

Chapter 2

The Threat of Climate Change: Psychological Response, Adaptation, and Impacts

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This chapter examines the existing social and health science literature addressing the psychological impacts of the threat of climate change. The exercise reflects a convergent environmental, social, and health psychology perspective, informed by those interdisciplinary bodies of work relating to the social construction and representation of environmental threat; psychosocial environmental impact assessment and monitoring; public and mental health; risk communication and perception; and disaster preparedness and response. Attention is also paid to public understandings of the phenomenon and threat of global climate change and popular culture discourse and reflections about the psychological and mental health responses to and impacts of ‘climate change’. The chapter indirectly addresses the unfolding physical environmental impacts of climate change and corresponding psychological, social, and societal consequences, but the principal focus is on public exposure and response to the phenomenon of climate change through multimedia representations of this phenomenon and limited direct experience. The larger context of this chapter and the present coverage is the post-Intergovernmental Panel on Climate Change [IPCC] focus on climate change adaptation and mitigation and the continuing neglect of the psychological, social, and cultural in research and policy considerations and initiatives addressing human and environmental quality, sustainability, and health. The chapter concludes with a brief consideration of what psychology has and can contribute in addressing psychological adaptation to the threat of climate change.

What Is Encompassed by ‘Climate Change’?

In the wording of the original United Nations Framework Convention on Climate Change (UNFCCC), endorsed at the Earth Summit in Rio de Janeiro in 1992, the specified meaning of climate change was: “‘Climate change’ means a change of

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climate which is attributable directly or indirectly to human activity” (in Kolbert, 2006, 153). In most discussions of climate change, it is anthropogenic climate change that is intended and meant, as it is this human contribution and ‘forcing’ that may provide some scope for correction and mitigation, and that addresses implicit questions of causal explanation and responsibility. But the continual shifting between lay use and reference and more specialised use in both scientific discussions of climate change and media coverage of climate change science means that meaning is often less than clear, such that reference to ‘climate change’ is typically to considerations very different from “the totality of the atmosphere, biosphere, and geosphere and their interactions” (UNFCCC, 1992) (in Kolbert, 2006, 153).

In most instances ‘climate change’ also implicitly includes reference to the consequences of global weather pattern changes on local and global environments and ecosystems, that is, to climate *changes* and their physical environmental *impacts*, which are actually the more noticeable changes taking place in our environments. But there is, of course, another ‘environment’, the human psychological, social, societal, and cultural environment, where important and dramatic changes and impacts relating to climate changes and consequent biophysical environmental changes are taking place. These human environment changes and impacts are less likely to be explicitly mentioned or even implicitly referred to in discussions of ‘climate change’ or appropriate policy responses, but they are profoundly important, not only in terms of human health and well-being (e.g., Clarke & Bourke, 2005; Martens & McMichael, 2002; Millennium Ecosystem Assessment, 2005; Patz, Engleberg & Last, 2000) but in terms of fully appreciating the scope and challenges of the global climate change phenomenon facing human society (Gifford, 2008; Moser & Dilling, 2007; Uzzell, 2008; Vlek & Steg, 2007). This fuller realisation that “climate change” is far more than climate change immediately follows any consideration of just what these cascading impacts of direct climate change influences the human environment encompass.

In what follows reference to climate change almost always refers to *the perceived threat and unfolding environmental impacts of climate change*, as it is these facets of the larger phenomenon that are of particular relevance to public understandings and responses, psychological and social impacts, and planned change. These perceived threats and impacts can be based on either *direct* experience and encounters or *indirect*, virtual, experience through social representations and media coverage. This matters greatly, as it is virtual and vicarious exposure to climate change that currently characterises climate change encounters for most people in the urbanised world.

Is ‘Climate Change’ Different from Other Perceived Threats?

In surveying the research and discursive literature on public risk perceptions and psychological responses to the threat of climate change, there would appear to be a growing consensus and mounting evidence that the threat and risk domain of

global climate change is in fact rather different from other perceived threats and sources of anxiety and concern. Climate change is increasingly a substantially constructed and socially represented phenomenon, environmental problem, threat, and narrative of environmental and societal risk and change. As well, in psychological terms, climate change is more of a chronic environmental stressor (e.g., Evans, 2001; Evans & Stecker, 2004), which is constant but uncertain, of possibly perilous consequence, and with a high dread risk, not dissimilar to that found for some 'technological risk' domains (e.g., Lewis & Tyshenko, 2009). It seems increasingly clear that those research and professional practice literatures that are most relevant to addressing the impacts of the climate change threat are the areas of work relating to the nuclear threat, terrorism, and natural disasters. In each of these contexts, there are strong common denominators relating to a condition of continuous environmental threat, high uncertainty, and the possibility of profound and highly adverse consequences for future as well as present human communities and the earth's as well as humanity's life support systems. The differing nature of these risk domains as contrasted with more conventional psychological sources of concern and anxiety should not preclude conventional interventions and strategies in terms of assisting individuals in managing their responses, but psychologists are at least raising this matter of *continuing threat*, particularly in the wake of 9/11, in the context of disasters such as Hurricane Katrina and flooding, heat wave, and cataclysmic wildfire events worldwide, with respect to continuous conflict and political instability and, more encompassingly, in the context of global climate change (e.g., Linden, 2006; Marshall et al., 2007; Oppenheimer & Todorov, 2006).

