social equality _____

We would have fewer problems if we treated people more equally _____

We would now like to ask you some questions about climate change

9. Which three people do you think of first when you think of climate change?

10. Using the following scale, how would you rate each of these people in relation to climate change?

-5	-4	-3	-2	-1	0	1	2	3	4	+5
Very Negative					Neutral					Very Positive

First person _____

Second person _____

Third person _____

11. Do you think that climate change is happening?

- Yes
- No

12. How sure are you that climate change is happening? *Tick one box only*

- Extremely sure
- Very sure
- Somewhat sure
- Not at all sure

13. Given what you know, which of the following statements best describes your thoughts about climate change? *Tick one box only*

- I don't think that climate change is happening
- I have no idea whether climate change is happening or not
- I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures
- I think that climate change is happening, and I think that humans are largely causing it

14. Try and guess the percentage of Australians who would think the following ways about climate change (HINT: the numbers you place beside all four boxes should add up to 100)

Don't think that climate change is happening _____

Have no idea whether climate change is happening or not _____

Think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures _____

Think that climate change is happening, and think that humans are largely causing it _____

[FOR THE NEXT QUESTION ONLY: SPLIT SAMPLE. 50% respondents answer QA; 50% respondents answer QB]

15. **A.** Using the scale below, how much do you support or oppose the Government's plan to reduce Australia's carbon emissions by putting a price on carbon emitted by industry? *Tick one box only*

1	2	3	4	5	6	7
Strongly support			Neither support nor oppose			Oppose strongly

B. Would you support or oppose putting a price on carbon emitted by industry if the money raised was used to ensure low and middle income households are fully compensated for energy price rises? *Tick one box only*

1	2	3	4	5	6	7
Strongly support			Neither support nor oppose			Oppose strongly

16. Over the past year, have you become more or less sure that climate change is happening? *Tick one box only*

- Much more sure
- Somewhat more sure
- Neither more or less sure
- Somewhat less sure
- Much less sure

17. How worried are you about climate change? *Tick one box only*

- Very worried
- Somewhat worried
- Not very worried
- Not at all worried

18. How much do you think climate change will harm you personally? *Tick one box only*

- A great deal
- A moderate amount
- Only a little
- Not at all
- Don't know

19. How important is the issue of climate change to you personally?

- Extremely important
- Very important
- Somewhat important
- Not too important
- Not at all important

20. How much have you personally experienced the effects of climate change? *Tick one box only*

- A great deal
- A moderate amount
- A little
- Not at all

21. How personally relevant is climate change to you?

- Extremely personally relevant
- Very personally relevant
- Somewhat personally relevant
- Not too personally relevant
- Not at all personally relevant

22. Given what you know, which of the following statements best describes your thoughts about the **severity (intensity)** natural disasters like floods, bushfires and drought? *Tick one box only*

- I don't think that these natural disasters are more severe than they used to be
- I have no idea whether these natural disasters are more severe than they used to be
- I think that these natural disasters are more severe than they used to be, but it's just a natural fluctuation in Earth's climate
- I think that these natural disasters are more severe than they used to be, and humans are contributing significantly to this increase

23. Given what you know, which of the following statements best describes your thoughts about how **often** natural disasters like floods, bushfires and drought are happening? *Tick one box only*

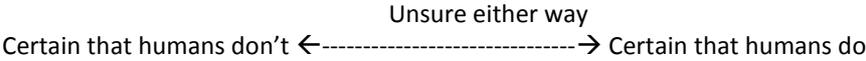
- I don't think that these natural disasters are more happening more often than they used to be
- I have no idea whether these natural disasters are happening more often than they used to be
- I think that natural disasters are happening more often than they used to be, but it's just a natural fluctuation in Earth's climate
- I think that natural disasters are happening more often than they used to be, and humans are contributing significantly to this increase

24. Thinking about the causes of climate change, which, if any, of the following best describes your opinion? *Tick one box only*

Please read all these alternatives, then select one answer only

- Climate change is entirely caused by natural processes
- Climate change is mainly caused by natural processes
- Climate change is partly caused by natural processes and caused partly by human activity
- Climate change is mainly caused by human activity
- Climate change is entirely caused by human activity
- I think there is no such thing as climate change
- Don't know
- No opinion

25. Move the cursor to the place on the slide which best represents how certain you are that humans contribute to climate change (100% sliding scale)



26. Using the scale below, how much do you trust the following organisations or people to tell you the truth about climate change?

1	2	3	4	5
Distrust a lot				Trust a lot

- Consumer organisations _____
- Environmental organisations _____
- University scientists _____
- Government scientists _____
- Industry scientists _____
- Environmental group scientists _____
- People from your community _____
- Friends and family _____
- Doctors _____
- Government _____
- Local authorities _____
- Oil companies _____
- Car companies _____

27. Using the scale below, how much do you think each of the following groups is responsible for doing something about climate change?

1	2	3	4	5
Not at all responsible		Partly responsible		Highly responsible

- Normal individuals _____
- Local governments _____
- State governments _____
- The Federal government _____
- Global organisations such as the United Nations _____
- Wealthy countries _____
- Big polluting countries _____
- Multi-national corporations _____

28. Using the scale below, how much do you think each of the following groups is responsible for *causing* climate change?

1	2	3	4	5
Not at all responsible		Partly responsible		Highly responsible

- Normal individuals _____
- Local governments _____
- State governments _____
- The Federal government _____
- Global organisations such as the United Nations _____
- Wealthy countries _____
- Big polluting countries _____
- Multi-national corporations _____

29. Using the scale below, please indicate how much you agree or disagree with the following statements

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

Realistically, nothing will be done about climate change until it's too late _____

The impacts of climate change on people's lives are huge _____

I think climate change will affect me personally _____

The impacts of climate change are really beyond my control _____

Climate change may mean that wealth and resources end up being distributed more fairly _____

Doing something about climate change is an opportunity to be part of something bigger than ourselves _____

I have stopped listening to people go on about climate change because I am tired of hearing about the topic _____

Individuals can make a difference to climate change _____

I feel it is my ethical responsibility to change my individual behaviour to combat climate change _____

The thought of climate change scares me _____

Climate change will foster greater community spirit and connectedness _____

The impacts of climate change are inevitable now so there's not much point worrying about it _____

I don't have the information I need to reduce the impact of climate change _____

Climate change will result in financial hardship for many people _____

Responding to climate change will cost Australia a lot of money _____

There's nothing Australia can do about climate change that will make a meaningful difference _____

There are meaningful things I can do to reduce the impact of climate change _____

- Individuals working together can make a difference to climate change _____
- People should be accountable to the whole of society for their behaviours _____
- I don't like being morally judged for my private behaviours _____
- I don't have enough money to do things that would reduce the impact of climate change _____
- Attempting to respond to climate change will cost the country too much money _____
- I don't have enough time to do things that would reduce the impact of climate change _____
- I try not to think about climate change _____
- Trying to do something about climate change will mean a lot of people lose their jobs _____
- The whole climate change issue could turn out to be one gigantic mistake by scientists _____
- I feel a moral duty to do something about climate change _____
- The challenge of climate change will provide people with a sense of purpose _____

30. Using the scale below, how does the issue of climate change make you feel?

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

- Angry _____
- Ashamed _____
- Guilty _____
- Fearful _____
- Hopeful _____
- Powerless _____
- Joyful _____
- Confused _____
- Despairing _____
- Excited _____
- Bored _____
- Irritated _____

31. The current federal government is....

- doing enough about climate change
- doing too much about climate change
- not doing enough about climate change
- doing the wrong thing about climate change

32. Which of the following statements best matches your view:

- The environment is fragile and will only be protected if there are large changes in human behaviour and society
- The environment can be managed by the government and experts if there are clear rules about what is allowed
- The environment can adapt to changes and technology will solve environmental problems eventually
- The environment is unpredictable and we can't control what happens

33. We are now going to ask you some questions about some of the things you do. There are no right or wrong answers! For each of the activities below, we would like to know if you take the action mainly for environmental reasons, or mainly for other reasons such as convenience, time, money, and so on. If you do an action for both environmental and other reasons, please select the strongest reason.

	Mostly for environmental reasons	Mostly for other reasons	I don't do this
I usually walk/cycle/carpool/take public transport to work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Most of my cleaning products are environmentally friendly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have switched to products that are more environmentally friendly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Where possible, I buy products that are made locally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have contacted a government member about climate change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have reduced the amount of gas and/or electricity I use around the house	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have taken part in a political campaign about an environmental issue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have reduced the amount of water I use around the house and garden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I switch lights off around the house whenever possible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I will usually try to fix things rather than replace them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am on Green Power electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

34. In the last five years, have you undertaken any of the following actions? (Mark ALL that apply)

- Been a member of an environmental group or movement
- Given money to a group that aims to protect the environment
- Taken part in an environmental event (e.g. Earth Hour)
- Taken part in a conservation activity (e.g. Landcare, bush regeneration)
- Voted in a government election on the basis of an environmental issue

Finally, we would like to ask you a few questions about yourself

35. What is your year of birth? _____

36. What is your sex?

Female

Male

37. What is your total income (including all wages and government benefits) before tax?

- \$2000 or more per week (\$104,000 a year)
- \$1,600 - \$1,999 a week (\$83,200 - \$103,999 a year)
- \$1,300 - \$1,599 a week (\$67,600 - \$83,199 a year)
- \$1,000 - \$1,299 a week (\$52,000 - \$67,599 a year)
- \$800 - \$999 a week (\$41,600 - \$51,999 a year)
- \$600 - \$799 a week (\$32,000 - \$41,599 a year)
- \$400 - \$599 a week (\$20,800 - \$31,199 a year)
- \$250 - \$399 a week (\$13,000 - \$20,799 a year)
- \$150 - \$249 a week (\$7,800 - \$12,999 a year)
- \$1- \$149 a week (\$1 - \$7,799 a year)
- Nil income
- Negative income
- Prefer not to respond

