

- Paterson, M. (2006) *Consumption and everyday life*, London: Routledge.
- Popke, J. (2006) Geography and ethics: Everyday mediations through care and consumption, *Progress in Human Geography* 30 (4), 504–12.
- (2009) 'Geography and ethics: non-representational encounters, collective responsibility and economic difference', *Progress in Human Geography* 33 (1), 81–90.
- Prudham, S. (2007) 'The fictions of autonomous invention: accumulation by dis-possession, commodification, and life patents in Canada', *Antipode* 39 (3), 406–29.
- Redmond, S. and S. Holmes (2007) *Stardom and celebrity: A reader*, London: Sage.
- Richey, L. and S. Ponte (2008) 'Better (RED)TM than dead: Celebrities, consumption and international aid', *Third World Quarterly* 29 (4), 711–29.
- Robbins, P. (2001) 'Fixed categories in portable landscape: The causes and consequences of land cover categorization', *Environment and Planning A* 33 (1), 161–79.
- (2004) *Political Ecology: A Critical Introduction*, London: Blackwell Publishers.
- Roddy, M. (2008) 'Skiers tell UN climate talks "save our snows"', *Reuters*, 5 December, www.reuters.com/article/latestCrisis/idUSL5419888 (accessed 20 December 2008).
- Rosati, C. (2007) 'Media geographies; uncovering the spatial politics of images', *Geography Compass* 1 (5), 995–1,014.
- Sassatelli, R. (2006) 'Virtue, responsibility and consumer choice: Framing critical consumerism', in J. Brewer and F. Trentmann (eds), *Consuming cultures, global perspectives: Historical trajectories, transnational exchanges*, London: Berg, 219–50.
- Schickel, R. (2000) *Intimate strangers: The culture of celebrity in America*, Chicago, IL: Ivan R. Dee.
- Scott, D. and B. Jones (2006) 'The impact of climate change on golf participation in the Greater Toronto Area (GTA): a case study', *Journal of Leisure Research* 38 (3), 363–80.
- Seabrook, J. (2000) *Nobrow: The culture of marketing and the marketing of culture*, New York: Vintage.
- Seyfang, G. (2005) 'Shopping for sustainability: Can sustainable consumption promote ecological citizenship?', *Environmental Politics* 14 (2), 290–306.
- Singer, S. (2002) 'Warrior One', *Vogue*, October.
- Slocum, R. (2004) 'Polar bears and energy-efficient lightbulbs: Strategies to bring climate change home', *Environment and Planning D: Society and Space* 22, 413–38.
- Street, J. (2004) 'Celebrity politicians: popular culture and political representation', *The British Journal of Politics and International Relations* 6 (4), 435–52.
- Swyngedouw, E. (2007) 'Impossible sustainability and the post-political condition', in *The sustainable development paradox: urban political economy in the United States and Europe*, New York: Guildford Press, 13–40.
- Weart, S. (2003) *The discovery of global warming*, Cambridge, MA: Harvard University Press.
- Weiskel, T. (2005) 'From sidekick to sideshow: Celebrity, entertainment, and the politics of distraction', *American Behavioral Scientist* 49 (3), 393–409.
- Whatmore, S. (2002) *Hybrid geographies: Natures, cultures, spaces*, London: Sage.
- Wolff, A. (2007) 'Sports and global warming: as the planet changes, so do the games we play – time to pay attention', *Sports Illustrated*, 12 March, 36–45.

Costly Knowledge— Unaffordable Denial: The Politics of Public Understanding and Engagement on Climate Change

SUSANNE C. MOSER

WHICH FUTURE WORLD?

It is the year 2050, two years into the presidency of a newly elected US President. Asian and European leaders are meeting with their North American counterparts at the 56th Conference of the Parties to discuss anew adaptation aid for developing nations. Tensions run high as monetary aid is much needed in the poorest nations of the world to deal with the consequences of climate change, yet developed nations are hardly in a position to assist their less developed neighbours. With global greenhouse gas emissions reduced more than 80% below 2000 levels and carbon markets generating only small revenues now to maintain the Adaptation Fund, the hardest hit nations are demanding new funding mechanisms to support their adaptation and coping needs. Developed nations in turn have trouble financing their own adaptation projects, as cities have to be protected from rapidly rising seas, water supplies are limited and food production is declining. Research cannot keep pace with the newly emerging public health challenges. The remarkable transformation of the energy and transportation sectors has stimulated enormous economic growth, but the loss of biodiversity and ecosystem services require massive compensatory programmes and interventions. The world that has made good on its policy promises in the early years of the 21st century has indeed averted more catastrophic increases in greenhouse gas concentrations and temperatures, yet adaptation is a persistent and expensive 'industry'.

This fictitious snapshot of the politics in the world of 2050 presents, alarming as that may be, an optimistic image. In a January 2009 hearing in the US Senate's Foreign Relations Committee, Democratic Chairman, Senator John Kerry, made that abundantly clear in his opening remarks. He stated:

A partnership led by the University of Pennsylvania, MIT [Massachusetts Institute of Technology], and the Heinz Center recently aggregated the impact of all the domestic policy proposals that every country currently talking about doing something [about their greenhouse gas emissions] has laid out, including President Obama's aggressive goal of 80% reductions by 2050. What they found was sobering. If every nation were to make good on its existing promises – *if* they were able to; there is no indication yet that we are – we would still see atmospheric carbon dioxide levels well above 600 parts per million, 50% above where we are today. This translates into global average temperatures at least 4 degrees Celsius above pre-industrial levels and no one in the scientific community disputes that this would be catastrophic. That is why we need more than just a policy shift. We need a transformation in public policy thinking to embrace the reality of what science is telling us. We must accept its implications and then act in accordance to the full scope and urgency of the problem.

(Kerry 2009)

The imagined policy challenge in 2050 described at the opening of this chapter thus emerges as the comparatively 'easy' world that policy-makers, resource managers and individuals get to navigate if the dramatic policy transformation invoked by Senator Kerry will have occurred in the early years of the 21st century. The *realpolitik* of our times demands, however, that we also imagine a far darker alternative—a world that did not manage to achieve such substantial emissions reductions, a world facing the impacts of a frightfully warmer world, with catastrophic, economy-crippling consequences, where coastal cities are abandoned or relocated inland, where hunger and drought are widespread, even in formerly rich, mid-latitudinal countries, where old and new diseases are rampant, and where tensions between nations vying for limited essential resources frequently erupt. Living from catastrophe to catastrophe may become a phenomenon not just common in poor nations.

Whatever the reality will be in just one or two generations from now, climate change is likely to manifest far more clearly in our lives than at present, especially in some regions of the world (such as the polar and dry, subtropical regions), for some sectors, and for those most vulnerable to climate variability and extremes. Whether the world of 2050 is a hugely transformed one with moderate adaptation needs or one trying to survive one crisis after another, one may legitimately ask: How did we get to this future world?

THE POLITICS OF PUBLIC UNDERSTANDING AND ENGAGEMENT ON CLIMATE CHANGE

This chapter attempts to answer this question from the standpoint of public understanding and engagement on climate change. It rests on the basic assumption that no matter which international climate treaties will be signed, no matter which national policy mechanisms are chosen to realize these

multi-lateral commitments, political support and engagement of the public will be required for any political leader to realize them. In democratic societies, advocacy groups and voting individuals must actively advocate, shape and support, vote for, or at least quietly acquiesce to any proposed policy. Societies and their individual members must also engage practically by adopting into their daily lives the changes, policies, technologies, and shifting consumer and travel choices which policies and markets have set in motion. Thus, both political pragmatism and normative arguments suggest that the future world is unavoidably dependent on the degree to which the public is engaged on the issue of climate change (Moser 2008; see also Halpern and Bates 2004). This basic assumption does not imply that such democratic engagement is efficient in the short run or that it can guarantee ecological survival and the socially most desirable results, certainly not for everyone. On the other hand, the counterfactual—a technocratic or ecofascist world in which democracy and public engagement are ignored—may well produce significant resistance, defiance and obstinate refusal to change that would make it even less likely to achieve rapid and substantial emissions reductions. I will return to this discussion of political alternatives again in the concluding section, as there is considerable discussion in the literature and important considerations follow from it for the politics of public understanding and engagement (see, for example, the review in Ockwell et al. 2009; or Bartels 2001). The challenge before policy-makers today thus is not only to produce viable and effective international policy solutions involving technological and economic means (as discussed, for example, in the chapters by Newell and Paterson, Okereke, and Schroeder in this volume), but to educate, bring along, gain the support of, and actively engage their various publics.