Threat Representations as Distinct from Physical Environmental Impacts

It is noteworthy that, for most people, their perceptions and experience of climate change are primarily *indirect and virtual*, mediated by media images, technologies, and reporting, by social constructions and representations of events and impacts in very distant parts of the planet (e.g., Boykoff, 2008; Trumbo, 1996; Wilson, 1995). This largely indirect experience is nonetheless very powerful; these media images, television documentaries, and climate change-themed films would appear to generate considerable concern and often distress and very directly influence understandings, preparedness, and adaptive responding (e.g., Corner, 2000; Gamson, Croteau, Hoynes, & Sasson, 1992; Leiserowitz, 2006; Smith, 2005; Smith & Joffe, 2009). A critical and strategic focal point for preparedness and planned change initiatives and interventions is at this interface where risk appraisals, sense making, and psychological responding takes place and where behavioural responses are primed and strongly influenced by media coverage and risk communications.

A three-decade research investment by social science risk researchers has examined what has come to be known as the 'social amplification of risk' (e.g., Flynn, Slovic & Kunreuther, 2001; Pidgeon, Kasperson & Slovic, 2003). This research

on how individual and social factors act to both amplify and dampen perceptions of risk is particularly important as it focuses not only on how individuals think and feel about risk messages and particular risk domains but also on those social processes relating to sense making and media communications that influence how communities and societies perceive and understand and respond to global risks such as terrorism, the nuclear threat, GM food, and climate change. (e.g., Bauer & Gaskell, 2002; Bohm, Nerb, McDaniels, & Spada, 2001; Etkin & Ho, 2007; Joffe, 2003; Kasperson & Kasperson, 2001; Lorenzoni, Pidgeon, & O'Connor, 2005; Slovic, Finucane, Peters, & MacGregor, 2004). These convergent psychological and social science research and practice domains encompass individual and societal awareness, risk appraisal and assessment, public understanding of science, environmental concerns, sense making, and individual and collective response to this environmental phenomenon, threat, and problem. These perspectives also make specific reference to how 'climate change' has been presented, imaged, and explained by journalists, scientists, government bodies, and others with vested interests. Further important considerations have included the extent to which human response to these media-based risk representations and communications are implicated in adequately understanding individual and community responses to directly experienced impacts and primary evidence of climate change.

Risk and Concerns: Risk-as-Analysis and Risk-as-Feelings

There are multiple psychological literatures relevant to the psychological response to the threat of climate change. These include environmental perception and evaluation; decision making under stress; risk communication, perception, and appraisal; threat appraisal and response in the context of stress and coping; environmental stress; and environmental concern. The theoretical and research literatures addressing risk perception, which substantially draw from the interdisciplinary risk and cognitive science literature, place somewhat more emphasis on those cognitive processes involved in appraising the risk phenomenon, whereas environmental concern perspectives, coming predominantly from environmental and social psychology, tend to emphasize one's psychological response to an appraisal of potential risk or harm to the environment (Reser, 2010). These perspectives tend to differ from personality- and motivation-based models of 'stress and coping', which privilege appraisals of environmental and/or social threats to oneself (and others), with the weighting on the psychological response to the judgement rather than on the threat and the judgement process.

But the new face of psychology-based risk research, particularly in the context of environmental risks and climate change, has been to acknowledge the reality that two pathways are involved in risk perception and response, or sense-making, in the face of threat: a more cognitive-based risk-as-analysis pathway and a simultaneous and more instantaneous emotion-based pathway (e.g., Bohm, 2003; Lowenstein, Weber, Hsee, Welch, 2001; Slovic et al., 2004; Slovic, 2010). Given the origins of

risk and decision making research in cognitive science (e.g., Kahneman, Slovic & Tversky, 1982; Slovic, 1987), the risk-as-feeling approach is arguably somewhat newer, but, in reality, these intersecting perspectives have been a hallmark of adaptation, motivational, and stress and coping models for well over half a century. The relevance of these two pathways to understanding psychological response to a risk domain such as climate change is that this response is much more than a rational, cognitive appraisal of a potential threat. Such risk evaluation and sense making also rely strongly on an immediate and visceral appraisal that has more to do with evolutionary hardwiring and symbolic and associative meaning responses to a multifaceted risk domain. It must also be appreciated that individual responses to a risk such as climate change are typically based on one's encounter with a 'risk communication' in the form of a 'social representation' (image, text, warning message) of the phenomenon and associated risk, itself reflecting a social and cultural 'construction' of this environmental threat or problem (e.g., Adam, 1998; Grauman & Kruse, 1990).

Hence individual responses to often highly charged risk communications are informed by social processes appraisals and an unparalleled new world of information and communication technologies and media coverage and reporting (Bartsch, Vorderer, Mangold, & Viehoff, 2008; Gifford, Steg & Reser, 2011). But such media images, the gravity of the problem and threat, and the tragic circumstances of those communities in the world already experiencing what are seen and presented as the environmental impacts of climate change are powerful, emotion eliciting, anxiety inducing, and impactful (e.g., Joffe, 2008; Nabi & Wirth, 2008). The nonstop media coverage of the climate change threat, its often apocalyptic portrayal, its media reach across news programming, commercial films, documentaries, and the blogosphere (Facebook and Twitter), and ubiquitous images in posters and magazine covers and advertisements have all given the phenomenon and threat of climate change a very substantial virtual and psychological reality, quite apart from its objective reality and status, which itself is arguably alarming and distressing. Hence climate change and its impacts are very real in human terms and with respect to these very strong and incessant risk communications and prognoses regarding an uncertain and very frightening future world.