38. What is your household's gross annual income before tax?

- | | |
|--|---|
| <input type="checkbox"/> Less than \$30,000 | <input type="checkbox"/> \$30,000 - \$59,999 |
| <input type="checkbox"/> \$60,000 - \$89,999 | <input type="checkbox"/> \$90,000 - \$119,999 |
| <input type="checkbox"/> \$120,000 - \$149,999 | <input type="checkbox"/> More than \$150,000 |
| <input type="checkbox"/> Prefer not to respond | |

39. How many people usually live in your home?

Adults _____
Children _____
Age of children _____

40. Which of the following best describes your occupation?

- Professional
- Clerical / Administrative Worker
- Technician / Trade Worker
- Manager
- Sales Worker
- Labourer
- Community and Personal Service Worker
- Machinery Operator / Driver
- Not presently in the labour force
- None of the above

41. Which of the following best describes the area in which you live?

- Capital city
- Regional town
- Rural town
- Other – please specify: _____

42. What is your postcode?

43. Which State or Territory do you live in?

- Australian Capital Territory
- New South Wales
- Northern Territory
- Queensland
- South Australia
- Victoria
- Western Australia

44. Move the cursor below to the place on the slide which best represents your political views (100% sliding scale)

Left Wing ←-----→ Right Wing

45. Which political party did you vote for in the last federal election?

- Labor Party
- Liberal Party
- National Party
- Greens Party
- Independent
- Family First
- Other
- Prefer not to say

46. Which federal electoral boundary do you fall into? (if known)

47. If a federal election were held tomorrow, which political party would you be most likely to vote for?

- Labor Party
- Liberal Party
- National Party
- Greens Party

- Independent
- Family First
- Other
- I have no idea!

48. What is the highest level of education you have attained?

- Some of primary school
- Completed primary school
- Some of high school / tertiary school
- Completed tertiary school
- Some of trade / TAFE qualification
- Completed trade / TAFE qualification
- Some of undergraduate degree
- Completed undergraduate degree
- Some of postgraduate qualification
- Completed postgraduate qualification

49. This questionnaire is part of a multi-year research program being undertaken by the CSIRO.
Would you be interested in participating in future phases of the project? (*saying 'yes' does not commit you future participation, it only indicates that you may be interested*)

- Yes, I may be interested
- No, I am not interested

THANK YOU FOR TAKING THE TIME TO COMPLETE THE SURVEY. IF YOU HAVE ANY COMMENTS TO MAKE, EITHER ON THE SURVEY OR ON CLIMATE CHANGE, PLEASE ENTER THEM IN THE BOX PROVIDED BELOW.

Comments

**APPENDIX C: VARIOUS RESPONSE FORMATS USED TO ESTABLISHING VIEWS TOWARD
CLIMATE CHANGE**

Table 46. Response formats for establishing Australian views on climate change causation.*

Study / Poll	Year	Question wording & response options
Griffith University	2010	<p><i>Thinking about the causes of climate change, which of the following best describes your opinion?</i></p> <ul style="list-style-type: none"> • Climate change is entirely caused by natural processes • Climate change is mainly caused by natural processes • Climate change is partly caused by natural processes and partly caused by human activity • Climate change is mainly caused by human activity • Climate change is entirely caused by human activity • I think there is no such thing as climate change • Don't know • No Opinion
UQ Political Leaders and Climate Change	2009	<p><i>The planet is warming because of human activity producing greenhouse gases</i></p> <ul style="list-style-type: none"> • Strongly disagree • Disagree • Uncertain • Agree • Strongly agree
Australian Gallup Poll	2010	<p><i>Temperature rise is a part of global warming or climate change. Do you think rising temperatures are a result of human activities, or a result of natural causes?</i></p> <ul style="list-style-type: none"> • Human activities • A result of natural causes • Both (volunteered response) • Don't know/refused • Have not heard of climate change
Thermometer surveys	2008 - 2009	<p><i>Which of the following best represents your view about climate change?</i></p> <ul style="list-style-type: none"> • Climate change is not happening • The climate is changing, but this has nothing to do with human activity • The climate is changing due to human activity • Unsure/other
Newspoll	2010	<p><i>Do you personally believe that climate change is...?</i></p> <ul style="list-style-type: none"> • Entirely caused by human activity • Partly caused by human activity

		<ul style="list-style-type: none"> • Or do you believe climate change is not caused by human activity at all • Uncommitted
		<p><i>Do you agree that there is fairly conclusive evidence that climate change is happening and caused by human activity or do you believe that the evidence is still not in and we may just be witnessing a normal fluctuation in the Earth's climate which happens from time to time?</i></p>
Essential Media Survey	2009-2010	<ul style="list-style-type: none"> • Believe that climate change is happening and is caused by human activity • I think we are just witnessing a normal fluctuation in the Earth's climate • Don't know
		<p><i>Which best describes your opinion about the causes of climate change?</i></p>
Ipsos Eureka Survey	2007-2010	<ul style="list-style-type: none"> • Climate change is partly caused by natural processes and partly by human activity • Climate change is mainly by human activity • Climate change is entirely caused by human activity • Climate change is entirely caused by natural processes • There is no such thing as climate change • Don't know
		<p><i>On a 1 to 7 point scale (with 1 strongly disagree and 7 strongly agree), to what extent do you agree or disagree with the following statements about climate change?</i></p>
ARCCANSI Survey	2009	<ul style="list-style-type: none"> • Climate change is a natural process that humans have contributed to • Climate change is not really happening
		<p><i>Tell me whether you agree or disagree or neither with the following statement? Human activity is the primary cause of climate change.</i></p>
Australia's Farming Future Market Research - DAFF Survey	2009	<ul style="list-style-type: none"> • Agree • Neither • Disagree

* Reproduced from original table in Leviston et al., 2011

APPENDIX D: LIST OF TIME 1 SURVEY PRO-ENVIRONMENTAL BEHAVIOURS

Table 47. List of T1 Pro-environmental Behaviours (N = 5036).

Item	No action (%)	Mostly for other reasons (%)	Mostly for environmental reasons (%)
I switch lights off around the house whenever possible	3.9	50.1	46.1
I recycle my household waste	8.9	21.4	69.7
I have reduced the amount of water I use around the house and garden	9.6	35.1	55.3
I will usually try to fix things rather than replace them	11.1	66.7	22.3
I have reduced the amount of gas and/or electricity I use around the house	12.7	48.8	38.5
Where possible, I buy products that are made locally	16.8	53.9	29.2
I have switched to products that are more environmentally friendly	24	21.5	54.5
Most of my cleaning products are environmentally friendly	25.8	25	49.2
I grow a lot of my own vegetables	34.6	23.9	11.5
I try to buy products that are second-hand	53.3	36.1	10.6
I have a front-loading washing machine	61.4	17.7	20.9
I usually walk/cycle/carpool/take public transport to work	65.1	24.3	10.7
I live within 5 kilometres of my workplace	68.6	24.9	6.5
I am on Green Power electricity	70.9	8.4	20.7
I have contacted a government member about climate change	87.1	5	7.9
I have taken part in a political campaign about an environmental issue	87.4	4	8.6
I have a vegetarian (or vegan) diet	89.8	7.6	2.6

APPENDIX E: MAJOR RESULTS FROM THE T1 NATIONAL SURVEY

This Appendix is an extract from the following publication:

Leviston, Z., & Walker, I. (2010). *Baseline Survey of Australian attitudes to climate change: Preliminary report*. Perth: CSIRO. Retrieved from <http://www.csiro.au/files/files/p102a.pdf>

Opinions about climate change

An initial question asking about the existence of climate change revealed that more than four in five respondents thought that climate change was indeed happening (Figure 48).

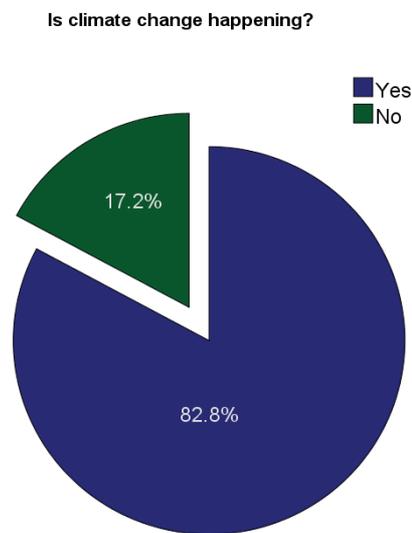


Figure 48: Percentage of agreement that climate change is happening (N = 5036)

There was a statistically significant association between gender and belief in climate change, with women more likely than men to answer *yes*, though the association was small. Those in capital cities were more likely to believe in climate change than those in regional towns or rural areas, although again the effect size was small. There was a very weak correlation (.082) between age and belief in climate change, with older people more likely to believe that climate change is happening than younger people ($p < .001$). Income was unrelated to belief in climate change.

Respondents were asked to rate which of a series of statements most accorded with their point of view (Figure 49). Responses to this question revealed that just over half thought about climate change as caused by human activities. More than 40% thought of climate change in terms of natural temperature variability. This suggests a lack of consensus regarding the causes of climate change, and a possible polarisation of beliefs.