By public 'engagement' I mean more than a level of awareness or even a high rating of the issue's importance in public opinion surveys. Engagement is defined here similarly as in Lorenzoni et al. (2007), who identified three dimensions of people's connection to the issue: 1) a cognitive dimension (related to people mentally grappling with and gaining understanding of the issue); 2) an affective dimension (reflecting an emotional response to the information and knowledge, such as interest or concern); and 3) a behavioural dimension (illustrated by people's active response through some kind of action, including pragmatic changes in climate-relevant, frequently habitual behaviour and political action) (see also Maibach et al. 2008; Nisbet and Kotcher 2009; Ockwell et al. 2009). An implicit normative assumption in Lorenzoni et al.'s (2007) definition is that such engagement will lead to climate-friendly behaviour, as opposed to activism that defends a status quo marked by heavy reliance on fossil fuels, energy-intensive economic development, wasteful modern-day conveniences and lifestyles; aims to confuse the public; or fights against climate legislation. While this chapter adopts the normative goal implied by Lorenzoni et al. (2007), it recognizes the central importance of certain actors working *against* greater public understanding that is consistent with scientific understanding and active engagement as defined above. This

chapter focuses on the challenges and politics of achieving positive, climate-protective public engagement, particularly in developed nations, with an emphasis on the USA. This focus is largely determined by the greater availability of surveys and in-depth studies in developed nations, especially in the USA and the United Kingdom. While some of the challenges that will be identified below (e.g. scientific literacy, changing habitual behaviour, the contextual importance of institutions and infrastructure in determining behavioural choices) may be quite similar in other nations and beyond the developed world, caution is warranted in transferring insights from these locations to other, especially less-developed nations.

If politics are not just understood as the affairs of a state, but also as the struggle for dominance among political opinions and sympathies, attitudes and positions, and, therefore, as a matter of power struggles among members of a society who hold different beliefs and political convictions, then the politics of public understanding and engagement on climate change is a struggle over who communicates and advocates what. It is a struggle over who knows what and how much; what it means in terms of individual and common interests and stakes; and what it implies in terms of action. It reflects how members of society with their different understandings and interests enact their personal and political convictions, and how they come together to form coalitions behind different policy proposals to support the political actors who can enact or block them. In the politics of public understanding and engagement, information and knowledge become resources that can empower and enable, but also challenge and obligate people to respond in certain ways. They can also become means to disempower and overwhelm individuals. In either case, information and knowledge become strategic goods and tools to communicators—a notion maybe anathema to scientists who insist on the objectivity, policy neutrality, or sometimes self-evidence of their claims, but familiar to advocates who use them deliberately to persuade, engage, confuse, disassociate, or otherwise influence their audiences, sometimes with inadvertent consequences. To achieve public engagement, then, in the ways defined above, communicators and advocates have to overcome a variety of barriers that stand in the way of people's cognitive, affective and behavioural connection with the issue. This chapter conceptualizes overcoming these barriers as 'costs'. While the use of an economic metaphor is intentional, the notion of 'costs' is by no means limited to a matter of money, financial losses, opportunities, or gains. Instead, the 'costs' incurred in the politics of climate change communication and public engagement may be financial, but are first and foremost cognitive, psychological, behavioural, social and cultural, and are borne by the public and those who try to foster or hinder greater public understanding and engagement. As we will see in this chapter, these costs arise from the structural, institutional and economic contexts that mediate and magnify the politics of communication and engagement on climate change, and thus cannot be understood if divorced from the structural forces that shape societal interactions and responses to global environmental change.

There also quite likely are significant 'benefits' to be gained from greater understanding and engagement with climate change. These may range from personal psychological gains such as knowledgeability, satisfaction, sense of self-worth and integrity; to social gains such as being accepted, admired, or in a leadership position; to practical gains such as lower energy consumption and consequent financial savings; to the penultimate social-environmental gain of socio-economic well-being, safety, environmental protection and species preservation. These potential gains are frequently motivational for individuals, organizations or communities to engage with the climate change issue, but are rarely sufficient to overcome the barriers typically encountered (Moser and Dilling 2007b). To better understand why even high understanding, concern or other motivations do not necessarily lead to active behavioural and political engagement, it is critical to recognize the many costs involved in overcoming them.

THE STATE OF PUBLIC OPINION, UNDERSTANDING AND ENGAGEMENT

To begin to appreciate the costs of engaging on climate change, then, it is essential to establish where the public is at this time in terms of its attitudes, understanding and active involvement with climate change. Public opinion polls abound on the issue, especially in the USA and the United Kingdom, but to a lesser extent in other developed, and some in developing nations, that allow for trend analysis over time. In the USA and the United Kingdom a number of surveys have been conducted repeatedly by individual researchers and surveying organizations (such as the Pew Research Center for the People and the Press, the Gallup Poll/EOS Gallup Europe, or The PIPA/Knowledge Networks Poll, GlobeScan's Climate Change Monitor, the Eurobarometer, the BBC, Ipsos/MORI and The Nielson Company). Nisbet and Myers (2007), updated by Moser (2008), recently reviewed more than 20 years of such polling information for the USA and found consistent and perplexing trends. Brewer (2003, 2005a, 2005b) has been following changes in public attitudes internationally, and other—regionally specific—in-depth reviews and analyses are occasionally published (e.g., Leiserowitz 2007b; Brechin 2003; Lorenzoni and Pidgeon 2006). Below, some of these findings are discussed, with particular emphasis on the data-rich countries (the USA and United Kingdom).

Awareness and Understanding

The greatest gains over the past 20 or more years have been made in terms of raising public awareness of climate change—a first indicator of cognitive engagement with the issue. The generally upward trend over the last two decades has been modified only by variability in media attention to the issue. In the USA, in 2006, 90% of Americans said they had heard of the

greenhouse effect or global warming, and figures have remained at this level since (Nisbet and Myers 2007, 444–47). Some US location-specific surveys have found virtually universal awareness (e.g. Semenza et al. 2008). A 2007 international comparison of attitudes in 21 countries—using a slightly different wording—found that while some European countries (France and Great Britain) showed a generally higher level of issue awareness than the USA or Canada, other European nations (e.g., Germany and some of the Mediterranean countries) did not (BBC World Service 2007). The most recent Eurobarometer did not ask this question (Directorate-General for Communication of the European Commission 2008). Moreover, such snapshots can be difficult to evaluate out of context and without a historical perspective. In a review of a range of international survey data, Brewer (2006) found, however, that awareness and concern (see below) have risen almost universally and in some instances quite dramatically (15–20% over three to five years) in the early years of the 21st century (see also Leiserowitz 2007b).

In the USA, for which the most detailed data are available, two different polls conducted in April and July 2007 found that between 72% and more than 80% of Americans believed that rising carbon dioxide levels and global temperature increases were ‘real’ (ABC News, Washington Post and Stanford University 2007; Leiserowitz 2007a). However, more recent audience segmentation studies of the American population show a more differentiated picture. In two repeat polls, the authors differentiated six segments of the public, three of which—the Alarmed, the Concerned and the Cautious—were somewhere between completely and mostly convinced that global warming was a reality, while the other three—the Unconcerned, the Doubtful and the Dismissive—were hardly or not at all convinced that climate change was happening (Leiserowitz et al. 2008; Maibach et al. 2009). Audience segmentation studies in the United Kingdom and in Canada show similar patterns, albeit with nationally and regionally specific variations (Angus Reid Strategies 2007a, 2007b, 2007c; Davidson et al. 2009; Downing and Ballantyne 2007).

Even less encouraging are the findings in terms of changes over time in public understanding of climate change. According to Nisbet and Myers (2007, 447) for the USA, ‘Twenty years after scientists and journalists first alerted the public to the potential problem of global warming, few Americans are confident that they fully grasp the complexities of the issue, and on questions measuring actual knowledge about either the science or the policy involved, the public scores very low’. In fact, a Gallup Poll in 2008 found that only 21% of Americans say that they understand climate change ‘very well’ (Gallup 2008). Factual knowledge (for example, about what does and does not constitute a significant cause of climate change) remains shaky, and the percentage of people being able to give correct answers to true/false questions about climate change have not changed significantly over the past decade. In a survey published in early 2009, 44% of likely US voters believed that global warming was caused by natural, planetary trends rather than by human activity; a smaller percentage (41%) was convinced otherwise (Rasmussen

Report 2009). Just one year earlier only 34% believed climate change was an all-natural phenomenon, and that again was a few percentage points higher than in 2007—at the height of US news coverage on anthropogenic climate change (Leiserowitz 2007a).

The situation is hardly more encouraging elsewhere. Only 10 years ago, in the 1999 GlobeScan survey of 25 developed and developing nations, when respondents were asked about the ‘main cause of the greenhouse effect’, the depletion of the earth’s ozone layer was—of course, erroneously, but almost universally across the entire set of nations—considered the number one cause of global warming (see summary and discussion in Leiserowitz 2007b).

After a decade of news reporting, online information and science education, in a 2006 survey of British citizens, 69% of respondents believed they knew ‘a great deal’ or a ‘fair amount’ about climate change, yet 41% of respondents were out of step with the IPCC conclusions, still believing that the causes of global warming are equally natural and human (Downing and Ballantyne 2007). Moreover, the number one action thought to alleviate climate change—chosen by 40% of the respondents—was (erroneously) recycling. Maybe not surprisingly, 63% of the British say they would like to have more information about climate change (Downing and Ballantyne 2007).

The most recent Eurobarometer suggests that Europe-wide, 9% feel very well informed about climate change, 47% feel fairly well informed, and the remaining more than 40% feel not very well or not at all informed about climate change. In this subjective self-assessment, Nordic and Western Europeans generally say they understand the issue better than other Europeans. Factual knowledge, though, was not tested to be able to assess what ‘well informed’ means (Directorate-General for Communication of the European Commission 2008). In Canada in 2007, 77% were convinced that global warming was real, and 70% believed that the science behind human-induced climate change was ‘true’, though detailed understanding of causes and impacts were significantly lower and more variable across segments of the population (Angus Reid Strategies 2007b).