Social Constructions, Social Representations, and the Nature and Role of Media

It is important to seriously consider the nature and content of the media coverage the public has been exposed to over the past several years with respect to global climate change. The probable events and environmental changes that are presented through images and interviews, sound bites, and popular films are about very large-scale and catastrophic changes, from the melting of polar icecaps and glaciers (the life source for the Asian subcontinent) to desertification of much of Africa and the United States, to acute water and food scarcity in many parts of the world, to mass

migrations, resultant international conflict, devastating biodiversity loss, and so on. These scenarios, often epilogue to scientific documentaries about global environmental change, are given further and graphic virtual reality through the coverage of unprecedented natural disasters that have occurred globally over the past decade (e.g., Hurricane Katrina, Asian Tsunami, Australian Black Saturday bushfires) and in the context of commercial films such as *An Inconvenient Truth*, *The Day After Tomorrow* (2004), *State of the Planet* BBC series (2006); *Six Degrees* (2008), *The 11th Hour* (2007), and *The Road* (2009) (e.g., Lowe et al., 2006). These documentaries and films of course resonate with classic, and now remarkably current nuclear threat images and films, such as *The Day After* (1983) and *Nuclear Tipping Point* (2010), which themselves tapped into widespread societal anxieties and fears, dread relating to nuclear winter, a dying planet, and apocalypse (e.g., Eckersley, 2008).

Psychological Responses, Adaptations, and Impacts

The language, constructs, and underlying processes involved in addressing the human response and impacts side of perceived threat and risk differ depending on framing, discipline, and indeed subdiscipline (e.g., social, environmental, cognitive, health psychology) and the extent to which an initiative is applied and/or is multi-disciplinary, at individual, community, or system level. These matters are brought to the fore in the context of the threat of climate change. As the phenomenon is dauntingly complex and global, it is engaging the efforts of many sciences and disciplines, and these initiatives straddle biophysical and human environments and landscapes, and their respective health and well-being status. As noted, the emergent language of climate change adaptation and mitigation within the climate change science discourse, and those more physical and natural environmental sciences involved with risk assessment and disaster management, has largely bypassed the extensive and nuanced work in the health and social sciences relating to psychological adaptation and related constructs (coping, vulnerability, resilience). But within the context of psychological understandings and approaches to the threat of climate change, and at the level of individual functioning, it is important to note that all psychological responses to perceived threat or changing environmental circumstances constitute adjustments and adaptations, and that these primarily reflect intra-individual appraisal, sense making, and coping processes, collectively referred to as 'psychological adaptation' (e.g., Reser & Swim, 2011). In the health psychology literature (e.g., Aspinwall, 2005; Taylor, 1983; Taylor, 2009), these processes are often termed 'cognitive adaptation', as it is often the case that interventions are premised on assisting individuals to reframe or change their thinking about the nature, causes, or consequences of their distress. In the related stress and coping literatures, the emphasis is on both the more analytic appraisal of not only the threat but also one's own resources, and the simultaneous management of one's emotional responses to the threat or situation or to fear or anxiety itself.

It is not surprising that *psychological adaptation* in the context of climate change has strong affinities with stress and coping perspectives (e.g. Lazarus, 1991; Zeidner & Endler, 1996), with a number of authors framing climate change adaptation as ‘coping with global environmental problems and global environmental change’ (e.g., Homburg, Stolberg & Wagner, 2007). The question of coping with a global phenomenon such as climate change has of course multiple problems of scale and specification if taken literally or when speaking of individual or collective response, but limiting the expression to individual and community coping with the threatened and environmental impacts of climate change allows for more realistic consideration and conceptualisation. Global and regional environmental changes and the continuing threat of climate change can and arguably are creating situations of high and often chronic environmental stress, which in turn are eliciting adaptation and coping responses (e.g., Bell, Greene, Fisher, & Baum, 2001; Homburg & Stolberg, 2006; Lepore & Evans, 1996). There are also the intertwined matters of the psychological and social costs of particular coping strategies and their cumulative psychological and mental health impacts. Attempts to adequately conceptualise, measure, and address psychological coping and adaptation strategies and responses to climate change at an individual and psychological level have to date been largely unsatisfactory (Reser & Swim, 2011). It is worth noting that the recent American Psychological Taskforce on Psychology and Climate Change (APA, 2009) spent considerable time and thought in attempting to achieve a more helpful and strategic integration of convergent perspectives within psychology relating to the psychological impacts of the threat of climate change (e.g., risk perception, environmental stress, stress and coping, psychological adaptation, anticipatory coping), with the hope that this crucial body of psychological work might be more widely appreciated and utilised.

Health and Mental Health Perspectives

In-depth ‘health and social science’ perspectives on how individuals and communities are being affected by the threat of climate change are not very easy to find. Those sources addressing climate changes and impacts on human environments across the world tend to be more descriptive, speculative, and interpretive, with little reference to objective data bases or systematic monitoring outcomes or state of the human environment reporting. While convergent research evidence is only now coming in, there is a strong professional consensus that ubiquitous media coverage and representations of climate change threat are causing appreciable concern, alarm, and distress for many. These are, after all, *global disaster* warnings and highly charged risk communications about what is happening to the planet, to our life support systems, to the world as we know it.

Climate change already appears to be having devastating environmental effects in the U.S. . . . The psychological responses to those effects can also be devastating. Many Americans are already anxious about what climate change portends. The greater risk is that millions of

people will develop severe and persistent anxiety, depression, post-traumatic stress, aggression, and other troubled behaviour if the U.S. does not quickly lead the way to dramatically reduce carbon emissions. Without such action, the impact of heatwaves, extreme storms and floods, droughts, and water shortages, food production problems, lessened air quality, sea level rise, and displacement from homes and communities is likely to pose significant mental-health challenges to millions of Americans and billions of others worldwide. (Psychologists for Social Responsibility, 2010, pp. 2–3).