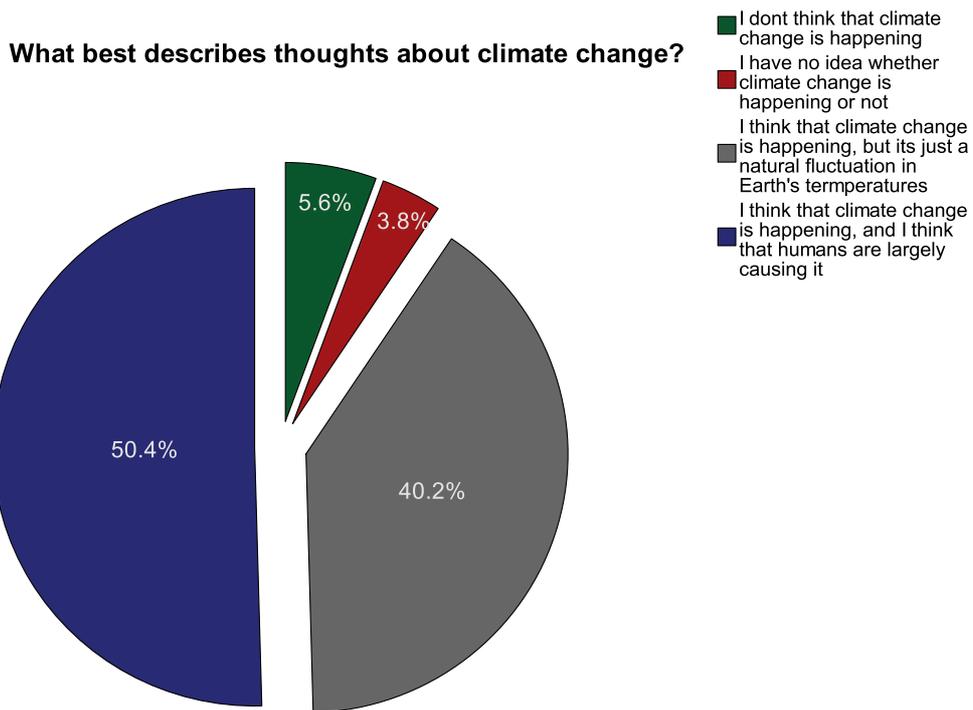


Figure 49: Typological breakdown of thoughts about climate change (n=5036)

Self-referent Attitudes Toward Climate Change

Respondents were asked a series of general questions about their attitudes towards climate change and its impacts. Figure 50 and Figure 51 suggest that the majority of people are only a little or moderately concerned with climate change and do not see it as posing a great deal of personal harm. As one would expect, levels of worry and expected harm were greater for those who thought climate change was human-induced, than for those who thought climate change was a natural phenomenon.

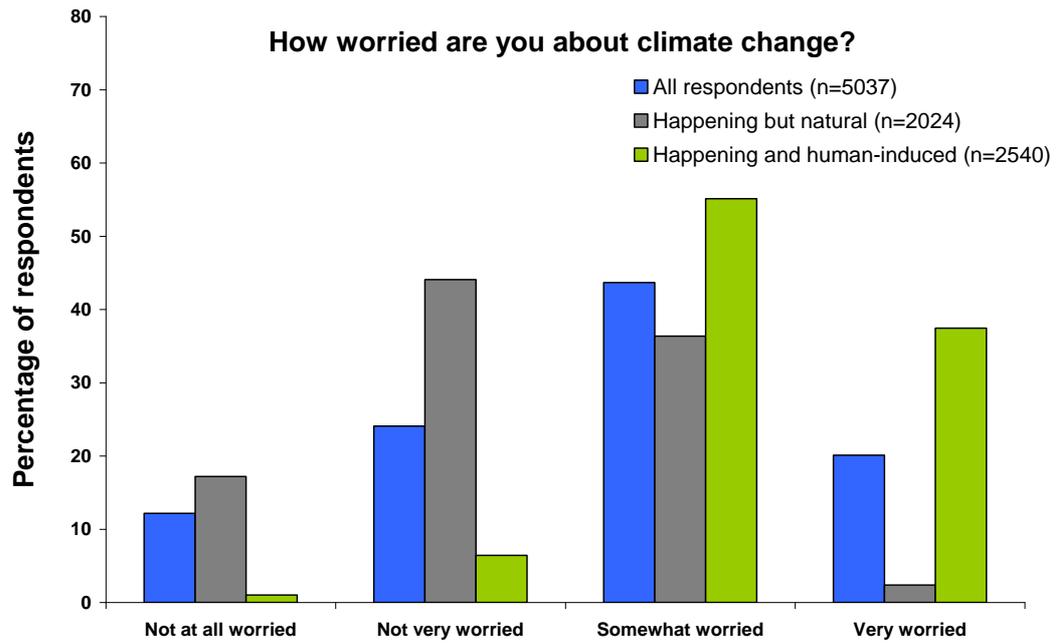


Figure 50: Levels of worry about climate change as a percentage of respondents

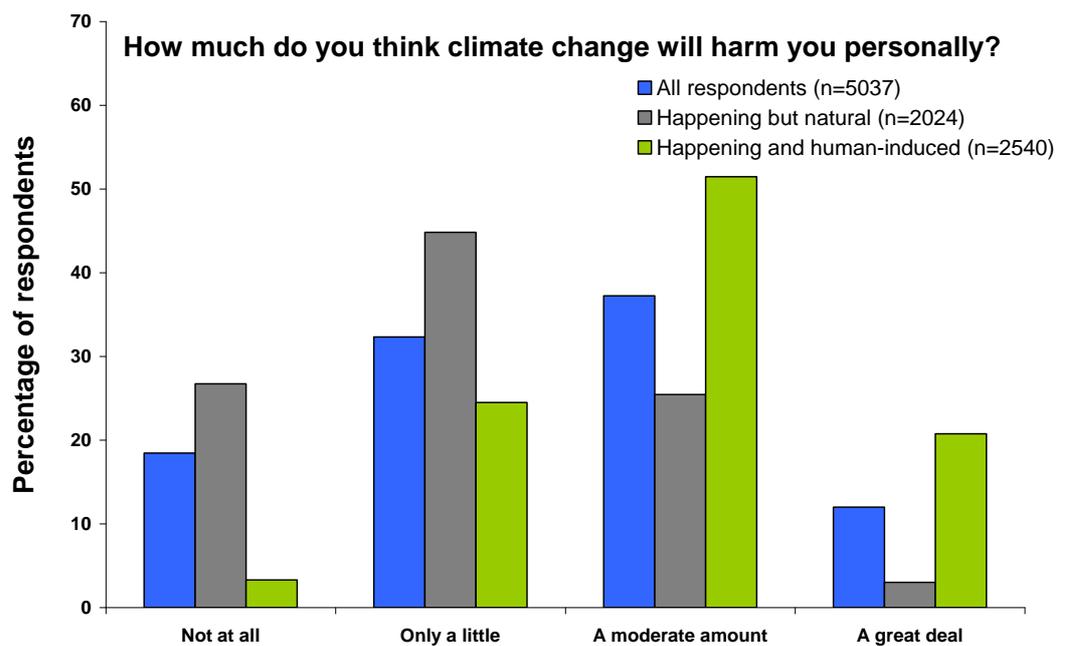


Figure 51: Levels of personal harm arising from climate change as a percentage of respondents

Participants rated their level of personal experience with climate change and how important they thought the issue was. Figure 52 suggests that the majority of people consider that they have had little or no personal experience with the effects of climate change, although a large proportion (38.1%) of those who consider climate change to be human-induced thought they had experienced moderate effects.

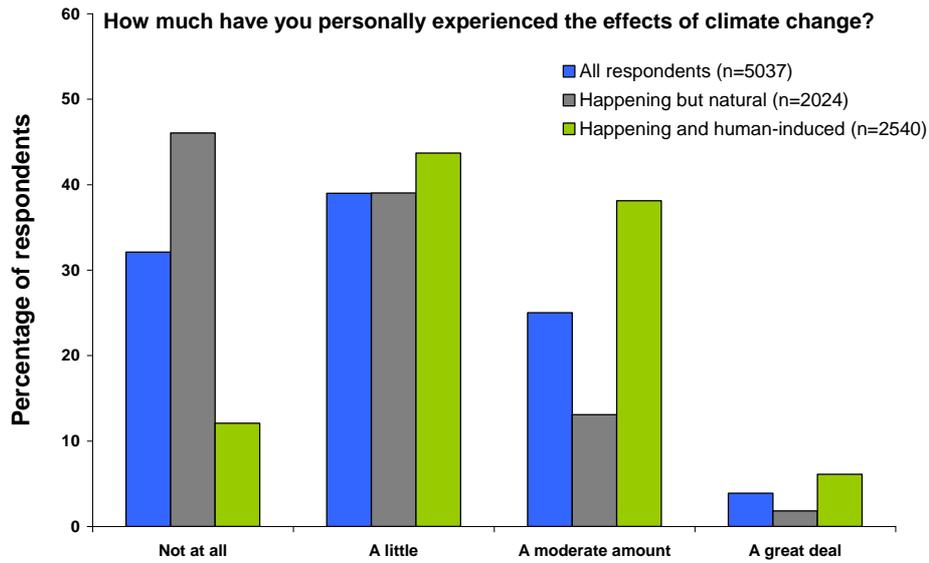


Figure 52: Levels of experience with climate change as a percentage of respondents

The perceived importance of climate change varied according to whether people thought it was human-induced or natural, with larger levels of importance cited by those who considered it human induced (Figure 53).