As for Americans’ perceptions of whether or not scientists agree about the reality, seriousness and causes of climate change, opinions have varied significantly over time. This variability reflects changes in science understanding, reporting practices in the media, and the efforts by conservative politicians, think tanks and fossil fuel-funded activists to spread contrarian and denialist thoughts, deliberately try to confuse the public, deliberately play on the ignorance of the lay public with scientific factoids taken out of context, and deliberately use scientific insignia and credentials to invoke a sense of credibility when they have none. The result has been to sow just enough doubt in Americans’ minds to undermine confidence in scientific conclusions (Boykoff 2007a, 2007b; Boykoff and Boykoff 2004; Davidson 2008; Krosnick et al. 2000; Lahsen 2008; McCright and Dunlap 2001, 2003). In the 2008 Gallup Poll, the highest percentage of Americans ever (65%) believed that ‘most scientists believe that global warming is occurring’ (Gallup 2008), but again,

audience segmentation suggests that Americans are quite distinctly and increasingly divided, roughly along Democratic/Republican or liberal-to-moderate/conservative lines on this question (Dunlap and McCright 2008; Leiserowitz et al. 2008). Compare this with a similar question asked in the United Kingdom: the 2008 Ipsos MORI update of British attitudes and opinions on global warming found significant uncertainty (and misperception of the actual reality) among respondents about the scientific consensus. A full 60% of the population believed that 'scientific experts still question if humans are contributing to climate change' (Downing 2008).

Concern

The level of affective connection to climate change is variably assessed, if maybe inadequately, by measuring levels of public concern or personal worry (Kahlor and Rosenthal 2009). Few opinion polls examine a wider range of affective responses to climate change (e.g. levels of interest, fear or dread, level of optimism or pessimism about the future), though anecdotal evidence (e.g. Anthes 2009) and some empirical studies (such as detailed interviews, focus group studies) have revealed a broader range of emotions (e.g. Immerwahr 1999; Leiserowitz 2006; Lowe 2006; Lowe et al. 2006; O'Neill and Nicholson-Cole 2009; Stoll-Kleemann et al. 2001). One way to assess the level of concern is the common question about whether or not individuals believe that the impacts of climate change have already begun to manifest, will soon, or will do so only in the future, if at all. The 2008 Gallup Poll suggests for the US population that a growing proportion of Americans believe global warming will pose a serious threat in their own lifetimes—now 40%, up from 35% in 2006 and 31% in 2001 (Gallup 2008). A 2006 British survey found similar figures, with 45% of respondents saying that they view climate change as 'the most serious threat' to the future well-being of the world (though a much smaller number, 19%, believed it would be so for Britain) (Downing and Ballantyne 2007). Europe-wide, in 2007 respondents believed that global warming/climate change was only second in overall seriousness to global poverty (including a lack of food and drinking water), with 62% of Europeans believing that the climate issue is the most serious issue facing the world now. When the degree of seriousness was judged on a scale from 1 (not at all serious) to 10 (extremely serious), no country had fewer than 59% ranking global warming in the top category (7–10 on the seriousness scale). Interestingly, the lowest ranking country (at 59%) was the United Kingdom, while the European average was at 75% and some of the southern and eastern European countries, which recently had experienced weather extremes such as droughts and floods, ranked highest, with more than 80% or even 90% believing that climate change is a very serious issue (Directorate-General for Communication of the European Commission 2008).

As for whether or not the impacts of climate change are already being felt, 65% of Americans—the highest percentage since the survey began asking this

question in 2001—believe the effects of global warming are already manifest or will happen within a few years (Gallup 2008). Other surveys show that even if Americans believe the impacts are already beginning to manifest, pluralities still view climate change as primarily a threat to other species, to people in far-away places, or to Americans elsewhere, but far less so to their own communities or families. Many still do not view the threat as particularly severe, even for other species and the environment (Leiserowitz 2007a; Moser 2008). An in-depth review of studies and surveys undertaken in the United Kingdom suggests similarly that the threat of global warming is mostly viewed still as a distant one (Lorenzoni and Pidgeon 2006).

While the percentage of Americans saying that global warming is either 'extremely' or 'very' important to them personally has grown from 27% in 1997 to 52% in 2007, the level of people's personal 'worry' has varied considerably over time. Similar variability has been shown among Europeans (for environmental attitude surveys by Ipsos/MORI and the Eurobarometer, see www.ipsos-mori.com and ec.europa.eu/public_opinion/archives/eb_special_en.htm). In the 2006 Pew Global Attitudes Survey, when respondents from various developed and developing nations were asked about their personal worry about global warming, levels were generally lower than perceived seriousness and greatly varied across countries. Direct threats to respondents or to their families in the next 10 years produced significant numbers only among developing nations, but remained consistently below about 20% among developed nation respondents (see summary and discussion in Leiserowitz 2007b). This variability reflects reporting cycles in the news media, direct experience with the vagaries of climate, and competing worries (for example, basic needs being met or not, the economy, jobs, health care, or terrorism since 2001) (e.g. Weber 2006). In the 2008 Gallup Poll, the proportion of Americans saying they personally worried 'a great deal' about global warming declined from the previous year's high of 41% to 37%; the combined proportion of those worrying 'a great deal' and 'a fair amount' (66% in 2008) was only 3% higher than when the question was first asked in 1989 (Gallup 2008).

Over the years, climate change has consistently ranked lower than most other environmental problems on people's list of concerns and far below most non-environmental issues (e.g. Macnaghten 2003; Poortinga and Pidgeon 2003). In 2007, an unprecedented 33% of Americans in open-ended questions offered global warming for the first time as the top global environmental problem (ABC News, Washington Post and Stanford University 2007). A similarly high ranking has been reported across Europe (Directorate-General for Communication of the European Commission 2008). Since then, the issue has resumed its more common position well below other issues. For example, in a January 2009 survey, American respondents assessed 20 policy priorities, ranking energy as number six, the environment as number 16, and global warming fading far behind the economy, jobs, terrorism, or any other issue as number 20 (The Pew Research Center for the People & the Press 2009). By general comparison, in an 'economy vs. environment' importance ranking by

the British population, the economy has always been more important than the environment—with exceptional years where both ranked almost the same—but in mid-2007, with the stock market collapse and economic recession in full swing, the economy surpassed the environment in relative importance by a 10:1 margin, and has not returned to historical levels since (Downing 2008). While not specific to climate change, such data suggest that climate change—conceived of as an environmental issue—also may have suffered a decline in societal importance during the recent economic crisis.

Personal Actions and Policy Support

The behavioural dimension of public engagement can be assessed by looking at different indicators of political support for particular mitigation strategies, political activism, behavioural changes and consumer choices. Since individuals do not get to vote on international or national policy proposals directly, surveys assessing categorical support must serve as proxies. Over the past two decades, surveys have revealed variable support for immediate (if unspecified) action to slow global warming. For example, in a 2007, 21-country comparison conducted by the BBC World Service, a significant majority (65%) of all respondents believed that there was a 'need for major action'. The countries with the largest majorities favouring taking major steps on climate change included Spain (91%), Italy (86%) and France (85%), as well as several Latin American countries, such as Mexico (83%), Chile (78%) and Brazil (76%) (BBC World Service 2007). While indicative of pervasive values (e.g. pro-environment, pro-social justice, precaution), such survey questions offer only limited insight into 'active engagement' as previously defined.

Similarly, in the US population, while support for policy action has generally risen in recent years (much dependent on how the questions are asked), many Americans still prefer doing more research, reflecting their general insecurity about the state of knowledge and varying perceptions of seriousness. In recent years, though, a plurality of Americans has emerged that seems to favour 'action now' versus 'wait and see' (see the review in Nisbet and Myers 2007). Support for actions has generally been lower during economic downturns, especially if actions involved economic costs, but surveys from the early years of the 21st century indicate a growing number of Americans favouring action even if it involves some costs. The low ranking of global warming in the 2009 Pew Research Center survey and political debates in the USA around economic recovery measures, however, put in question how solid the support is among Americans (and that of many members of Congress) for climate change action during crisis times and when personal interests and income are at stake.

Questions about more specific policy options, actions taken, or behavioural intentions may be more revealing (if maybe not conclusive). For example, surveys show rather consistent support among Americans for mandatory regulations imposed on industry and automobile manufacturers, as well as on

utilities. Especially higher fuel efficiency standards on vehicles are consistently favoured by a majority of Americans, even if vehicle costs would increase (Nisbet and Myers 2007). Interestingly, when asked directly about the type of car Americans own or are likely to purchase, a recent survey revealed that only 21% of Americans currently own a vehicle that gets 30 miles per gallon (about 7.8 litres/100 km) or more, and while another 61% would like to buy such a vehicle, 40% believe they probably will not do so because of high costs and other reasons (Leiserowitz et al. 2009).