That literature which one might think would address the health, mental health, and psychological well-being implications of the threat of climate change would logically fall under the heading and search terms of 'climate change' and 'health'. But this is not the case, with the health literature retrieved being almost exclusively a public health literature. There is very little reference to psychological, social or mental health impacts, or quality of life or environment considerations, other than direct physical health problems such as disease vectors, food and water shortages, essential services, and the envisioned humanitarian plight of increasing numbers of climate change refugees (e.g., IPCC, 2007; Jackson & Shields, 2008; Myers & Patz, 2008; St Louis & Hess, 2008). In marked contrast, there exists a growing psychology science-based literature that squarely addresses the psychological and societal impacts of climate change and unmet needs for the more general audience (e.g., APA, 2009; APS, 2010; Kazdin, 2009; Lertzman, 2008; Linden, 2006; Stokols, Misra, Runnerstrom, & Hipp, 2009; Swim et al., in press). While many of these sources are written by psychologists and other mental health professionals, a number of these authors are, ironically, natural and physical scientists and philosophers associated with climate change research (e.g., Flannery, 2006; Hamilton, 2010; Hulme, 2009). Although the literature addressing the psychological and mental health impacts of the threat of climate change is modest, it is particularly relevant, given the substantially psychological nature of public risk perceptions and threat appraisals (e.g., Doherty & Clayton, 2011; Gifford, 2007). This literature is itself diverse, including perspectives from health and clinical psychology, psychiatry, disaster mental health, a multidisciplinary risk communication and response literature, and environmental phenomenology (e.g., APA, 2009; Marshall, 2009; Pidgeon, 2010; Roszak, Gomes & Kanner, 1995; Stefanovich, 2000; Vlek & Steg, 2007).

A number of recent articles and research reviews on climate change and mental health have addressed various direct and indirect pathways through which the threat and physical environmental impacts of climate change may lead to adverse psychological and social impacts of concern, mental health, and well-being (e.g., Berry, Bowen & Kjellstrom, 2010; Doherty & Clayton, 2011).

Climate change has the potential to lead to adverse mental health outcomes through a number of pathways. First, there is an established body of literature outlining the adverse mental health impacts of natural disasters (such as floods, cyclone events, droughts, and fires) and the factors that can modify the risk of poor mental health outcomes in the event of such disasters. . . . The threat of climate change and its consequences may have wider psychological and social effects on communities through the impact on perceptions of safety, security and fears regarding the future. The methods and tenor of communication regarding the

actual or potential health and social risks associated with climate change will be important determinants of community emotional and behavioural responses. (NCCARF, 2009).

While the impacts of a changing climate taking place in biophysical environments and human settlements, and in the context of more structural social and governance systems, are being closely monitored and, to the extent possible, addressed, there are few corresponding evaluation or monitoring exercises taking place with respect to the human landscape of individual and community experience, risk perception, sense making, and psychological and behavioural responses. This is, unfortunately, a much neglected focus in climate change science and in general considerations of climate change adaptation and mitigation. The impacts of natural environmental changes and associated environmental consequences on individuals and communities are an integral part of environmental impact assessment and environmental protection legislation (e.g., Barrow, 1997; Reser & Bentrupperbäumer, 2001). Very little research and monitoring has been undertaken with respect to what is taking place at the level of individual experience, sense making, and psychological and behavioural response. Similarly, very little hard data exist with respect to the likely impacts of the threat of climate change on individual and community well-being, quality of life, perceived environmental quality, and mental health.

Psychological responses to the phenomenon of climate change are posing particular challenges for psychological understandings of fear, anxiety, and worry. Typically fear is related to something tangible, for example, one can be afraid of the dark, or of spiders, or of being alone, or of being in crowds. Fear is usually understandable, and many individuals would report having been frightened or of being fearful of something at some time in their life. Responses to fearful situations or stimuli are usually individualistic, and it is rare that a mass fear response is documented. Only in the case of extreme fear, such as a phobia, does a person usually seek help. Anxiety on the other hand, is considered to be more 'clinical', one may suffer with an anxiety disorders (e.g., social anxiety, health anxiety, panic disorder, posttraumatic stress disorder, or generalised anxiety disorder). These 'disorders' are often considered something to be managed, something to be overcome; they are considered treatable, with cognitive and behaviour therapies providing a suite of evidence-based individual and group protocols for helping anxious individuals learn to cope with and manage (and reduce) their anxiety. While worry is typically seen as more pervasive and similar to an enduring personality trait there are now evidence-based psychological therapies designed to assist worriers to manage to control and reduce their worrying (e.g., Davey & Wells, 2006, Leahy, 2005).

Anxiety disorders all share features of threat-relevant responding (e.g., Barlow, 1988; Beck & Emery, 1985; Craske & Waters, 2005), with components of anxious apprehension, fear, and avoidance present to a larger or lesser extent. While there has been considerable advances in the clinical psychology field with respect to the development, assessment, and treatment of threat in the context of anxiety disorders, less is known about how individuals manage anxiety in the face of threats that are far removed from everyday life, or in the context of continuing threat such as the threat

of climate change (e.g., Diamond, Lipsitz, Fajerman, & Rozenblat, 2010; Marshall et al., 2007; Oppenheimer & Todorov, 2006).