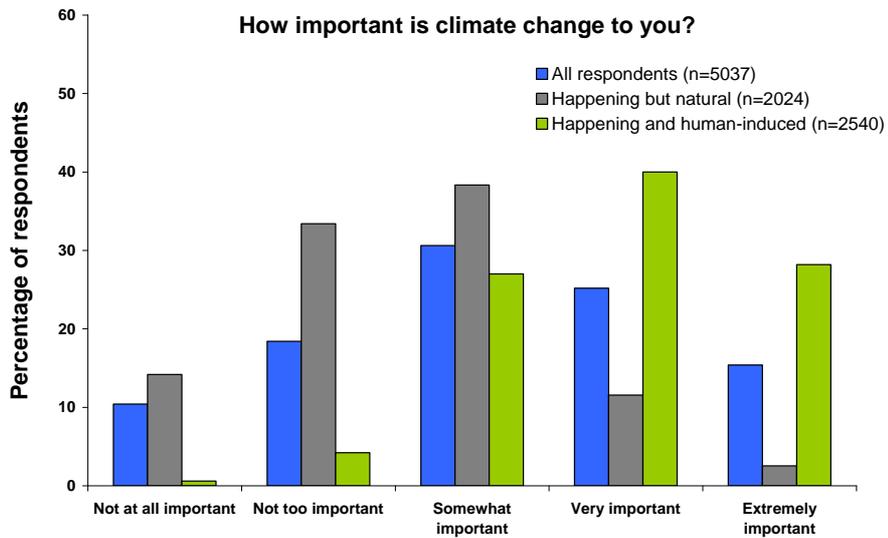


Figure 53: Levels of the importance of climate change as a percentage of respondents

Trust and responsibility

Respondents were asked to rate their levels of trust in different sources to provide them with truthful information about climate change (Figure 54). There were significant differences in ratings according to climate change belief-type, with those who considered it a natural process recording lower levels of trust than those who considered it human-induced in all sources but car and oil companies.

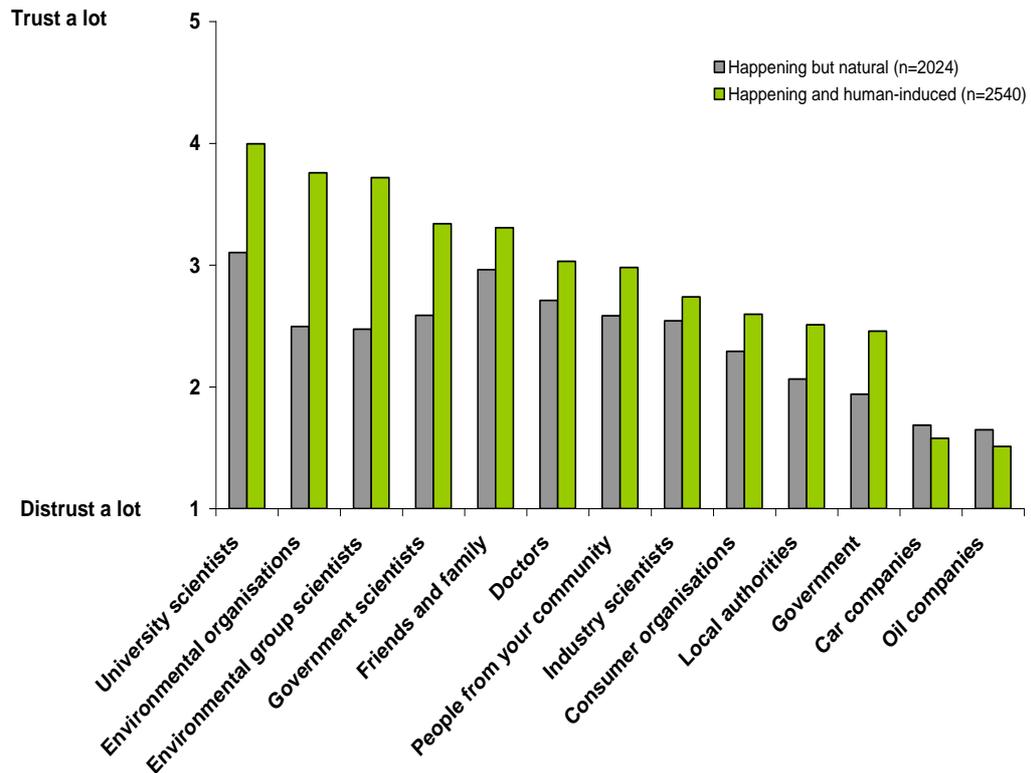


Figure 54: Mean ratings of trust in climate change information sources by belief type

While University scientists topped the rankings in trust, government fared relatively poorly – outranking only car and oil companies. Interestingly, friends and family were rated highly (second amongst the natural process respondents). Not surprisingly, car companies and oil companies fared poorly for both belief-types.

The survey also sought views on what entities people considered most responsible for causing climate change (Figure 55).

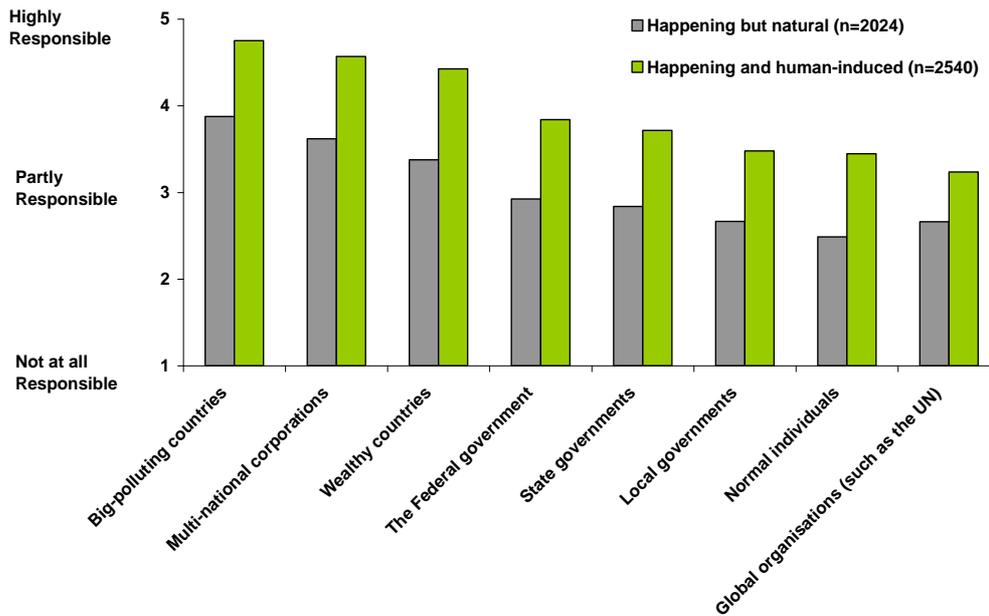


Figure 55: Mean ratings of responsibility for causing climate change by belief type

A question was also asked regarding which entities people considered had the greatest responsibility for responding to climate change. Figure 56 shows that greatest rating of responsibility was given to big-polluting countries; the responsibility of the individual was rated significantly lower than the others.

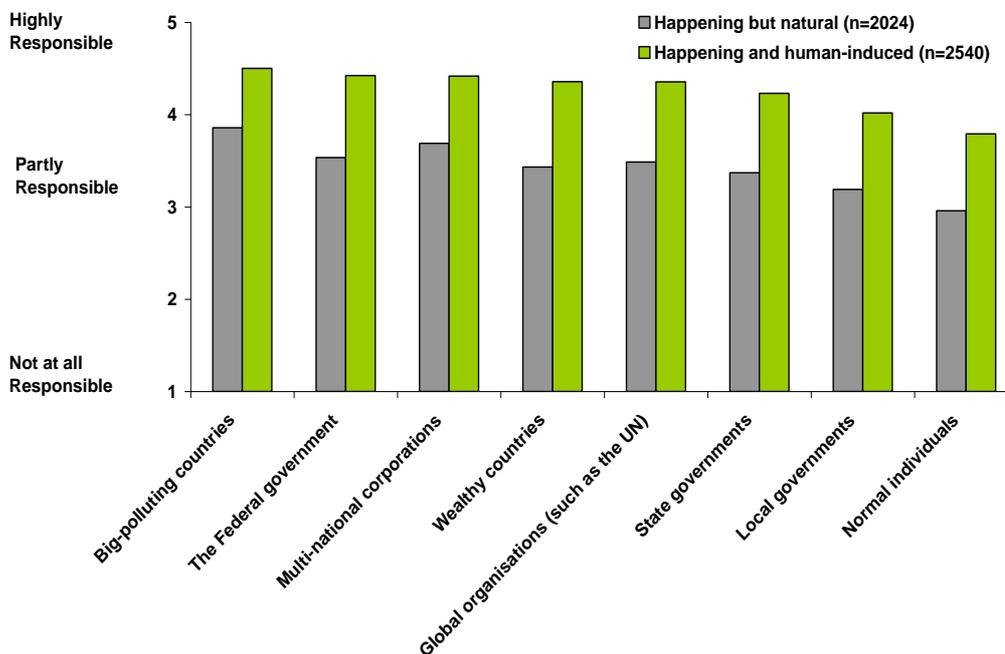


Figure 56: Mean ratings of responsibility for responding to climate change by belief type

Table 48 displays the strength of correlations between people’s rankings of responsibility for causing and responsibility for responding to climate change for the two main belief-types. A lower correlation coefficient indicates a greater dissimilarity in ratings between

cause and response. Global organisations were rated most disparately, with relatively low ratings for causing climate change, but relatively high ratings for responding to it.