In terms of Americans' other energy saving behaviours—either already adopted or intended in the near future—recent research found quite optimistically that, '[o]verall roughly half of Americans say they have already made energy-efficiency improvements to their homes', although percentages varied significantly by the type and level of investment in different activities (Leiserowitz et al. 2009). Similarly, among the British there is strong support for climate-protective technologies (e.g. renewables) and related policy changes (Ipsos/MORI 2008, see Downing 2008). Moreover, 78% of the population responded in 2006 that they would be prepared to change their behaviour to help limit climate change (though only 22% felt strongly so). When asked specifically whether they had any plans to change their air travel behaviour, however, 70% intended to take 'about the same number of flights' in the next 12 months as they did previously (Downing and Ballantyne 2007). A recent review of Canadians' willingness to act on climate change and actual engagement found that 'Canadians vary in the level of action they take with respect to their global warming beliefs' (Moser 2009): 23% didn't believe in global warming and were completely opposed to action (identified by surveyors as 'skeptics'); 16% had not yet made up their mind on global warming ('agnostics') and tended not to act consciously in climate-friendly ways; another 22% (the 'converts') did not act on climate change either, but felt guilty about their lack of environmentally conscious behaviour; the 22% of Canadians identified as 'believers' were far more environmentally conscious and behaved accordingly; and a final 18% of 'activists' acted most environmentally conscious and fervently tried to convert others to do the same (Angus Reid Strategies 2007c, percentages do not add up to 100% due to rounding error). Taken together, these data suggest that 'about six out of 10 Canadians either doubt the need for action and/or do not act on their beliefs for action' (Moser 2009).

Several of the recent surveys on behavioural engagement and intention found that respondents would be interested in taking additional steps in the coming year, but cost, inconvenience, or competing priorities stand in the way (Leiserowitz et al. 2009). British respondents in addition found the lack of logistical support (such as amenities to help with recycling), lack of time, lack of interest, or an attitude that a single person's action would make no difference among the most pervasive action barriers preventing more environmentally friendly behaviour (Downing and Ballantyne 2007). These barriers to becoming more practically engaged will be discussed further below, as they

speak to the range of 'costs' involved in the politics of public engagement. The findings also reflect the well-established fact—not just from survey studies but also from in-depth research of environmentally significant behaviour (e.g. Verplanken 2006; Verplanken and Aarts 1999; Verplanken and Orbell 2003; Verplanken and Wood 2006)—that habitual behaviour is particularly hard to change. The shift to more climate-friendly behaviour can be enabled and sustained, however, by pertinent economic, social and infrastructure conditions and support. The resulting new routines and habits can be equally persistent and even supportive of adopting additional green behaviours (Costanzo et al. 1986; de Young 1993; Gardner and Stern 2002; Knussen and Yule 2008; Kollmuss and Agyeman 2002; McKenzie-Mohr 2000; Prochaska 2003; Barr 2008; Tudor et al. 2008). A case in point is that relatively 'easy' energy saving actions—such as turning off unnecessary lights—are already being taken by more than nine out of 10 Americans, while only 20% always or often take public transportation, car pool, walk or cycle instead of driving (Leiserowitz et al. 2009).

In summary, surveys over the years find rather consistently that large numbers of individuals from a diverse set of nations support international policy commitments, even though factual knowledge of what they would entail is extremely limited, and probably reflect basic value commitments to fairness, leadership and equitable co-operation. Many individuals expect their governments to take proactive leadership roles in international negotiations, but most believe that everyone in society (including industry and businesses, all levels of government, civic institutions and individuals themselves) must do more to tackle climate change (e.g. Directorate-General for Communication of the European Commission 2008; Downing and Ballantyne 2007; Ipsos/MORI 2008 in Downing 2008; Leiserowitz 2007b; The Nielsen Company and Oxford University 2007). They also support mandatory policies at the national, state and local levels if they affect others or their own pocket-books only marginally, but generally prefer incentives over taxes or regulatory approaches to support individual actions. If policies involve personal costs, support tends to decline, but recovers a little if the generated revenues are used to fight global warming, and if they are perceived as fair and applying to everyone (e.g. Brewer 2006; GfK Roper Public Affairs & Media and Yale School of Forestry & Environmental Studies 2007; Krosnick et al. 2000; Leiserowitz et al. 2008, 2009; Next 10 and Field Research Corporation 2007; Nisbet and Myers 2007).

This review also suggests that there are ample opportunities for increasing the level of cognitive, affective and behavioural engagement of individuals. At each level, untapped or insufficiently utilized potentials, frames, emotions, motivations, actors and actions are available to help people become more involved. Yet these opportunities are unlikely to be realized without equal attention to the barriers that prevent individuals from engaging more (Moser and Dilling 2007a). This would include, but certainly not be limited to, removing erroneous or misguided beliefs many individuals still appear to hold that either nothing

needs to be done, nothing can be done to slow climate change, individual and collective efforts are in vain, or that they are already taking climate-protective/emission-reducing actions, when in fact they are not (e.g. Downing and Ballantyne 2007; IMPACTS 2008; Leiserowitz et al. 2008). Clearly, more than 20 years of climate change on the public agenda would have offered enough opportunities to get engaged, if it just were not so costly to do.

THE COST OF INCREASING PUBLIC UNDERSTANDING AND CONCERN

From the modernist perspective of enlightenment, there is value to individuals and to society in being educated generally and knowledgeable about specific issues. Theorists of democracy and of education would argue, in fact, that such education is necessary to be an able participant in the political and civic affairs of a society (e.g. Albert Shanker Institute 2003; Dewey 1915; Freire 2008; Galston 2001). A more critical perspective might suggest that in Western, consumption-oriented, capitalist societies, there is also a value in staying (or keeping people) ignorant of certain issues. Certainly, as the US experience over the past 10–15 years with climate contrarians has shown, there are powerful forces who expend enormous resources and efforts not just on lobbying and defending their own economic and political interests, but on actively attempting (and succeeding) in undermining Americans' conviction that climate change is happening, largely human-caused, serious, and requiring policy and behavioural changes throughout society (e.g. McCright 2007; McCright and Dunlap 2003). Yet, as the survey research summarized above suggested, even where climate denialists are less active and audible through mainstream media channels, the nature of climate change itself offers plenty of opportunities to deny its reality, seriousness and urgency—at least for now (Moser, forthcoming). Thus, both those who try to increase public understanding and engagement, and those who would rather undermine it, have incentive—and real financial costs—in pursuing their respective goals. The question, then, of how to be most effective becomes a critical one. The answer requires understanding of the cognitive, psychological and other barriers that can prevent deeper public understanding.

Importantly, the forces defending the fossil fuel-heavy, energy-consumptive status quo always have an advantage over those who would try to change it given the enormous effort that has to be generated to overcome human habits, replace existing infrastructure, loosen technological and economic path dependencies, shift policy commitments, and try to change people's perceptions of self-interest, stakes, and long-held beliefs and values. Together, these social and structural factors are at the root of the politics of public understanding and engagement. They strongly influence 1) the cost involved in providing information, educating individuals, and attempting to increase their understanding and concern—itsself a highly contested and political activity; and 2) the cost to individuals in acquiring knowledge, deepening their

understanding of specific issues and the connections among them, and tolerating the cognitive and emotional impact of taking in and processing such information. These costs have cognitive, psychological, social, political and economic dimensions, and overlap with the behavioural, social, economic and institutional ones incurred in increasing practical engagement discussed below. This section explores those dimensions relevant to increasing public understanding and concern (the cognitive and affective dimensions of engagement), which make it 'costly' for individuals to understand what is at stake with global warming. As Boykoff, Goodman and Curtis (Chapter 8) show, the forces that would foster public understanding are pitched against those that would rather suppress it.

There is an increasing recognition of the range of barriers people face when encountering and processing climate change information (see reviews and discussions in Jamieson and VanderWerf 1994; Kollmuss and Agyeman 2002; Lorenzoni et al. 2007; Moser 2009; Moser and Dilling 2007b; Ockwell et al. 2009; O'Neill and Nicholson-Cole 2009). It takes significant cognitive effort to try to understand climate change, its causes, and how it is relevant to one's personal life, family, community, and economic, environmental and social context; it would take research and sorting through mounds of highly technical (and politicized) information on possible policies and technological solutions to identify what is viable, what the costs and possible risks involved are, and what the environmental or cultural consequences of adopting them may be. A growing concern in the media with 'green washing' and 'green fatigue' is indicative of the cognitive challenges individuals face in trying to make sense of the sheer amount and sometimes conflicting information about what actions and consumer choices would achieve the lowest carbon footprint and, more generally, the smallest impact on the environment in terms of pollutants, toxins and waste (e.g. Barringer 2008; Williams 2008). To the extent such information requires revision of previously held mental models or attitudes, the cognitive cost rises significantly; so much so, in fact, that individuals frequently reject the new information as 'false' (e.g. Bostrom and Lashof 2007; Dunwoody 2007). Even without trying to become a 'lay expert' on such matters, it is difficult to discern whom to trust. In the absence of technical expertise and in the face of too much and/or uncertain information, individuals tend to fall back on heuristic thinking—mental shortcuts—and other clues emerging from the framing, language, imagery and messenger to help them 'satisfice', i.e. to arrive at conclusions or decisions with limited, simplified information (e.g. Kahneman 2003; Kahneman et al. 1982; Krosnick 1991; Tversky and Kahneman 1974).