There are also those who deny the reality of climate change, and some who are still turning a blind eye to it. This is, of course, understandable. People are motivated to avoid ambiguity and uncertainty, and they can be seen to be more pessimistic when faced with ambiguous risk information. Similarly, psychologists acknowledge that in the face of overwhelming fear and anxiety about the future, denial is a common psychological defence mechanism. What better way to prevent being afraid, than to avoid? Avoidance is well documented as one of the most important factors that prevent individuals from dealing with and overcoming their fears. Defending against anxiety in the first place provides a perfect avoidance strategy for ‘not dealing’ with it. In addition, years of research into depression has indicated that when individuals feel a sense of helplessness to make any real changes in their lives, they refrain from doing anything. However, while avoidance-oriented coping has been associated with positive psychological outcomes in the short term, avoidant coping has also been related to increased distress in the longer term (Taylor & Stanton, 2007).

Anxiety is both protective and adaptive, and it can motivate people. An optimal level of anxiety is required in order for the fight and flight response to be activated (Selye, 1973) and appropriate responses to threats be made. As Epstein says, “living with risk can lead to anticipatory feelings such as anxiety that the eventual outcome will be bad, or hopefulness that it will be good” (2008, p. 1121). While the concept of threat is central to theories of stress as well as to theories of anxiety, the management of stress has been on events in the past or occurring currently. While anxiety management programs acknowledge anxiety for future events – these events are usually in the near future, rather than being in the distant future. With climate change, global warming and environmental threat, future-oriented proactive coping strategies such as building a reserve of resources in order to “mute the impact of events that are potential stressors” are required (Aspinwall, 2005; Folkman & Moskovich, 2004, p. 757).

As with the nuclear threat, we are dealing with a planetary and human consequence and meaning scenario that is genuinely anxiety inducing if not terrifying for many. There is a tendency in the climate change science discourse to not only overlook an individual level of analysis and human experience but also ignore the import, meaning, and significance of climate change representations and risk communications. Indeed the rather terrifying state of felt helplessness in the face of dire threat is often interpreted as apathy, and the raising of the mental health consequences of climate change can often be met with incredulity and scorn by some science-based colleagues.

But what if the ways we are thinking about apathy and denial are themselves misguided, and potentially damaging? What if the issue is not about caring too little, but perhaps too much? Is it possible that our anxieties about ecological problems, and the existential dilemmas they raise regarding how we are to live, can be so great as to be unmanageable or unthinkable? Might we unconsciously deny what is staring us in the face because what is at stake is too painful to consider? (Lertzman, 2008, p. 16)

According to Lertzman, lessons can be learned from the psychoanalytic perspective by “finding ways to inform and inspire, and stimulate action rather than paralysis” (p. 17). Somewhat similarly, a psychological perspective on managing anxiety taken from an acceptance and commitment approach (Hayes, Strosahl, & Wilson, 1999) suggests that negative reactions to one’s thoughts, feelings, or bodily sensations, as well as fusion with internal experience, lead to difficulties in monitoring, accepting, and interpreting emotion. As a result, the individual engages in experiential avoidance in an attempt to avoid these experiences, both behaviourally and cognitively. This avoidance reduces distress in the short term; however, in the long term it reinforces behavioural restriction as the individual becomes less engaged in valued activities (Roemer & Orsillo, 2002). In working with worried individuals, therapists can assist clients to accept the uncertainty, the fear, and the anxiety, while committing to activities that will be consistent with valued living (e.g., caring for the environment).

In the last year or so, there is the appearance of a growing number of concerned and anxious individuals presenting to therapists. In a recent report on the Columbia News Service, a therapist (eco-therapist) in Santa Fe, USA, reported seeing between 40 and 80 eco-anxious clients per month (Nobel, 2007). Albrecht at the University of Newcastle in Australia has introduced the term “solastalgia” (Albrecht, 2006, Albrecht et al., 2007) to describe the distress that is produced by environmental change (see Chapter 2, this volume). He argues that solastalgia exists “when there is recognition that the beloved place in which one resides is under assault” (2006: p. 32).

Climate Change and Place Meaning, Connection, and Identity

Many have argued the case that adverse environmental changes and progressive environmental degradation can lead to substantial environmental concern, distress, and both psychological and physical health consequences. A disparate set of literatures have addressed these matters, with particularly powerful accounts and discussions found in the natural and technological disaster literatures (e.g., Cvetkovich & Earl, 1992; Reyes & Jacobs, 2006), the contaminated environments literature (e.g., Adeola, 2009; Edelstein & Makofske, 1998), the psychosocial environmental impact assessment literature (Reser & Bentrupperbäumer, 2001), the environmental concern literature (Schmuck & Schultz, 2002; Gifford, 2007), the place attachment literature (Altman & Low, 1992; Groat, 1995), the ecopsychology literature (Randall, 2009; Roszak et al., 1995), and other discussions of encounters with dramatically altered and/or adversely impacted natural environments.

The issue and threat of climate change and its psychological significance and impacts relate to place in multiple ways. People’s connections to ‘where they live’, their ‘home’, backyard, street, neighbourhood, and region are typically very important, emotionally charged, and indeed an integral part of who they are. These connections and attachments are different from national or ethnic identity in that these feelings and sentiments are much more intimate, experiential, familiar, and

personal. The place where we live, or have lived, is backdrop to our lives in many ways, as silent witness, memory frame, ubiquitous companion, and view from the kitchen window. It is an encompassing 'material self'. The sights, sounds, and smells of 'our places' are evocative, restorative, and comforting. Equally, disturbance and change can be very disquieting, threatening, and disorienting. Clearly the unfolding impacts of climate change will mean that many of the natural and built environments in which people live will undergo dramatic and, in most cases, adverse change. These changes will in many cases be accompanied by increasingly severe and consequential extreme weather events and natural disasters such as severe storms, cyclones, flooding, bushfires, and prolonged drought. These environmental impacts will mean and have already been the cause of community relocations and forced migration and the associated human impacts of such relocations. The majority of people will see and experience environmental changes in familiar landscapes and natural areas along with seasonal weather pattern changes, often with associated biodiversity and agricultural productivity losses, and a very visible and symbolic 'environmental' deterioration. Such changes and impacts can be very personally salient and impactful, particularly in the case of one's garden, neighbourhood park, or a familiar and restorative place frequently visited.