Table 48: Rank order correlations between responsibility for causing and responding to climate change by belief type

	Happening but natural <i>r_s</i> coefficient	Happening and human-induced <i>r_s</i> coefficient
Global organisations such as the UN	0.38	0.24
The Federal government	0.52	0.38
State governments	0.54	0.42
Wealthy countries	0.56	0.48
Local governments	0.56	0.43
Normal individuals	0.58	0.51
Big-polluting countries	0.59	0.47
Multi-national corporations	0.62	0.51

Pro-Environmental Behaviours

Participants were asked 17 questions relating to behaviour relevant to greenhouse gas emissions (Figure 57). Behaviours ranged from personal transport choices to diet and purchasing decisions. An aggregated score was calculated for each respondent to capture the total number of behaviours engaged in. Motivations for performing carbon-friendly behaviours were also accounted for.

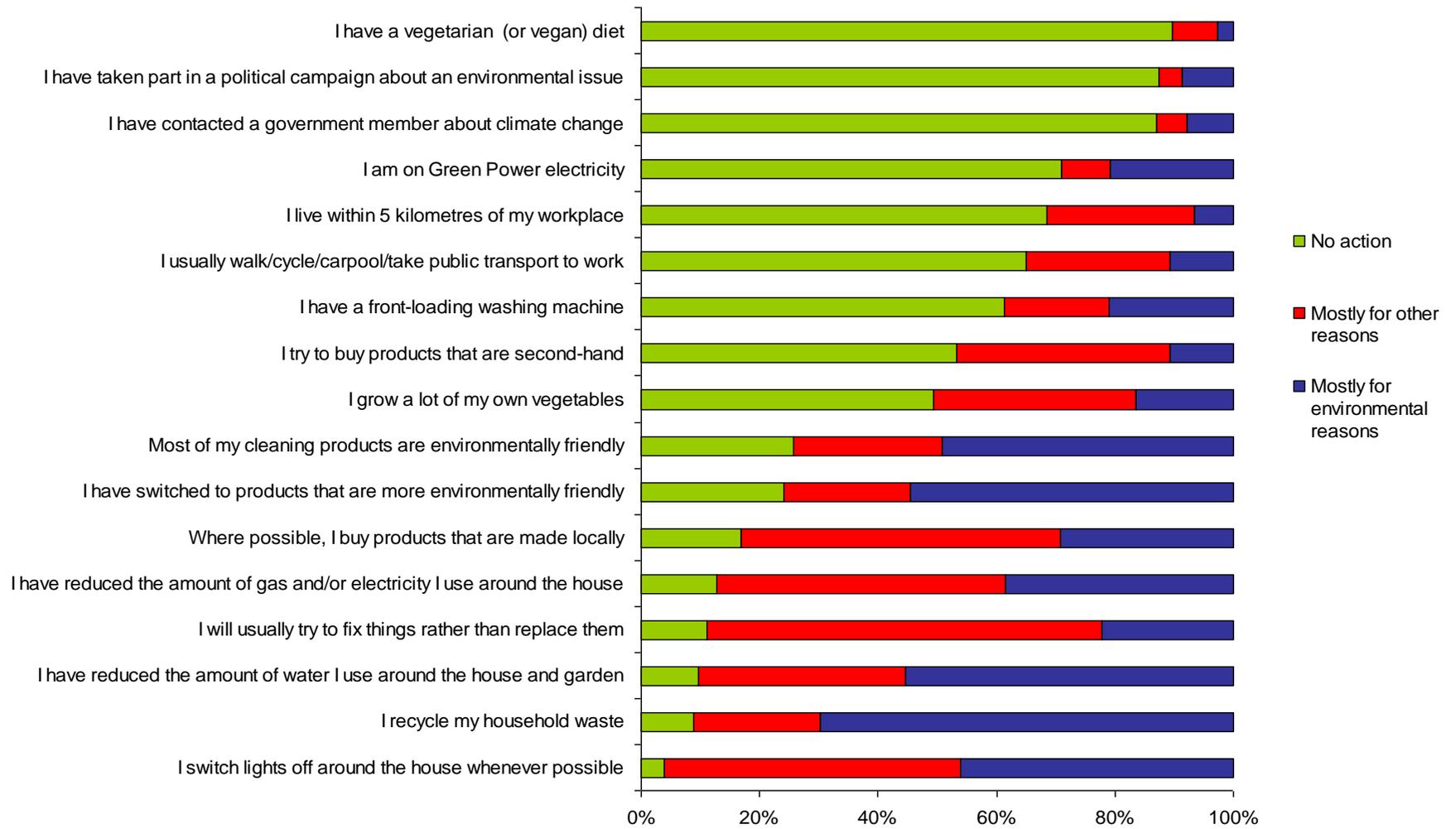


Figure 57: Percentage of respondents engaging in climate change relevant behaviours

Opinions, pro-environmental behaviours, and political voting intentions

Figure 58 displays the average aggregated behaviour score for respondents from each climate change belief group. People who thought human-induced climate change was happening scored significantly higher on average on pro-environmental behaviours than other participants. The average pro-environmental behaviour score for those who thought that climate change wasn't happening was lower than for all other groups.

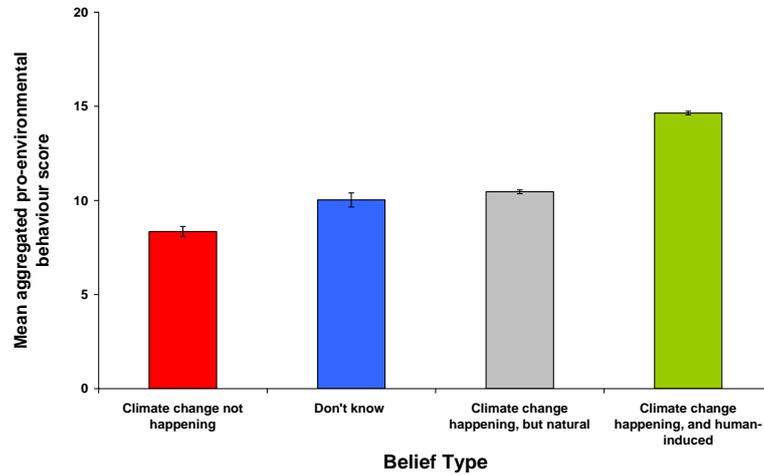


Figure 58: Pro-environmental behaviour scores by climate change belief (n=5036)

Participants were asked to nominate who they intended to vote for in the upcoming federal election. Voting intentions were related to pro-environmental behaviours (Figure 59), with those intending to vote for the Greens scoring higher on pro-environmental than other participants, followed by those intending to vote for the Labor Party.

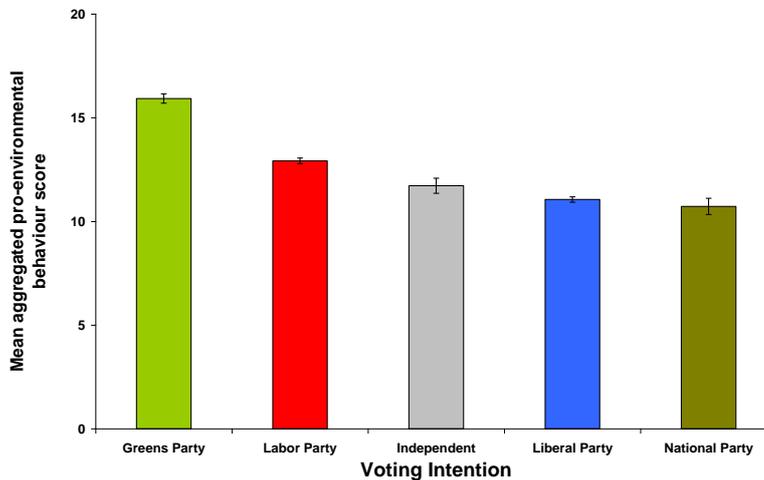


Figure 59: Pro-environmental behaviour scores by political voting intentions (n=5036)

Voting intentions were also related to belief-type (Figure 60), with participants who intended to vote for the Greens and Labor more likely to state belief in human-induced climate change. Those intending to vote Liberal, National or for the Independents, were more likely to state that climate change was happening due to natural variations in Earth's temperatures.

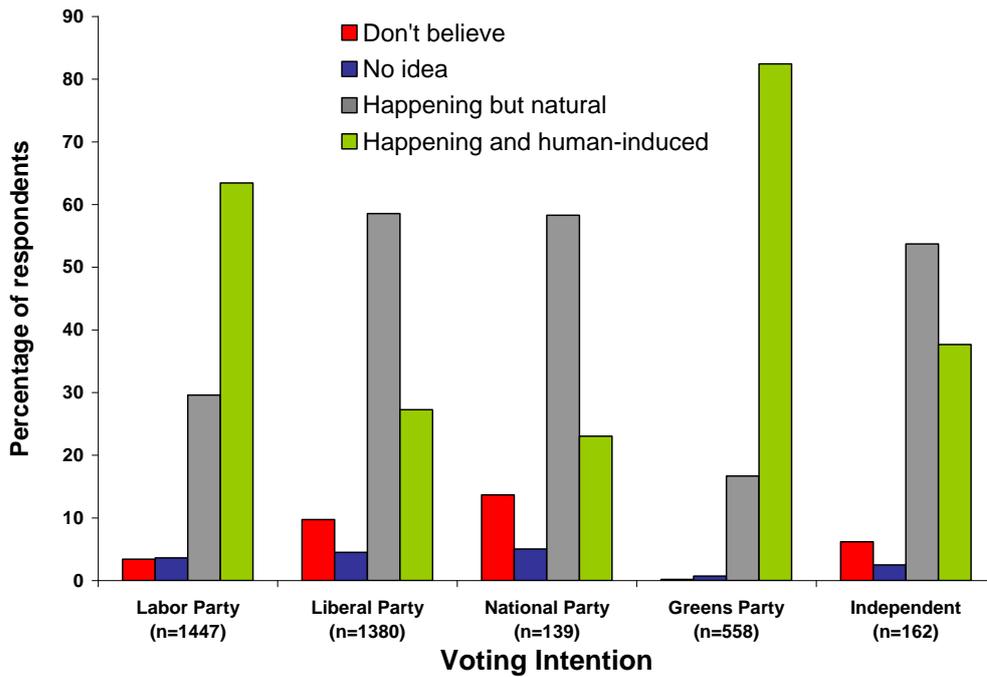


Figure 60: Belief in climate change as a percentage of respondents intending to vote for each party

Emotional responses

Participants were asked to rate a list of emotions, on a scale of 1 (strongly disagree) to 5 (strongly agree), according to how climate change made them feel. Average ratings are provided in Table 49. The most highly rated emotions for each belief-type are presented in Table 50.