Processing climate change information can either increase or undermine the motivation to engage with the issue further. Very quickly, emotional responses arise (e.g. to images of a doom-and-gloom future) that might involve a sense of being powerless and overwhelmed; denial; numbing; feeling exempt from the threat; blaming others for the problem; wishful thinking or rationalization that the problem will be resolved by experts; displacement of attention on other problems; apathy; fatalism; or other forms of psycho-cognitive

capitulation or transference (Immerwahr 1999; O'Neill and Nicholson-Cole 2009). These types of cognitive and emotional responses are particularly common in response to issues that are scary, ill-understood, difficult to control, overwhelming, and in which people are complicit, such as global climate change (Moser 2007). By contrast, images of a positive future, empowering messages and admirable, trusted opinion leaders can support further engagement (Benjamin et al. 2001; Cartwright 1959; French and Raven 1959; Meadows et al. 1992; Nisbet and Kotcher 2009; Olson 1995; Raven 1993; Stevenson 2006).

In addition, there are social barriers that not only affect people's behavioural and political engagement (see the next section), but also one's cognitive and affective engagement. As socially embedded individuals people tend to associate with 'like' individuals, with people much like themselves—a commonly observed principle called 'homophily' (Lazarsfeld and Merton 1954; McPherson et al. 2001; Rogers 2003). As McPherson et al. (2001, 415) stated in a review of the relevant literature, '[h]omophily limits people's social worlds in a way that has powerful implications for the information they receive, the attitudes they form, and the interactions they experience'. Members of one group are more likely to hear only the information, opinions and attitudes that conform with that group's social and political norms, and are attracted to similar kinds of issue framings, while discounting or even rejecting information that does not reflect the values, attitudes and opinions held by the members of one's group. People tend to communicate most frequently with people of similar socio-economic and attitudinal background, and thus are less likely to hear from others with different knowledge, attitudes and opinions. It takes work to put aside—at least temporarily—one's closely held views and explore those of others, to cross the distance to those from whom one is otherwise relatively isolated (e.g. upper- or middle-class people talking to working-class individuals; people of one racial or ethnic background talking to those of another), and to overcome the psychological resistance to thinking about or doing something that could potentially disconnect oneself from those with whom one bonds for social recognition, identity and validation. While it may be costly to build the broad issue coalitions needed to support substantial policy change, doing so tends to pay great political dividends (e.g. Agyeman et al. 2007; Sabatier and Jenkins-Smith 1993).

These personal tendencies can be exacerbated by information sources and channels as well as the communication infrastructure hindering exchange and engagement, even in the age of ubiquitous information available in the palm of one's hand. Heavy perceptual filters to prevent information overload, declining newspaper readership, reliance on 'bite-sized' television news, much reduced diversity in news sources as a result of media industry consolidation, and increasing reliance on, and high selectivity among, internet news sources can limit depth of coverage, understanding of an issue, and frequently does not offer individuals the breadth of views that may allow them to develop a well-considered opinion (The Pew Research Center for the People & the Press 2004).

In summary, the discussion of cognitive, psychological, social and other structural barriers makes clear how costly it is to reach diverse social groups and individuals, to attract and keep their attention, and invite or even compel them to mentally and emotionally engage with the complex, removed, uncertain and overwhelming issue of climate change. To increase the level of engagement, researchers and advocates have proposed a wide range of improvements, and none, probably, can be dismissed. Instead, an effective public engagement campaign is likely to require elements of all: a more sophisticated use of messengers, opinion leaders and the social influence they exert (Bagozzi and Lee 2002; Chess and Johnson 2007; Nisbet and Kotcher 2009); framing of climate change that links the issue with more persistent concerns and values (Bostrom and Lashof 2007; FrameWorks Institute 2001); the complementary use of mass media and face-to-face communication channels (Dunwoody 2007; Regan 2007); careful attention to the emotional impact of climate change communication, sending messages that prevent evoking fear or overwhelm and instead convey empowerment, positive vision and practical, enabling help (Moser 2007; O'Neill and Nicholson-Cole 2009). Maybe, counter-intuitively, communicators and advocates interested in increasing positive public engagement may even have to rethink their own commitment to the enlightenment ideal. Substantial research shows that providing information and filling knowledge gaps is at best necessary, but rarely sufficient to create active, behavioural engagement, and occasionally may even be used as a substitute for action (Kellstedt et al. 2008; Rabkin and Gershon 2007; Schultz 2002; Sturgis and Allum 2004; Tribbia 2007).

THE PRICE OF ACTIVE ENGAGEMENT

If knowledge and understanding constitute only a necessary, but typically insufficient motivation for people to actively engage with climate change, what else may be needed? It is important to recognize that different people are motivated by different things. Some will be motivated by self-interest, while others will act altruistically and prioritize communal goals and common goods; individuals may need a range of reasons to stay engaged over time. Clearly, knowledge and information can be a pathway to tapping deeper motivations. Communicators and advocates must reach these deeper levels of motivation, such as persistent beliefs, concerns, emotions, social norms, aspirations, social identities, visions of a promising future and underlying values through the messages, frames and messengers chosen to convey the need for greater engagement. Some audiences may only respond to financial incentives or higher costs; others may not act until compelled legally or unless there is political gain; and many may see the need to 'do something' only once the problems manifest in their backyards (Moser and Dilling 2007a). In the politics of public understanding and engagement, advocates for change—incurring significant cost—must motivate action long before climate change unfolds its full impacts.

An increasing number of researchers recognize that there is an even greater price tag attached to overcoming the internal resistances and external barriers that can prevent or constrain active political or behavioural engagement (e.g. DEFRA 2007; Lorenzoni et al. 2007; Moser and Dilling 2007b; Ockwell et al. 2009; O'Neill and Nicholson-Cole 2009). Internal barriers to making behavioural changes can arise from perceptions of comfort and ease (with current behaviour) and those of discomfort, loss, 'too much effort', difficulty, or helplessness vis-à-vis the novel behaviour, as well as the lack of requisite skills, knowledge of what to do, or the means to implement them, as reflected repeatedly in detailed studies of environmentally significant behaviour (e.g. Kollmuss and Agyeman 2002; Leiserowitz et al. 2009). As socially embedded individuals, individuals' adopted identities and social norms also suggest what is or is not appropriate behaviour. If, for example engaging in political action on climate change or changing one's behaviour portrays a particular social identity, produces a social stigma, or reflects social norms that are in conflict with people's desired identity and aspirations, individuals will resist engaging. If such practical engagement (e.g. writing letters to political representatives, investigating energy-efficient heaters for the home) takes 'too much' time or resources, and is inconvenient or too demanding given other daily concerns and competing obligations, even those who are sympathetic to the cause may refuse to get involved.

In addition to the psychological, mental, financial and social barriers to changing one's actions, there are also significant and sometimes ossified structural barriers that may not allow realization of one's motivation and commitment to action. There may not (yet) be a convenient or economically feasible alternative technology (e.g. widespread, affordable solar energy), the public infrastructure may not be in place (e.g. mass transportation, distributed renewable energy production), path dependencies from land use and technological choices may inhibit quick and easy changes (e.g. urban sprawl and fuel-inefficient vehicles), or existing laws, regulations and associated interests may prevent or at least delay adoption of climate-friendly, energy-saving technologies and practices (e.g. fuel- and energy-efficiency standards in vehicles and appliances, building codes). It is for these reasons that communication and outreach campaigns cannot succeed without concomitant policy changes that remove barriers or provide specific assistance in overcoming them (e.g. Leiserowitz et al. 2009; Ockwell et al. 2009).

Political activism may be particularly difficult to increase. While political engagement through voting was higher in the 2008 US presidential elections than in many previous elections, only relatively small percentages of Americans engage in political and civic activism such as writing letters to the editors of newspapers, voicing their opinions personally and directly to elected officials, engaging in local town hall meetings, participating in political organizations, standing for political office, or engaging in demonstrations, civil disobedience, or other forms of protest (Lopez et al. 2006; National Conference on Citizenship 2008; Teske 1997). Reasons vary by age, gender,

ethnicity and political leanings, and range from individuals being disinterested in political matters, preferring to leave political activism to others, being uneducated about political and civic actions, and/or feeling disenfranchised from the political process. Moreover, many individuals in Western and Westernized societies display a strong technological optimism, expecting or hoping that technological fixes (and associated policy and market mechanisms) will be found (e.g. Dunlap and van Liere 1984; Kirk 2007; Marx 2000; Nye 1996; Weinstein 1980). Even so, many individuals expect that technology alone will not suffice to solve the problem (Patchen 2006). Yet others may not believe that existing institutions are failing in their responsibilities, thus seeing no need for activism, or believing that they cannot change them. A related response is blaming others for the problem and/or projecting responsibility for remedial action onto them, as was found in a recent cross-national survey (IMPACTS 2008), and which also holds true at the neighbourhood or person-to-person level ('why should I ride my bike in the rain if my neighbour still drives his gas guzzler?'). Those with strongly vested interests may simply refuse to do anything different or new or use their influence on political institutions and electoral processes to delay action; for them, scientific uncertainty, time delays and perceptions of remote impacts can serve as a rationale to hold on to the status quo (e.g. Klandermans and Oegema 1987; Leighley 1995; Macnaghten and Jacobs 1997). While this dismissive segment of the population may not (need to) be persuaded, their potentially significant social influence on others (as opinion leaders or trusted spokespeople for certain segments of the population) may prevent deeper engagement and action by many others and thus deeply shape the politics of public engagement with climate change (see also Chapter 7 by Parks and Roberts).