An Australian Perspective

Modest research data exist on the psychological and societal responses of Australians to global or local climate change and climate change impacts. In contrast there exist a substantial and growing body of survey research data and more in-depth research findings on the perceptions, understandings, risk appraisals, thoughts and feelings, anxieties and concerns, and motivational and behavioural responses to climate change in North America and Europe. There are many reasons for thinking that public response to climate change in Australia might differ in important respects, given the unique nature of the Australian continent, its global location, geography and climatic systems, its history and experience with climate change-related natural disasters, its current exposure to climate change impacts, its differing media coverage, and its cultural contexts and perspectives with respect to environmental issues and challenges (e.g., Garnaut, 2008). Hence studying the psychological and social impacts of unfolding biophysical environmental impacts and weather-related natural disaster incidence and intensity is crucial to effectively addressing the human side of climate change impacts and adaptation strategies.

What particularly characterises the Australian geographic, climatic, and cultural contexts, however, is the dramatic presence of the full spectrum of natural disasters (e.g., Pittock, 2009). As well, Australia is deemed to be the inhabited continent most exposed to the potential ravages of global climate change, with a current public discourse and understanding that would appear to see and understand current natural disaster events and impacts as clear manifestations of unfolding climate change (e.g., Steffen, 2009; Garnaut, 2008). Given the predictions being made with respect to global warming and climate change, and the consequences of these

environmental changes on weather patterns in Australia, substantial concerns with respect to extreme weather events and an increased frequency and intensity of natural disasters exist. As discussed previously, the issue of the mental health impacts of climate change has had particular resonance in Australia.

Rural Australians live with various systematic disadvantages and many feel marginalised; climate change, especially drought, has worsened this. With drier conditions and more severe droughts expected in much of southern and eastern Australia over coming decades, and the demands for change and adaptation that this will present, we urgently need to understand the likely consequences for the mental health and well being of people in rural Australia. . . Australian communities and environments are diverse and climate change will have a variety of emotional and social impacts... It can be expected that the same loss of people, property, and possessions, dislocation from community and disruption of key social connections that precede or amplify the development of psychiatric disorders following acute disasters would apply equally in response to chronic disasters of equivalent magnitude. (Berry et al., 2008, pp. 3–6).

The circumstances of drought provide a useful window on the psychosocial and possible mental health impacts of global climate change in Australia (e.g., Morrissey & Reser, 2007; Satore et al., 2008). Australia has, of course, a recurrent history of prolonged drought-affecting extensive areas of the continent. Drought is a natural disaster with particular affinities with the projected manifestations and impacts of climate change. It takes the form of a 'slow emergency' and a pervasive condition of unrelieved environmental stress, with imperceptible beginnings and often no clear end point. From a rural and remote community perspective, sustained drought dramatically alters the appearance of landscape and country, as does dryland salinity. Gardens die, stock and crops die, water is rationed, and livelihoods are lost. In Australia the symbolic and socioeconomic impacts of the most recent decade-long drought for many have been interlinked with a very visible and dramatic rural decline across much of Australia, at the same time that global climate change has emerged as a salient and contested environmental, social, and political issue. The discourse of distress and mental health problems in rural and remote communities has been a collective conversation and shared experience in which depression, suicide, broken hopes, torn families, and dying towns have coincided with seemingly profound 'environmental' changes and the ever-present environmental problem and threat of climate change (e.g., Centre for Rural & Remote Mental Health [CRRMH], 2010). Australia has until recently been in the grip of a decade-long nationwide drought, has in the past several years experienced bushfires of unprecedented extent and intensity, and as this chapter is being written, is facing the worst nationwide floods in recorded history.

Can these quality of life and environment impacts of drought and parallel but possibly coincidental societal changes in the Australian economy and agricultural sector, and accompanying demographic redistributions, be considered psychosocial and mental health impacts of climate change? This is not a question that can be readily or clearly answered at this point in time. However it is clear that public understandings and 'idioms of distress' on the part of those living in areas dramatically altered by severe drought, bushfires, and floods, have embraced and implicated

'climate change' in a very noteworthy and consequential way. Rural and remote health workers themselves appear to have accepted this emergent and collective sense making narrative as a helpful framing of what is happening which is understandable, meaning-conferring, local and personal in terms of one's own experience and place, and possibly both adaptive and therapeutic (e.g., Morrissey & Reser, 2007).

Current Available Resources and Advice

Psychology has much to offer in developing evidence-informed resources and materials that can be disseminated to the general public and for use by health professionals and others in the context of disaster threats.