Table 49: Mean ratings of agreement with emotions prompted by climate change (n=5036)

Emotion Descriptor	Mean	SD
Angry	3.12	1.01
Hopeful	3.07	0.95
Fearful	3.03	1.09
Powerless	2.97	1.05
Irritated	2.94	1.12
Ashamed	2.90	1.08
Confused	2.85	1.04
Guilty	2.74	1.05
Despairing	2.68	.99
Bored	2.52	1.10
Excited	2.24	.89
Joyful	2.08	.84

Table 50: Most highly rated emotion descriptor for each belief-type

Belief type	Most highly agreed with emotion descriptor	Mean rating
I don't think that climate change is happening (n=283)	Irritated	3.52
I have no idea whether climate change is happening or not (n=189)	Confused	3.50
I think that climate change is happening, but its just a natural variation in Earth's temperatures (n=2,024)	Irritated	3.09
I think that climate change is happening, and I think that it has largely been caused by humans (n=2,540)	Fear	3.53

Social attitudes to climate change

Participants were asked to rate their agreement with several statements on a scale of 1 (strongly disagree) to 5 (strongly agree) about how they thought about climate change and what some of its potential impacts might be. Average ratings for each statement are provided in Table 51, in order of most agreed with to least agreed with. Responses to this series of statements suggest that people hold both positive and negative thoughts about the potential impacts of climate change.

Table 51: Mean ratings of agreement with cognitive evaluations of climate change

Statement (n=5036)	Mean	SD
Responding to climate change will cost Australia a lot of money	3.61	1.01
Doing something about climate change is an opportunity to be part of something bigger than ourselves	3.57	0.99
Climate change will result in financial hardship for many people	3.45	1.00
The challenge of climate change will provide people with a sense of purpose	3.26	0.94
Climate change will mean better weather in some parts of the world	2.96	0.97
Climate change will foster greater community spirit and connectedness	2.95	0.99
Trying to do something about climate change will mean a lot of people lose their jobs	2.79	1.02
Climate change may mean that wealth and resources end up being distributed more fairly	2.61	0.99
There's nothing Australia can do about climate change that will make a meaningful difference	2.47	1.23

**APPENDIX F: Z_{obs} VALUES MATRIX FOR MORAL ENGAGEMENT AND RESPONSIBILITY RATING
CORRELATIONS**

Table 52. Z_{obs} Values matrix for Moral Engagement to act on climate change with responsibility ratings of different groups to respond to climate change.

	1	2	3	4	5	6	7
1 Normal individuals	-						
2 Local Governments	2.76	-					
3 State Governments	3.91	1.15	-				
4 Federal Governments	50.1	2.26	1.10	-			
5 Wealthy Countries	5.77	3.01	1.86	0.75	-		
6 Global organisations	7.17	4.41	3.26	2.16	1.40	-	
7 Multi-National Corporations	9.88	7.12	5.97	4.86	4.11	2.71	-
8 Big Polluting Countries	13.69	10.93	9.78	8.67	7.92	6.52	3.81

**APPENDIX G: ECONOMIC SYSTEM JUSTIFICATION, RIGHT-WING AUTHORITARIANISM, AND
SOCIAL DOMINANCE ORIENTATION SCORES**

Table 53. Responses to Economic System Justification Items (N = 5030).

Item	M	SD
If people work hard, they almost always get what they want	5.74	1.86
Laws of nature are responsible for differences in wealth in society	4.22	1.86
It is virtually impossible to eliminate poverty	5.75	2.03
Most people who don't get ahead in our society should not blame the system, they have only themselves to blame	5.38	1.95
Social class differences reflect differences in the natural order of things	4.70	1.92
There will always be poor people, because there will never be enough jobs for everybody	5.30	1.96
If people wanted to change the economic system to make things equal, they could *	5.04	1.85
It is unfair to have an economic system which produces extreme wealth and extreme poverty at the same time *	3.78	1.93
There are no inherent differences between rich and poor, it is purely a matter of the circumstances into which you are born *	5.33	2.03
The existence of widespread economic differences does not mean that they are inevitable *	4.39	1.62
There are many reasons to think that the economic system is unfair *	3.85	1.55
Poor people are not essentially different from rich people *	4.03	1.96
Equal distribution of resources is a possibility for our society *	4.88	1.99
Economic differences in the society reflect an illegitimate distribution of resources *	4.74	1.90
Economic positions are legitimate reflections of people's achievements	5.18	1.79
Equal distribution of resources is unnatural	4.79	1.88
There is no point in trying to make incomes more equal	4.60	2.07

* Means and standard deviations after items were reversed coded

Table 54. Responses to Right-Wing Authoritarianism Items (N = 5030).

Item	M	SD
Our customs and national heritage are the things that have made us great, and certain people should be made to show greater respect for them	3.82	1.05
Our prisons are a shocking disgrace. Criminals are unfortunate people who deserve much better care, instead of so much punishment *	3.97	1.04
Obedience and respect for authority are the most important virtues children should learn.	3.88	1.06
Organisations like the army have a pretty unhealthy effect upon men because they require strict obedience of commands from supervisors *	3.72	1.09
The courts are right in being easy on drug offenders. Punishment would not do any good in cases like these *	4.03	1.12
Being kind to bludgers or criminals will only encourage them to take advantage of your weakness, so its best to use a firm, tough hand when dealing with them	3.72	1.19

* Means and standard deviations after items were reversed coded

Table 55. Responses to Social Dominance Orientation Items (N = 5030).

Item	M	SD
Some groups of people are simply inferior to others	2.80	1.68
It's OK if some groups have more of a life chance than others	2.79	1.56
To get ahead in life, it is sometimes necessary to step on other groups	2.54	1.55
Inferior groups should stay in their place	2.23	1.44
Group equality should be our ideal *	3.07	1.61
We should do what we can to equalise conditions for different groups *	3.02	1.50
Increased social equality *	2.95	1.47
We would have fewer problems if we treated people more equally *	2.74	1.52

* Means and standard deviations after items were reversed coded

**APPENDIX H: Z_{obs} VALUES MATRIX POLICY SUPPORT FRAMING: SYSTEM-JUSTIFYING
TENDENCIES BY VOTING INTENTION**

Table 56. Z_{obs} values matrix for policy support framing: System-justification tendencies by voting intention ($N = 5030$).

	Government Carbon Price /			
	Generic Carbon Price			
	Labor ($n = 1031$)	Liberal ($n = 1759$)	Nationals ($n = 176$)	Greens ($n = 438$)
RWA	0.91	4.24*	3.35*	0.91
ESJ	0.91	0.62	2.80*	2.18*
SDO	1.50	2.35*	1.96*	1.74

* Denotes significant difference between correlations

APPENDIX I: EXAMPLE OF CODING COMBINATIONS FOR IMAGE ASSOCIATION RESPONSES

Table 57. Examples of coding combinations for the associations Hot weather, Melting ice caps, Water shortage, and Deforestation

<p>hot_weather warmer_weather rising_temperatures hotter_weather hotter_summers higher_temperatures hotter_temperatures heat_waves hotter warming hot_days heatwaves hotter_climate warmer_climate increasing_temperatures increased_temperatures increase_in_temperature temperature_rise getting_hotter warmer hot_summers hotter_summer hotter_days heatwave higher_temps increased_temperature high_temperatures very_hot_weather rise_in_temperatures hotter_temps summer heating_up increased_hot_weather rising_temperature warmer_tempratures</p>	<p>melting_ice melting_ice_caps ice_melting melting_icebergs ice_caps_melting melting_icecaps icebergs_melting polar_caps_melting melting_polar_ice_caps melting_polar_ice polar_ice_caps_melting polar_ice_melting icecaps_melting melting_polar_caps melting_ice_bergs melting shrinking_polar_caps melting_ice_cap ice_cap_melting melting_poles poles_melting melting_iceburgs polar_melting melting_polar_icecaps loss_of_polar_ice melting_ice_packs shrinking_ice_caps melting_of_the_ice_caps ice_bergs_melting melting_snow_caps ice_burgs_melting melting_ice_at_the_poles iceburgs_melting ice_caps_melting_and_seas_rising melting_icefloes</p>
<p>lack_of_water no_water less_water water_shortage empty_dams water_shortages shortage_of_water water_supply water_availability water_resources water_supplies not_enough_water lackof_water</p>	<p>no_trees dying_trees dead_trees dying_vegetation dead_plants vegetation_dying deforestation rainforest_destruction destruction_of_rainforests loss_of_trees barren_forests cutting_down_trees deforestation plant_more_trees less_vegetation</p>

APPENDIX J: IMAGE ASSOCIATIONS

Table 58. Image associations nominated by respondents (N = 2502).