THE UNAFFORDABILITY OF DENIAL AND INACTION

In this chapter, I have argued that the politics of public understanding and engagement is a struggle for dominance among political opinions and sympathies, attitudes and positions, and one in which members of society have to become at once more motivated to understand and act differently, and to overcome a wide range of internal and external barriers to enact their personal and political convictions. Both raising the motivation and lowering or helping to overcome the barriers to political and behavioural engagement occurs among competing interests embedded in a cultural, social, institutional, economic and political context that tends to favour the status quo, and thus makes it more difficult and costly for change agents to succeed.

Clearly, the journey toward greater public understanding and engagement emerges as an arduous, long and 'expensive' one given the many hurdles that must be overcome, only overshadowed by the prohibitively expensive alternative described in the introduction (see also Chapter 1 by Schneider and Mastrandrea). In the USA, the level of public understanding and engagement to date has suffered from unsophisticated communication and inadequate

engagement campaigns, as well as persistent efforts of countervailing interests to confuse public understanding and block policy changes that could help reduce emissions or facilitate public engagement in climate-friendly behaviour. Such deliberate interference and willful denial of the need to change energy production and consumption patterns in the face of awareness and understanding of the problem has been termed 'ignore-ance' (Glantz 2003, 228), and may well lead to a future far worse than that described by Senator Kerry in the introduction.

However, a depiction of the politics of public understanding and engagement as merely a communicative or political-economic struggle between 'green' advocates and nay-saying defenders of fossil fuel interests would be incomplete, if not misleading. Rather, these politics must be placed in the structural, institutional and economic context that mediates and magnifies them, including media industry trends and reporting practices, trends in political and civic engagement, competing issues vying for attention and resources, structural forces that perpetuate habitual behaviour, and last, but not least, the nature of global climate change itself. Moreover, cognito-psychological, educational, social and cultural factors intervene in people's perception and understanding of issues, responsiveness to information, messages and frames, and expectations of themselves and others in solving this complex problem.

The question then arises whether the American public—as the citizens standing behind one indispensable international policy actor—can be rallied sufficiently and in time to help move the world toward the 'easier' climate future of 2050 rather than relegate it to a far more challenging one. Hulme (2008) argues that society's predominant answers to this question reflect a culturally deeply conditioned, modernist desire of mastery over 'something' in the face of fear of an unknown climate future. Those most pessimistic about society's capacity to engender sufficient public engagement promote geo-engineering or mastery over climate and the environment, while those hopeful about policy, market and technological solutions might favour 'political engineering', and those most optimistic (and maybe most demanding) of individuals and human nature might bank on the promise of social engineering (Hulme 2008). Some propose a combination of these approaches that would resemble the mobilization during the Second World War to get citizens and industry to fully support the war effort of the Allies against Nazism (e.g. Bartels 2001).

The politics of public understanding and engagement with climate change are interwoven by these discourses of mastery, even while deeper, alternative discourses are trying to be heard (e.g. Speth 2008). The US public is still largely ignorant of the prospects of geo-engineering, advocates and politicians display a half-hearted commitment to behavioural change (with a strong distaste of the notion of social engineering), and US leaders at this time lean toward policy, market and technological solutions that only hint at the hidden hand of government and policy orchestration. Currently debated policy solutions and the level of public engagement are unlikely to suffice to avert the

spectre of an extremely challenging future. The insights and considerations in this chapter are offered to help inform strategies that democratically, actively and effectively engage individuals and their leaders on climate change, and thereby not just avoid the darker of our potential futures, but instead help create a brighter one.

REFERENCES

- ABC News, Washington Post and Stanford University (2007) *Global Warming Soars to Top Slot as Greatest Environmental Threat*, Stanford, CA: Stanford University.
- Agyeman, J., B. Doppelt, K. Lynn and H. Hatic (2007) 'The Climate-Justice Link: Communicating Risk with Low-Income and Minority Audiences', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- Albert Shanker Institute (2003) *Education for Democracy*, Washington, DC: Albert Shanker Institute.
- Angus Reid Strategies (2007a) 'Angus Reid Climate Change Survey: Commit to Kyoto, but Don't Curb Car Travel, Say Canadians', www.angusreidstrategies.com/uploads/pages/pdfs/2007.04.03%20Enviro%20Policy%20Release.pdf (accessed 31 May 2009).
- (2007b) 'Angus Reid Climate Change Survey: Global Warming a Reality and a Threat, Canadians Say', www.angusreidstrategies.com/uploads/pages/pdfs/2007.03.21%20Enviro%20Press%20Release.pdf (accessed 31 May 2009).
- (2007c) 'Angus Reid Climate Change Survey: Rich and Educated Less Likely to Act Green, Today or Tomorrow', www.angusreidstrategies.com/index.cfm?fuseaction=news&newsid=36&page=27 (accessed 31 May 2009).
- Anthes, E. (2009) 'Climate Change Takes a Mental Toll', *The Boston Globe*, www.boston.com/news/science/articles/2009/02/09/climate_change_takes_a_mental_toll (accessed 31 May 2009), 9 February.
- Bagozzi, R.P. and K.-H. Lee (2002) 'Multiple Routes for Social Influence: The Role of Compliance, Internalization, and Social Identity', *Social Psychology Quarterly* Vol. 65, No. 3.
- Barr, S. (2008) *Environment and Society: Sustainability, Policy and the Citizen*, Hampshire, UK: Ashgate.
- Barringer, F. (2008) 'Talking Directly, and Kindly, to Believers in the Eco Life', *The New York Times*, 26 August.
- Bartels, D. (2001) 'Wartime Mobilization to Counter Severe Global Climate Change', *Human Ecology* Vol. 10, Special Issue.
- BBC World Service (2007) 'All Countries Need to Take Major Steps on Climate Change: Global Poll', survey conducted by GlobeScan together with the Program on International Policy Attitudes (PIPA) at the University of Maryland, www.worldpublicopinion.org/pipa/pdf/sep07/BBCClimate_Sep07_rpt.pdf (accessed 8 April 2008).
- Benjamin, P., J.X. Kasperson, R.E. Kasperson, J.L. Emel and D.E. Rocheleau (2001) 'Social Visions of Future Sustainable Societies', in J.X. Kasperson and R.E. Kasperson (eds), *Global Environmental Risk*, Tokyo: UNU Press.
- Bostrom, A. and D. Lashof (2007) 'Weather it's Climate Change?', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- Boykoff, M.T. (2007a) 'Flogging a Dead Norm? Newspaper Coverage of Anthropogenic Climate Change in the United States and United Kingdom from 2003 to 2006', *Area* Vol. 39, No. 4.
- (2007b) 'From Convergence to Contention: United States Mass Media Representations of Anthropogenic Climate Change Science', *Transactions of the Institution of British Geographers* Vol. 32, No. 4.
- Boykoff, M.T. and J.M. Boykoff (2004) 'Balance as Bias: Global Warming and the US Prestige Press', *Global Environmental Change* Vol. 14, No. 2.
- Brechin, S.R. (2003) 'Comparative Public Opinion and Knowledge on Global Climatic Change and the Kyoto Protocol: The US Versus the Rest of the World?', *International Journal of Sociology and Social Policy* Vol. 23, No. 10.
- Brewer, T.L. (2003) 'Seeds of Change in the US: Public Opinion Ahead of Politicians on Climate Change', *New Economy* Vol. 10, No. 3.
- (2005a) 'US Public Opinion on Climate Change Issues: Implications for Consensus-Building and Policymaking', *Climate Policy* Vol. 4, No. 1.
- (2005b) 'U.S. Public Opinion on Climate Change Issues: Update for 2005', *Climate Policy* Vol. 5, No. 4.
- (2006) 'Public Opinion on Climate Change Issues in the G-8 and G-5 Countries', www.usclimatechange.com (accessed 14 July 2006).
- Cartwright, D. (ed.) (1959) *Studies in Social Power*, Ann Arbor, MI: University of Michigan, Research Center for Group Dynamics, Institute for Social Research.
- Chess, C. and B.B. Johnson (2007) 'Information is Not Enough', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- Costanzo, M., D. Archer and E. Aronson (1986) 'Energy Conservation Behavior: The Difficult Path from Information to Action', *American Psychologist* Vol. 41, No. 5.
- Davidson, M.D. (2008) 'Parallels in Reactionary Argumentation in the US Congressional Debates on the Abolition of Slavery and the Kyoto Protocol', *Climatic Change* Vol. 86.
- Davidson, S., C. Martin and S. Treanor (2009) 'Scottish Environmental Attitudes and Behaviours Survey 2008', Edinburgh: Ipsos/MORI.
- DEFRA (2007) *2007 Survey of Public Attitudes and Behaviours Toward the Environment*, London: Department of the Environment, Food and Rural Affairs.
- de Young, R. (1993) 'Changing Behavior and Making it Stick: The Conceptualization and Management of Conservation Behavior', *Environment and Behavior* Vol. 25.
- Dewey, J. (1915) *Democracy and Education: An Introduction to the Philosophy of Education*, New York: The Macmillan Company.
- Directorate-General for Communication of the European Commission (2008) 'Europeans' Attitudes Towards Climate Change', *Special Eurobarometer 300*. Brussels, Belgium: European Commission.
- Downing, P. (2008) *Public Attitudes to Climate Change, 2008: Concerned But Still Unconvinced*, London: Ipsos/MORI.
- Downing, P. and J. Ballantyne (2007) *Tipping Point or Turning Point? Social Marketing & Climate Change*, London: Ipsos/MORI Social Research Institute.
- Dunlap, R.E. and A.M. McCright (2008) 'A Widening Gap: Republican and Democratic Views on Climate Change', *Environment* Vol. 50.
- Dunlap, R.E. and K.D. van Liere (1984) 'Commitment to the Dominant Social Paradigm and Concern for Environmental Quality', *Social Science Quarterly* Vol. 65, No. 44.