The American Psychological Association (APA) has been very active, especially since 9/11 and Hurricane Katrina in developing resources relating to coping with disasters. In Australia, The Australian Psychological Society (APS) has also developed a suite of materials to assist individuals and communities to understand psychological response to and impacts of both the threats of natural disasters and more recently the threat of climate change. The APS 'Tip Sheets' generally incorporate some information about the phenomena (e.g., climate change or psychological preparedness for cyclones or bushfires), as well as some tips for identifying the common reactions (emotional, cognitive, and behavioural) and some strategies for managing the feelings and behaviours that might result from the worry and concern that the particular impending threat is evoking. These Tip Sheets may be downloaded free of charge from the APS website:

https://www.psychology.org.au/publications/tip_sheets/climate/ and
https://www.psychology.org.au/publications/tip_sheets/disasters/

Other government and nongovernment agencies such as state governments, emergency management agencies, and the Red Cross in Australia also provide helpful information and advice, which includes psychological advice on their websites. In addition, a number of authors have also provided some general information (e.g., APS, Doherty & Clayton, 2011; Fritze, Blashki, Burke & Wiseman, 2008; Mainteny, 2002; Victorian Local Governance Association, 2009).

In general, one might expect such psychological advice to include the following:

- Provide tips to assist more accurate assessment of the climate change risks.
- Provide Information relating to probable (likely) reactions (emotions, cognitions, and behaviours).
- Suggest effective management of emotions and problem solving, including a focus on pro-social outcomes, and engagement in actions that have a reasonable chance of mitigation.
- Suggest and encourage action, providing an opportunity to 'respond personally', increase self-efficacy, participation, and competence, and help move individuals from despair and hopelessness.

- Direct people to appropriate resources to become more informed about problems and solutions (e.g., *The Weather Makers*, *An Inconvenient Truth*), as well as environmental websites, books, or magazines.
- Suggest that support groups are another way for people to improve their preparedness for climate-related impacts providing not only support but hope and positivity.
- Emphasise the notion of shared responsibility and the importance of collective action.
- Remind the individuals to be mindful of the amount of exposure to the radio, TV, Internet, and so on. Sometimes taking a break can be helpful and can provide a welcome relief.

The information provided should be appropriately optimistic about the future and reinforce that the future is not all bleak. It is helpful to acknowledge that there are many people who share similar concerns, who are working on protecting the environment and encouraging others to change their behaviour.

Concluding Observations

The psychological and well-being impacts of the threat and physical environmental impacts of climate change have been largely ignored in the climate change science discourse, in adaptation and mitigation policy discussions, in risk communication and management deliberations, and, ironically, in the dramatically expanding climate change and public health literature (Morrissey & Reser, 2007). There are many reasons why this is the case: the system, structures, and population levels of impact and mitigation considerations; the natural and physical science (and very selective social science) underpinnings of climate change science post IPCC; the challenges in distinguishing the psychological, mental health, and quality of life impacts of the threat of climate change from a dynamic and interacting set of other specific background threats, stressors, social and personal circumstance issues; and the dearth of appropriate and sensitive measures and monitoring systems in place to document important changes and impacts in the human environment and landscape as distinct from physical environments and ecosystems.

But perhaps the most important reason why psychological responses and mental health impacts generally have not been on the radar of climate change science is the fact that the psychological, social, and cultural realities and consequent impacts of the threat and risk domain of climate change have simply not been seriously factored into impact analyses and discussions, other than in terms of strategic behaviour and lifestyle changes and adjustments, and public health, safety, and security considerations and risk management procedures. While the media coverage and representation of the phenomenon, the science, the politics, and reported public response to global climate change has been everyone's distorting window on 'climate change', the psychological impact, adaptation, and well-being implications of such an indirect, virtual, socially constructed, and *mediated* encounter

with climate change for much of the developed, urbanised world have not been seriously considered or addressed. As well, of course, many countries and communities have been directly experiencing the physical environmental consequences of climate change for several decades, with the threat of climate change being much more of a here and now objective reality in terms of natural disaster intensities and extent, changing regional climate regimes inimicable to already-marginal agricultural and pastoral economies, severe water shortages, consequent social unrest and upheavals, and the growing numbers of climate change refugees. But what remains a basic and underlying reality in the context of climate change is that public risk perceptions, understandings, and responses to the threat of climate change are not only crucially important psychological and social realities, they themselves constitute critically significant and determining impacts of the threat of climate change.

There is increasingly little ambiguity in the survey research evidence respecting public concern levels about climate change. They are very high and have indeed been very high for the past decade, though competing concerns, major events of the day, and some degrees of apocalypse fatigue (Nordhaus & Shellenberger, 2009) and finite worry capacity (Weber, 2006) have eventuated in temporary falls in reported relative concern levels (Villar & Krosnick, 2010). But many have seen strategic opportunity in a populace very concerned about an environmental issue such as climate change, with these analysts ranging from journalists to commercial marketers, to political analysts and strategists, to social change agents, to public health, to environmental organizations, and to prospective researchers looking for funding. This interest in (and possible exploitation of) salient public concerns is an important and complex issue, with perceived media exaggeration, for example, being seen by many as substantially eroding public concern and adaptive action (e.g., Spence & Pidgeon, 2009).

It may well be that public concerns and very genuine and associated psychological and mental health impacts of the threat of climate change are at the same time being 'oversold' and 'undersold' despite climate change's unequivocal status and importance as a profoundly important and urgent environmental and social issue, risk domain, and psychological as well as physical health and sustainability challenge. As well, perhaps, the complexity of this objective phenomenon and its equally challenging socially constructed and represented 'environmental problem' character have confused and splintered societal and policy focus and resolve, as well as reflecting the reality of powerful and undercutting political and economic interests and tensions. The absence of clear and convincing data with respect to adverse psychological as well as social impacts of this still-virtual-for-many global threat has not assisted in bringing mental health implications and optimal psychological functioning 'in from the cold' with respect to public health and planning and policy deliberations. Notwithstanding the largely self-evident character of this clear and present global and societal danger and case, there has not been the transdisciplinary conceptual and paradigmatic scaffolding necessary to put psychological adaptation and the mental health impacts of climate change on the radar of governments, funding bodies, and climate change science. Hence we urgently need to

better communicate and collaboratively share this convergent body of work relating to the impacts of the global climate change on the human environment, and how these impacts both mediate and determine whether climate change adaptation and mitigation initiatives and policies in more conventional terms have any prospect of success.