Association	n	%	Association	n	%	Association	n	%
Rising sea levels	411	16.4%	smog pollution	50	2.0%	dry	23	0.9%
Drought	328	13.1%	earth	50	2.0%	overpopulation	23	0.9%
Melting ice caps	256	10.2%	no such thing	49	2.0%	lifestyle changes	23	0.9%
Floods	200	8.0%	famine	49	2.0%	government	22	0.9%
Pollution	193	7.7%	polar bears	47	1.9%	children / future generations	22	0.9%
Hot weather	167	6.7%	air pollution	47	1.9%	resignation/ despair	22	0.9%
Don't know	154	6.2%	dead plants	46	1.8%	changes to local conditions	21	0.8%
Water shortage	139	5.6%	politics	45	1.8%	coral bleaching & reef damage	21	0.8%
Global warming	132	5.3%	cold	44	1.8%	renewable energy	21	0.8%
Vegetation	127	5.1%	animals	44	1.8%	more disease & ill-health	20	0.8%
Hot sun	123	4.9%	dry waterways	43	1.7%	tsunami	20	0.8%
Waterways	122	4.9%	warmth	40	1.6%	warming of the earth	19	0.8%
Rising temperatures	122	4.9%	environment	40	1.6%	better place to live	19	0.8%
Ozone layer	121	4.8%	clouds	40	1.6%	death	19	0.8%
Changing weather patterns	116	4.6%	solar power	40	1.6%	political grandstanding	19	0.8%
Severe storms	114	4.6%	seasons changing	38	1.5%	saving energy	19	0.8%
Weather	110	4.4%	natural disaster	37	1.5%	water pollution	18	0.7%
Melting ice	107	4.3%	crop failures	36	1.4%	melting snowcaps	18	0.7%
Desert	106	4.2%	icebergs	35	1.4%	industry	18	0.7%
Smoke stacks	105	4.2%	overhyped/ exaggerated	34	1.4%	high tides	16	0.6%
Natural phenomenon	90	3.6%	extreme heat	32	1.3%	carbon tax	16	0.6%
Extreme weather	87	3.5%	the greens	32	1.3%	al gore	16	0.6%
Rain	83	3.3%	polar icecaps	31	1.2%	coal	16	0.6%
Deforestation	81	3.2%	unpredictable weather	31	1.2%	refugees & displacement	16	0.6%
Bushfires	81	3.2%	bad weather	31	1.2%	iceage	16	0.6%
animal extinction	75	3.0%	snow	30	1.2%	dead earth	16	0.6%
carbon emissions	73	2.9%	cyclones & hurricanes	30	1.2%	scientists	15	0.6%
misc	71	2.8%	bad science	29	1.2%	carbon footprint	15	0.6%
melting icebergs	70	2.8%	tax	28	1.1%	water conservation	15	0.6%
hotter weather	70	2.8%	ice	28	1.1%	high cost of electricity	15	0.6%
parched land	65	2.6%	winter	27	1.1%	loss of habitat	15	0.6%
ocean	64	2.6%	crap/ rubbish	27	1.1%	aridity	15	0.6%
less rain	61	2.4%	reduced food production	26	1.0%	changes to our planet	15	0.6%
dead animals	56	2.2%	greenhouse gases	26	1.0%	manmade waste	14	0.6%
temperature	54	2.2%	islands inundated	26	1.0%	human suffering	14	0.6%
hotter summers	54	2.2%	need to adapt	26	1.0%	international control	14	0.6%
glaciers melting	53	2.1%	sky	26	1.0%	climate change	13	0.5%
higher prices	54	2.2%	confusion about facts	25	1.0%	kevin rudd	13	0.5%
vehicle emissions	54	2.2%	variability in weather	25	1.0%	manmade	13	0.5%
wind farms	52	2.1%	heatwave	24	1.0%	greenhouse effect	13	0.5%
coastal erosion & inundation	51	2.0%	impacts on agriculture	24	1.0%	air	13	0.5%
scam	50	2.0%	recycling	24	1.0%	scare mongering	13	0.5%

Table 57 continued...

Association	n	%	Association	n	%	Association	n	%
money grabbing scheme	13	0.5%	smog in cities	6	0.2%	a way to control people	2	0.1%
electricity	12	0.5%	bob brown	6	0.2%	islands	2	0.1%
fossil fuels	12	0.5%	heavy rain	6	0.2%	lack of oxygen	2	0.1%
earthquakes	12	0.5%	traffic congestion	6	0.2%	inversion layers	2	0.1%
antarctica	12	0.5%	atmosphere	6	0.2%	reduce fossil fuel use	2	0.1%
future	11	0.4%	control pollution	6	0.2%	acid rain	2	0.1%
don't believe in climate change	11	0.4%	vested interests	5	0.2%	andrew bolt	1	0.0%
not man-made	11	0.4%	conservation of resources	5	0.2%	christine milne	1	0.0%
volcanoes	11	0.4%	overuse of aircon	5	0.2%	water rise	1	0.0%
dry gardens	11	0.4%	humidity	5	0.2%			
exploitation of natural resources	11	0.4%	el nino	5	0.2%			
damaged/ imbalanced ecosystems	10	0.4%	resource depletion	5	0.2%			
government inaction	10	0.4%	solar system	5	0.2%			
human greed	10	0.4%	salinity	5	0.2%			
apocalypse	10	0.4%	tony abbott	5	0.2%			
incompetent politicians	10	0.4%	inability to heat/ cool homes	5	0.2%			
controversial subject	10	0.4%	green propanganda	4	0.2%			
skin cancer	10	0.4%	sweat	4	0.2%			
carbon trading	10	0.4%	nuclear energy	4	0.2%			
change in temperature	10	0.4%	economic impact	4	0.2%			
major problem	9	0.4%	natural evolution	4	0.2%			
coal mining	9	0.4%	better growing conditions	4	0.2%			
media hype	9	0.4%	starving livestock	4	0.2%			
misinformation	9	0.4%	overcrowded cities	4	0.2%			
sunburn	8	0.3%	wetter	4	0.2%			
jobs & unemployment	8	0.3%	negative	3	0.1%			
beaches	8	0.3%	penny wong	3	0.1%			
ocean temperatures	8	0.3%	barnaby joyce	3	0.1%			
rough seas	8	0.3%	land pollution	3	0.1%			
oil spills	8	0.3%	fear	3	0.1%			
dust storms	8	0.3%	plant trees	3	0.1%			
unusual wind	8	0.3%	expensive water bills	3	0.1%			
protesting	7	0.3%	blackouts	3	0.1%			
cut down on fuel	7	0.3%	changing rainfall pattern	3	0.1%			
human apathy	7	0.3%	too much money spent on it	3	0.1%			
mountains	7	0.3%	annoying	3	0.1%			
sustainability	7	0.3%	snowstorms	3	0.1%			
plastics	7	0.3%	julia gillard	2	0.1%			
sceptics	7	0.3%	methane	2	0.1%			
stupidity	6	0.2%	tim flannery	2	0.1%			

APPENDIX K: WORKSHOP IMAGES, SOURCE, AND, AND TIMES SELECTED

Table 59. Climate change images used in workshop

				
11 Al Gore.jpg	12 atmosphere.jpg	13 baby-feet.jpg	14 bills-energy.jpg	15 Bird oil spill.jpg
				
16 boat people.jpg	17 bob brown.jpg	18 brown lawn.JPG	19 bushfire.jpg	20 china pollution.jpg
				
21 Coal mining.jpg	22 coal powered station.jpg	23 coastal erosion.jpg	24 cold weather.jpg	25 collapsing ice shelf.jpg
				
26 coral bleaching.jpg	27 crowded beach.jpg	28 cyclone.jpg	29 dam-dry.jpg	30 deforestation 2.jpg
				
31 distressed sheep.jpg	32 drought farmer.jpg	33 earth on fire.jpg	34 eden project.jpg	35 electricity lines.jpg
				
36 end-of-the-world.jpg	37 extreme heat.jpg	38 Famine.jpg	39 flood SOH.jpg	40 food shortage.jpg



41 frog.jpg



42 gillard
abbott.jpg



43 Glacier.jpg



44 green bulb.jpg



45 Greenie
protest.jpg



46 Heatwave
koala.jpg



47 heatwave
old.jpg



48 heavy rain
suv.jpg



49 Hippie
bike.jpg



50 homeless.jpg



51 hospital.jpg



52 ice age.JPG



53 ice core
scientist.jpg



54 iceberg.jpg



55 kevin
penny.jpg



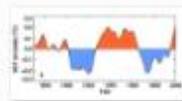
56 king tide.jpg



57 Mad
scientist.jpg



58 mosquito.jpg



59 natural
cycle.JPG



60
No_pullution_ple
ase_by_Chris_La
mprianidis.jpg



61 ocean.jpg



62 parched
earth.jpg



63 polar bear.jpg



64 polar cap.jpg



65 polluted
water.jpg



66 pollution
cars.jpg



67
propaganda.jpg



68 rainforest.jpg



69 recycle.jpg



70 rising sea
levels perth.jpg



71 river bed skull.jpg



72 rivers waterways.jpg



73 rough seas.jpg



74 Sale.jpg



75 Salinity.jpg



76 smoke stacks.jpg



77 solar panel.jpg



78 storm perth.jpg



79 stranded ship.jpg



80 strong wind palm.jpg



81 submerged island.jpg



82 summer children.jpg



83 Sunburn.jpg



84 the earth.jpg



85
The_Mesocyclone_HDR_by_Nebra
skies.jpg



86 Tidal Wave.jpg



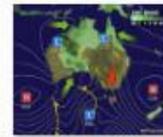
87 veggie garden.JPG



88 volcano.jpeg



89 water shortage.jpg



90 weather patterns australia.jpg



91 windfarm.jpg



92 Working Together.bmp

Table 60. Frequency selection and source of climate change images.