- Dunwoody, S. (2007) 'The Challenge of Trying to Make a Difference Using Media Messages', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- FrameWorks Institute (2001) *Talking Global Warming (Summary of Research Findings)*, Washington, DC: FrameWorks Institute.
- Freire, P. (2008) *Pedagogy of the Oppressed*, 30th Anniversary edn, New York, London: Continuum.
- French, Jr, J.R.P. and B.H. Raven (1959) 'The Bases of Social Power', in D. Cartwright (ed.), *Studies in Social Power*, Ann Arbor, MI: University of Michigan, Research Center for Group Dynamics, Institute for Social Research.
- Gallup (2008) 'Gallup's Pulse of Democracy: Environment', in *The Gallup Poll*, Princeton, NJ: Gallup.
- Galston, W.A. (2001) 'Political Knowledge, Political Engagement, and Civic Education', *Annual Review of Political Science* Vol. 44, No. 1.
- Gardner, G.T. and P.C. Stern (2002) *Environmental Problems and Human Behavior*, Boston, MA: Pearson Custom Publishing.
- GfK Roper Public Affairs & Media and Yale School of Forestry & Environmental Studies (2007) 'The GfK Roper Yale Survey on Environmental Issues: Fall, 2007: American Support for Local Action on Global Warming', New Haven, CT: Yale University.
- Glantz, M.H. (2003) *Climate Affairs: A Primer*, Washington, DC: Island Press.
- Halpern, D. and C. Bates (2004) *Personal Responsibility and Changing Behaviour: The State of Knowledge and Its Implications for Public Policy*, London: UK Prime Minister's Strategy Unit.
- Hulme, M. (2008) 'The Conquering of Climate: Discourses of Fear and their Dis-solution', *The Geographical Journal* Vol. 174, No. 1.
- Immerwahr, J. (1999) *Waiting for a Signal: Public Attitudes Toward Global Warming, the Environment and Geophysical Research*, Washington, DC: American Geophysical Union.
- IMPACTS (2008) 'Public Awareness, Attitudes and Behaviors Concerning Global Climate Change: Prepared for the Monterey Bay Aquarium: Selected Findings from a Collaborative Project of The Ocean Project, the Monterey Bay Aquarium, and the National Aquarium in Baltimore', Providence RI: The Ocean Project.
- Jamieson, D. and K. VanderWerf (1994) 'Societal Response to Creeping Environmental Phenomena: Some Cultural Barriers', in M. Glantz (ed.), *Creeping Environmental Phenomena and Societal Responses to Them: Workshop Report*, Boulder, CO: National Center for Atmospheric Research, Environmental and Societal Impacts Group.
- Kahlor, L. and S. Rosenthal (2009) 'If We Seek, Do We Learn? Predicting Knowledge of Global Warming', *Science Communication* Vol. 30, No. 3.
- Kahneman, D. (2003) 'Maps of Bounded Rationality: Psychology for Behavioral Economics', *The American Economic Review* Vol. 93, No. 5.
- Kahneman, D., P. Slovic and A. Tversky (eds) (1982) *Judgment Under Uncertainty: Heuristics and Biases*, New York: Cambridge University Press.
- Kellstedt, P.M., S. Zahran and A. Vedlitz (2008) 'Personal Efficacy, the Information Environment, and Attitudes Toward Global Warming and Climate Change in the United States', *Risk Analysis* Vol. 28, No. 1.
- Kerry, J. (2009) 'Opening Remarks, Senate Foreign Relations Committee Hearing with Former US Vice-President, Al Gore, on January 28, 2009', transcribed from www.c-span.com (accessed 3 February 2009).
- Kirk, A.G. (2007) *Counterculture Green: The Whole Earth Catalog and American Environmentalism*, Lawrence, KS: University Press of Kansas.
- Klandermands, B. and D. Oegema (1987) 'Potentials, Networks, Motivations, and Barriers: Steps Towards Participation in Social Movements', *American Sociological Review* Vol. 52, No. 4.
- Knussen, C. and F. Yule (2008) "'I'm Not in the Habit of Recycling": The Role of Habitual Behavior in the Disposal of Household Waste', *Environment and Behavior* Vol. 40, No. 5.
- Kollmuss, A. and J. Agyeman (2002) 'Mind the Gap: Why Do People Act Environmentally and What Are the Barriers to Pro-Environmental Behavior?', *Environmental Education Review* Vol. 8, No. 3.
- Krosnick, J.A. (1991) 'Response Strategies for Coping with the Cognitive Demands of Attitude Measures in Surveys', *Applied Cognitive Psychology* Vol. 5.
- Krosnick, J.A., A.L. Holbrook and P.S. Visser (2000) 'The Impact of the Fall 1997 Debate about Global Warming on American Public Opinion', *Public Understanding of Science* Vol. 9, No. 3.
- 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* Vol. 18, No. 1.
- Lazarsfeld, P. and R.K. Merton (1954) 'Friendship as a Social Process: A Substantive and Methodological Analysis', in M. Berger, T. Abel and C. H. Page (eds), *Freedom and Control in Modern Society*, New York: Van Nostrand.
- Leighley, J.E. (1995) 'Attitudes, Opportunities and Incentives: A Field Essay on Political Participation', *Political Research Quarterly* Vol. 48, No. 1.
- Leiserowitz, A. (2006) 'Climate Change Risk Perception and Policy Preferences: The Role of Affect, Imagery, and Values', *Climatic Change* Vol. 77, NO. 1.
- (2007a) *American Opinions on Global Warming*, New Haven, CT: Yale University.
- (2007b) *International Public Opinion, Perception, and Understanding of Global Climate Change*, New Haven, CT: Yale University.
- Leiserowitz, A., E. Maibach and C. Roser-Renouf (2008) *Global Warming's "Six Americas": An Audience Segmentation*, New Haven, CT: Yale University, Yale Project of Climate Change, Yale School of Forestry & Environmental Studies / Fairfax, VA: George Mason University, Center for Climate Change Communication.
- (2009) *Saving Energy at Home and on the Road: A Survey of Americans' Energy Saving Behaviors, Intentions, Motivations, and Barriers*, New Haven, CT: Yale Project of Climate Change, Yale School of Forestry & Environmental Studies / Fairfax, VA: George Mason University, Center for Climate Change Communication.
- Lopez, M.H. et al. (2006) *The 2006 Civic and Political Health of the Nation: A Detailed Look at How Youth Participate in Politics and Communities*, College Park, MD: Center for Information and Research on Civic Learning and Engagement.
- Lorenzoni, I., S. Nicholson-Cole and L. Whitmarsh (2007) 'Barriers Perceived to Engaging with Climate Change Among the UK Public and Their Policy Implications', *Global Environmental Change* Vol. 17, Nos 3–4.
- Lorenzoni, I. and N.F. Pidgeon (2006) 'Public Views on Climate Change: European and USA Perspectives', *Climatic Change* Vol. 77, Nos 1–2.
- Lowe, D.C. (2006) 'Vicarious Experiences vs. Scientific Information in Climate Change Risk Perception and Behaviour: A Case Study of Undergraduate Students in Norwich, UK', *Technical Report 43*, Norwich, UK: Tyndall Centre for Climate Change Research.