While this chapter has focused on a more individual level, experience-based consideration of psychological responses and impacts to the threat of climate change, in keeping with our objective of addressing this area of crucial neglect, it is incumbent that we remind ourselves and our readers that in this context of environmental risk and change, apocalyptic scenarios, and human sense making and response, we cannot neglect that underlying change agent, adaptation process, and collective sense making apparatus that informs all individual experience, culture itself. Indeed cultural foundations and differences with respect to natural environmental connections, worldviews, and response to change have informed the social sciences from their inception. That literature specifically addressing culture and risk is of central importance to public understandings of and responses to 'climate change'. But ironically there is little clarity, particularly in our contemporary 'globalised' world of information technology-mediated social and environmental 'realities', with respect to where and how differing assumptive worlds are entering the equation regarding this global challenge requiring global human responses. It is clear that 'public' risk perceptions and understandings of climate change do not equate with climate change science accounts, even in those countries and cultures where such science enjoys reasonable public respect and trust.

Yet effective interventions in the case of adverse psychological and social impacts are premised on an informed understanding of prevailing environmental-lived experience, narratives, and values. It is noteworthy that those social psychological and risk perspectives within psychology that have played a leading role in better understanding the underlying cognitive science, and the social cognition, construction, representation, and social amplification and attenuation of risk (e.g., Pidgeon et al., 2003), have been more recently re-evaluating the very central nature and roles of cultural beliefs and values and associated affect in climate change adaptation and response (e.g., Kahan, 2010; Slovic, 2010). Australia is recognised as having an indigenous people who have been addressing and adapting to dramatic climate sequences for possibly 60,000 years. Traditionally oriented communities retain a literal identification and relationship with their natural environment, with the quality of this relationship being the touchstone and foundation for interdependent health and well-being (e.g., Rose, 1996). But indigenous communities in Australia, as throughout the world (e.g., Leduc, 2011), are well aware that destabilising environmental changes of profound consequence have been underway for at least several decades, with these changes and encompassing risk having genuinely cataclysmic implications in the context of cultural meaning systems and beliefs. In such communities, and indeed in more rural and remote subsistence communities throughout the world, the threat and environmental stress of climate change would appear to be exacting very real though largely undocumented human costs.

Postscript: Australian Survey Results

At this point in completing our chapter we have been analysing the results of a substantial national survey in Australia, undertaken in conjunction with Cardiff University's Understanding Risk Centre and a corresponding British national survey. The focus of the Australian survey was public risk perceptions, understandings, and responses to climate change and natural disasters in Australia (Reser et al., 2011). This survey specifically addressed levels of concern and reported psychological distress in the context of climate change, with multi-item scales utilised for these and a number of other parameters (e.g., psychological adaptation, direct experience, objective knowledge, self-efficacy, residential exposure). While a final analysis of this survey data has not been completed, initial findings are very relevant to matters canvassed in this chapter. The study included a geographically stratified sample of 3096 Australian respondents and 1822 from Britain residing specifically in England, Scotland, and Wales. This study provided a unique opportunity to document and monitor important psychological and social changes and impacts in the human landscape in relation to global climate change, with this important study to be replicated in Australia in June 2011.

The research found high levels of climate change concern with a composite measure including seriousness of the problem, sense of urgency to reduce the problem, personal and societal concerns, and perceived importance of the issue. Several single comparison items were used to assess general levels of concern relating to climate change for both Australia and Britain with very similar results found for both countries. Respondents overall were 'very' or 'fairly' concerned about climate change, 66 and 71%, respectively. (Response format was a four-point scale, with two additional options of 'don't know' and 'no opinion'.)

The Australian survey additionally sought to address psychological distress with a seven-item measure designed by the research team. Across all respondents the averaged results indicated moderate levels of distress when thinking about and responding to the threat of climate change. More specifically, when reviewing each of the items individually, it became clear that a large proportion of respondents indicated very strong levels of distress relating to specific aspects of the climate change threat. A large number of respondents, for example, were very or fairly worried about what the world will really be like for future generations because of climate change (38%), with a further 24% experiencing some distress each time they saw or read media coverage as to the likely impacts and consequences of climate change. Other respondents were upset that there seemed to be so little that they could do to address environmental problems such as climate change (23%). Respondents were less likely to endorse items such as 'climate change is affecting my quality of life and my assessment of environmental quality more generally' (9%) and 'I feel some sense of loss because of the climate change impacts that are becoming apparent in my area' (12%). These results suggest appreciable *psychological distress* as well as *concern* at the nature and implications of the threat of climate change. Initial correlation analyses indicate that this psychological distress in the context of climate change measure correlated strongly with measures of climate change concern

($r = 0.84$), risk perception ($r = 0.73$), and psychological adaptation ($r = 0.78$), further suggesting important mediating roles and outcomes with respect to climate change distress. It will be important to compare and contrast the results of programmatic national survey and monitoring exercises such as this with more focused psychosocial impact assessment and community health and mental health studies in specific regions with differing notional exposures to the impacts of climate change, extreme weather events, and/or other salient environmental changes.

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