Image	Selection Frequency (N = 52)	Image Source
polar bear	33	http://globalwarming.org/global-warming-and-polar-bears.php
collapsing ice shelf	28	http://wn.com/On_the_ice
flooded Sydney	25	http://www.news.com.au/features/look-out-its-the-end-of-the-world/story-e6frflor-1225842356810
parched earth	22	http://www.gmpromagazine.com/climate-change-threatens-water-shortage.aspx
smoke stacks	21	http://www.treehugger.com/files/2007/06/wow_is_right.php
coal-powered station	18	http://www.flickr.com/photos/tatraskoda/5214470823/sizes/z/in/photostream/
polar cap	15	http://www.gearthblog.com/blog/archives/2008/09/more_detailed_arctic_ice_melting_an.html
submerged island	15	http://www.smh.com.au/news/world/rescue-efforts-all-at-sea/2007/04/06/1175366474403.html
bushfire	14	http://www.dailymail.co.uk/news/worldnews/article-1145903/Man-accused-starting-killer-Australian-bush-blaze-applied-volunteer-fireman-post.html
pollution cars	14	http://science.howstuffworks.com/environmental/green-science/air-pollution-heart-health2.htm
windfarm	14	http://www.zmescience.com/ecology/climate/oregon-prepares-for-the-larges-wind-farm-in-the-world/
solar panel	13	http://img.directindustry.com/images_di/photo-g/photovoltaic-solar-panels-367270.jpg
tidal wave	13	http://rabbit.eng.miami.edu/students/dwalker/index.html
china pollution	11	http://magstags.com/eco-tips/ap_china_pollution_071218_ms-jpg-jpeg-image-413%C3%97310-pixels/
coal mining	11	http://inhabitat.com/coal-mine-pits-grow-new-trees-without-human-assistance/
coastal erosion	11	http://www.smh.com.au/environment/high-tide-for-housing-20091018-h2xz.html
deforestation	11	http://en.wikipedia.org/wiki/File:Lacanja_burn.JPG
earth on fire	11	http://media.photobucket.com/image/earth+on+fire+/GuardianofHeaven5/Earth20on20Fire.jpg
Al Gore	10	http://blog.mapawatt.com/2009/11/29/al-gore-in-person/
extreme heat	10	http://www.in.gov/dhs/2789.htm
end-of-the-world	9	http://www.xarj.net/2009/end-of-the-world-animation/
king tide	9	http://billsponderings-wilbo43.blogspot.com/2010/02/king-tides-on-queensland-coasts.html
cold weather	8	http://www.getcarparts.co.uk/get-car-parts-blog/post/2010/11/19/Preparing-Your-Vehicle-ahead-of-time-for-the-Winter-Freeze.aspx
drying dam	8	http://www.abc.net.au/news/stories/2008/08/01/2321144.htm
green bulb	8	http://www.celsias.com/media/uploads/admin/heatwave.jpg

natural cycle	8	http://www.worldclimatereport.com/index.php/2005/10/31/hurricanes-and-global-warming-do-not-believe-the-hype/
coral bleaching	7	http://www.flickr.com/photos/44124484801@N01/53063637/sizes/z/in/photostream/
food shortage	7	http://newshopper.sulekha.com/pakistan-food-shortage_photo_958212.htm
no pollution please	7	http://coolclimate.deviantart.com/#/d2u5pz7
recycle	7	http://www.flickr.com/photos/adrianafox/2924287233/sizes/z/in/photostream/
river bed skull	7	http://commons.wikimedia.org/wiki/File:Arthur_Rothstein_-_The_bleached_skull_of_a_steer,_South_Dakota_Badlands,_1936.jpg
Gillard Abbott	6	http://www.mediamanint.com/profiles/gillard.html
mosquito	6	http://www.nhm.ac.uk/about-us/news/2007/june/news_11804.html
boat people	6	http://knowledge.allianz.com/en/news/viewdetail/eu_migration_numbers.html
bird oil spill	5	http://filesfromtoni.blogspot.com/2010/06/shocking-pictures-of-wildlife-birds-and.html
cyclone	5	http://www.smh.com.au/articles/2005/03/10/1110316120415.html
ice age	5	http://www.redstate.com/erinmist/
Salinity	5	http://www.couriermail.com.au/news/features/excess-water-the-irony-of-salinity/story-e6freowx-111114259874
glacier	4	http://www.flickr.com/photos/olopez/853283010/sizes/z/in/photostream/
heavy rain suv	4	http://www.life.com/image/97474687
rising sea levels perth	4	http://www.crikey.com.au/2008/10/03/girt-by-sea-to-underwater-see-australia-post-warming/
strong wind palm	4	http://www.boston.com/news/nation/gallery/081707_dean?pg=20
brown lawn	3	http://www.123rf.com/photo_1354939_water-sprinkler-spreading-water-on-a-dry-brown-lawn.html
distressed sheep	3	http://www.flickr.com/photos/jamidwyer/173937750/sizes/z/in/photostream/
famine	3	http://www.flickr.com/photos/zoriah/3255174135/sizes/z/in/photostream/
polluted water	3	http://pigandpeppers.wordpress.com/category/research-and-resources/page/2/
rainforest	3	http://www.starrylady.com.au/Hawaii/hawaii.html
stranded ship	3	http://www.flickr.com/photos/bhobohm/3367849635/sizes/z/in/photostream/
bob brown	2	http://www.news.com.au/national/greens-support-soars-to-record-high/story-e6frfkvr-1225873820897
drought farmer	2	http://www.flickr.com/photos/86303880@N00/320275141
eden project	2	http://en.wikipedia.org/wiki/File:Eden_project_tropical_biome.jpg
electricity lines	2	http://www.allposters.com/-sp/Line-of-High-Tension-Electrical-Towers-at-Dusk-Posters_i3723055_.htm
greenie	2	http://www.flickr.com/photos/skipppunk/5250623365/sizes/z/

protest		in/photostream/
ice core scientist	2	http://www.antarctica.gov.au/about-antarctica/australian-antarctic-magazine/issue-14-2008/cosmic-clues-into-solar-activity-and-climate
iceberg	2	http://blog.2012pro.com/tag/global-catastrophe/page/2
Sale	2	http://www.flickr.com/photos/dreamer7112/89835609/sizes/z/in/photostream/
the mesocyclone	2	http://coolclimate.deviantart.com/favourites/?set=41039647&offset=24#/d2whaib
veggie garden	2	http://www.odt.co.nz/files/story/2009/05/opoho_school_pupils_from_left_beth_fitchett_9_kat_1506060671.JPG
weather patterns australia	2	http://blogs.abc.net.au/.a/6a00e0097e4e6888330120a73c5601970b-300wi
atmosphere	1	http://www.weirdwarp.com/2010/03/atmospheres-of-the-earth-and-terrestrial-planets/
bills-energy	1	http://wjb-cpa.typepad.com/.a/6a00d8354c0d2669e2014e8b11e89c970d-pi
crowded beach	1	http://travel.webshots.com/photo/1119384817041391066CbbesQ
frog	1	http://www.flickr.com/photos/pedro-segura/4426314241/sizes/z/in/photostream/
heatwave koala	1	http://www.flickr.com/photos/trixie65/3252818208/sizes/z/in/photostream/
heatwave old	1	http://www.celsias.com/media/uploads/admin/heatwave.jpg
hippie bike	1	http://www.flickr.com/photos/pseudowhis/294497834/sizes/l/in/photostream/
hospital	1	http://blogs.laweekly.com/informer/2009/06/index.php?keepThis=true&TB_iframe=true&page=12
kevin penny	1	http://www.couriermail.com.au/news/national/copenhagen-climate-change-summit-ends-in-hot-air/story-e6freooo-1225812035547
mad scientist	1	http://www.flickr.com/photos/philandpam/2209856007/sizes/z/in/photostream/
ocean	1	http://www.flickr.com/photos/36245824@N05/3352084588
propaganda	1	http://deathby1000papercuts.com/2009/11/climategate-definition-of-climate-change-after-climategate/
storm perth	1	http://www.lonelyplanet.com/australia/images/lightning-storm-australia\$25292-197
water shortage	1	http://www.christiantoday.com/article/christian.relief.agencies.respond.to.haiti.cholera.outbreak/27040.htm
working together	1	http://noetictrainingsolutions.com/images/empathy_skills.jpg
baby-feet	0	http://organictobe.org/protect2ui.345.pl/
homeless	0	http://thirdsectormagazine.com.au/news/community_housing_providers_unite_against_housing_cuts/005036/
rivers waterways	0	http://www.ewater.com.au/h2othinking/?q=2010/08/new-software-tools-help-environment
rough seas	0	http://pkmohan.wordpress.com/2010/04/01/dharma-of-existence/
summer children	0	http://supersecrettwilightblog.blogspot.com/2010/06/summer-lovin.html

sunburn	0	http://www.flickr.com/photos/sebtec/4813036158/sizes/z/in/p/photostream/
the earth	0	http://en.epochtimes.com/news/7-1-31/51167.html
volcano	0	http://www.naturewalls.net/wallpaper/Volcanoes-1/