- Lowe, T., K. Brown, S. Dessai, M. Doria, K. Haynes and K. Vincent (2006) 'Does Tomorrow Ever Come? Disaster Narrative and Public Perceptions of Climate Change', *Public Understanding of Science* Vol. 15, No. 4.
- McCright, A.M. (2007) 'Dealing with Climate Change Contrarians', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- McCright, A.M. and R.E. Dunlap (2001) 'Challenging Global Warming as a Social Problem: An Analysis of the Conservative Movement's Counter-Claims', *Social Problems* Vol. 47, No. 4.
- (2003) 'Defeating Kyoto: The Conservative Movement's Impact on US Climate Change Policy', *Social Problems* Vol. 50, No. 3.
- McKenzie-Mohr, D. (2000) 'New Ways to Promote Proenvironmental Behavior: Promoting Sustainable Behavior: An Introduction to Community-Based Social Marketing', *Journal of Social Issues* Vol. 56, No. 3.
- Macnaghten, P. (2003) 'Embodying the Environment in Everyday Life Practices', *The Sociological Review* Vol. 51, No. 1.
- Macnaghten, P. and M. Jacobs (1997) 'Public Identification with Sustainable Development: Investigating Cultural Barriers to Participation', *Global Environmental Change* Vol. 7, No. 1.
- McPherson, M., L. Smith-Lovin and J. Cook (2001) 'Birds of a Feather: Homophily in Social Networks', *Annual Review of Sociology* Vol. 27, No. 1.
- Maibach, E., C. Roser-Renouf and A. Leiserowitz (2009) 'Global Warming's Six Americas 2009: An Audience Segmentation Analysis', New Haven, CT: Yale Project on Climate Change, School of Forestry and Environmental Studies, Yale University / Fairfax, VA: Center for Climate Change Communication, Department of Communication, George Mason University.
- Maibach, E., C. Roser-Renouf, D. Weber and M. Taylor (2008) *What Are Americans Thinking and Doing about Global Warming? Results of a National Household Survey*, Washington, DC: Porter Novelli / Fairfax, VA: George Mason University, Center of Excellence in Climate Change Communication Research.
- Marx, L. (2000) *The Machine in the Garden: Technology and the Pastoral Ideal in America*, Oxford: Oxford University Press.
- Meadows, D.H., D.L. Meadows and J. Randers (1992) *Beyond the Limits to Growth: Confronting Global Collapse, Envisioning a Sustainable Future*, White River Junction, VT: Chelsea Green Publishing.
- Moser, S.C. (2007) 'More Bad News: The Risk of Neglecting Emotional Responses to Climate Change Information', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- (2008) 'Toward a Deeper Engagement of the US Public on Climate Change: An Open Letter to the 44th President of the United States of America', *International Journal for Sustainability Communication* Vol. 3.
- (2009) 'Communicating Climate Change and Motivating Civic Action: Renewing, Activating, and Building Democracies', in H. Selin and S.D. VanDeveer (eds), *Changing Climates in North American Politics: Institutions, Policymaking and Multilevel Governance*, Cambridge, MA: MIT Press.
- (forthcoming) 'Communicating Climate Change: History, Challenges, Process and Future Directions', *Wiley Interdisciplinary Reviews (WIRE) – Climate Change*, accepted for publication.
- Moser, S.C. and L. Dilling (2007a) 'Toward the Social Tipping Point: Conclusions', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- (eds) (2007b) *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- National Conference on Citizenship (2008) *America's 2008 Civic Health Index: Beyond the Vote*, Washington, DC: National Conference on Citizenship.
- Next 10 and Field Research Corporation (2007) *California Opinion Index: A Digest Summarizing the California Public's Views About Global Warming*, Palo Alto, CA: Next 10 / San Francisco, CA: Field Research Corporation.
- The Nielsen Company and Oxford University (2007) 'Global Nielsen Survey: Consumers Look to Governments to Act on Climate Change', *Breaking News*, June 2007, Oxford: The Nielsen Company and Oxford University Environmental Change Institute.
- Nisbet, M.C. and J.E. Kotcher (2009) 'A Two-Step Flow of Influence?: Opinion-Leader Campaigns on Climate Change', *Science Communication* Vol. 30, No. 3.
- Nisbet, M.C. and T. Myers (2007) 'Twenty Years of Public Opinion About Global Warming', *Public Opinion Quarterly* Vol. 71, No. 3.
- Nye, D.E. (1996) *American Technological Sublime*, Cambridge, MA: MIT Press.
- Ockwell, D., L. Whitmarsh and S. O'Neill (2009) 'Reorienting Climate Change Communication for Effective Mitigation: Forcing People to Be Green or Fostering Grass-Roots Engagement?', *Science Communication* Vol. 30, No. 3.
- Olson, R.L. (1995) 'Sustainability as a Social Vision', *Journal of Social Issues* Vol. 51, No. 4.
- O'Neill, S. and S. Nicholson-Cole (2009) "'Fear Won't Do It": Promoting Positive Engagement with Climate Change Through Visual and Iconic Representations', *Science Communication* Vol. 30, No. 3.
- Patchen, M. (2006) 'Public Attitudes and Behavior about Climate Change: What Shapes Them and How to Influence Them', *PCCRC Outreach Publication No. 0601*, West Lafayette, IN: Purdue University, Purdue Climate Change Research Center.
- The Pew Research Center for The People & the Press (2004) 'News Audiences Increasingly Politicized: Pew Research Center Biennial News Consumption Survey', released 8 June 2004, Washington, DC: The Pew Research Center for the People & the Press.
- (2009) 'Economy, Jobs Trump All Other Policy Priorities in 2009: Environment, Immigration, Health Care Slip Down the List', Washington, DC: The Pew Research Center for the People & the Press.
- Poortinga, W. and N. Pidgeon (2003) *Public Perceptions of Risk, Science and Governance: Main Findings of a British Survey of Five Risk Cases*, Centre for Environmental Risk, University of East Anglia.
- Prochaska, J.O. (2003) 'Changing for Good: Applying Theories of Behavioral Change to Environmental Action', presentation given on 16 April 2003, New England Aquarium, Boston, MA.
- Rabkin, S. and D. Gershon (2007) 'Changing the World One Household at a Time: Portland's 30-Day Program to Lose 5000 Pounds', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.

- Rasmussen Report (2009) '44% Say Global Warming Due to Planetary Trends, Not People', *Rasmussen Report*, 19 January.
- Raven, B.H. (1993) 'The Bases of Power: Origins and Recent Developments', *Journal of Social Issues* Vol. 49, No. 4.
- Regan, K. (2007) 'A Role for Dialogue in Communication about Climate Change', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- Rogers, E.M. (2003) *Diffusion of Innovations*, 5th edn [1962], New York: Free Press.
- Sabatier, P.A. and H.C. Jenkins-Smith (1993) *Policy Change and Learning: An Advocacy Coalition Approach*, Boulder, CO: Westview Press.
- Schultz, P.W. (2002) 'Knowledge, Information, and Household Recycling: Examining the Knowledge-Deficit Model of Behavior Change', in T. Dietz and P.C. Stern (eds), *New Tools for Environmental Protection: Education, Information, and Voluntary Measures*, Washington, DC: National Academy Press.
- Semenza, J.C., D.E. Hall, D.J. Wilson, B.D. Bontempo, D.J. Sailor and L.A. George (2008) 'Public Perception of Climate Change: Voluntary Mitigation and Barriers to Behavior Change', *American Journal of Preventive Medicine* Vol. 35, No. 5.
- Speth, J.G. (2008) 'Toward a New Consciousness: Values to Sustain Human and Natural Communities', *The Leopold Outlook* Vol. 8, No. 2.
- Stevenson, T. (2006) 'From Vision into Action', *Futures* Vol. 38, No. 6.
- Stoll-Kleemann, S., T. O'Riordan and C.C. Jaeger (2001) 'The Psychology of Denial Concerning Climate Mitigation Measures: Evidence from Swiss Focus Groups', *Global Environmental Change* Vol. 11.
- Sturgis, P. and N. Allum (2004) 'Science in Society: Re-Evaluating the Deficit Model of Public Attitudes', *Public Understanding of Science* Vol. 13.
- Teske, N. (1997) *Political Activists in America: The Identity Construction Model of Political Participation*, Cambridge: Cambridge University Press.
- Tompkins, E.L. (2006) 'Scenario-Based Stakeholder Engagement: A Framework for Incorporating Climate Change into Coastal Decision Making', presentation on 6 February 2006 at the National Center for Atmospheric Research, Boulder, CO.
- Tribbia, J. (2007) 'Stuck in the Slow Lane of Behavior Change? A Not-So-Superhuman Perspective on Getting out of our Cars', in S.C. Moser and L. Dilling (eds), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*, Cambridge: Cambridge University Press.
- Tudor, T.L., S.W. Barr and A.W. Gilg (2008) 'A Novel Conceptual Framework for Examining Environmental Behavior in Large Organizations: Case Study of the Cornwall National Health Service (NHS) in the United Kingdom', *Environment and Behavior* Vol. 40, No. 3.
- Tversky, A. and D. Kahneman (1974) 'Judgments under Uncertainty: Heuristics and Biases', *Science* Vol. 185, No. 4157.
- Verplanken, B. (2006) 'Beyond Frequency: Habit as Mental Construct', *British Journal of Social Psychology* Vol. 45, No. 3.
- Verplanken, B. and H. Aarts (1999) 'Habit, Attitude, and Planned Behaviour: Is Habit an Empty Construct or an Interesting Case of Automaticity?', *European Review of Social Psychology* Vol. 10.
- Verplanken, B. and S. Orbell (2003) 'Reflections on Past Behavior: A Self-Report Index of Habit Strength', *Journal of Applied Social Psychology* Vol. 33, No. 6.
- Verplanken, B. and W. Wood (2006) 'Interventions to Break and Create Consumer Habits', *Journal of Public Policy and Marketing* Vol. 25, No. 1.
- Weber, E.U. (2006) 'Experience-Based and Description-Based Perceptions of Long-Term Risk: Why Global Warming Does Not Scare Us (Yet)', *Climatic Change* Vol. 77, Nos 1–2.
- Weinstein, N.D. (1980) 'Unrealistic Optimism about Future Life Events', *Journal of Personality and Social Psychology* Vol. 39.
- Williams, A. (2008) 'That Buzz in Your Ear May Be Green Noise', *The New York Times*, 15 June.