Elke U. Weber
Climate Change Demands Behavioral Change: What Are the Challenges?

IN A WORLD FULL OF GEOPOLITICAL, ECONOMIC, AND HEALTH THREATS, climate change may well be the most daunting challenge of the twenty-first century. Required action needs to match the challenge, with necessary changes in our social systems, economic systems, energy technology, personal and collective energy use, and consumption habits. The magnitude of these changes seems so large as to overwhelm us. The feeling that there is little that we—as citizens, consumers, or even local or national policymakers—can do immobilizes us and prevents the enactment of initiatives that, in combination and multi-plied by millions of potential initiators, would live up to the challenge.

It is true that there is no silver bullet—no single solution—to get us to a sustainable climate. The 2015 United Nations Conference of the Parties (COP) in Paris is not going to be a sufficient solution even if it will result in a comprehensive global agreement on Green-house Gas (GHG) mitigation. The devil will be in the details of how to ratify, implement, monitor, and enforce any agreement in individual countries around the world, which will require political leadership, diplomacy, and sustained attention over time. Technological solutions also are no panacea; neither carbon capture and storage nor renewable energy sources nor increased energy efficiency alone will get us to the GHG parts per million required to keep temperature increases to 2°C over this century. Behavioral or economic solutions in isolation are also not going to save us—from a redefinition of human

happiness or development to the introduction of a price on carbon. In combination, however, these different "wedges" in a pie chart of actions will allow us to achieve global carbon objectives (Pacala and Sokolow 2004).

When the challenge seems overwhelming and existing solutions inadequate, there is good reason to turn away from the problem. With no feasible action plan in sight, it is tempting to focus on uncertainties inherent in specific predictions about climate change and to use them as an excuse to delay action. There is no question that uncertainties exist—uncertainties about the climate system response to our current globally accelerating emission of carbon dioxide and other greenhouse gases; about the availability and cost of technology to address climate change mitigation or even adaptation; and about individual, social, and organizational willingness to respond to climate change hazards (Patt and Weber 2014). And yet, in many other situations where protective action seems feasible, we use the existence of uncertainty as an argument for action rather than as an excuse for inaction (Kunreuther et al. 2014). We buy collision insurance for our car or fire insurance for our house to protect against the odds (not the certainty) of an accident or a fire and to reduce the worst-case scenario consequences in the case fate decides against us.

The perceived immediacy and personal relevance of threat plays a large role in human willingness to take action (Slovic 1982). Consider one of the large challenges of the twentieth century, German and Japanese militarism. At the outset of both World War I and II, the United States and its citizens were presumably as well informed about the severity of the threat as other parts of the world. And yet, in both cases it took a personal attack on the US—the WWI sinking of the Lusitania by a German U-boat and the Japanese attack on Pearl Harbor in WWII—to motivate the government to declare war on the enemy.

The past year has seen the release of a number of important reports on climate change, detailing both the challenges and existing solutions. The UN Intergovernmental Panel on Climate Change (IPCC) released the third and final volume of its Fifth

Assessment Report in April 2014 (Edenhofer et al 2014). The US Global Change Research Program issued its National Climate Assessment in May of that year. The Risky Business Project, co-chaired by former New York Mayor Michael Bloomberg, former treasury secretary Hank Paulson, and New York developer Tom Steyer, published its report, The Economic Risks of Climate Change, in June 2014. And the multinational Global Commission on the Economy and Climate released its New Climate Economy report in September 2014. These reports provide massive evidence that climate change is happening now; not in the future; that it is affecting not just distant victims like Pacific islanders, Inuits, polar bears, or future generations, but us. The *New York Times* editorial page welcomed the IPCC report by hoping that the American public would perhaps fully accept that global warming is a danger now and an even graver threat to future generations.

HOMO ECONOMICUS OR HOMO SAPIENS?

Like the *New York Times* editorial board, these reports and most if not all policy response formulations assume that human decision making is rational—that is, guided by a comprehensive, appropriate, and consistent use of all available information, leading to logical expectations about future events and the determination of the most efficient ways to achieve agreed-upon goals under existing constraints. It is true that people sometimes make decisions in a rational fashion. And, at least in principle, we delegate policy formulation to experts with the requisite knowledge and expertise to make our long-term strategic decisions in a rational fashion for us, in a way that weighs costs against benefits and current consequences against future consequences, appropriately discounted. Nevertheless, it is also true that human decisionmakers, including policymakers, do not necessarily or even predominantly think, decide, and act like Homo economicus. Instead, they are members of the species Homo sapiens, not known for its rational deliberation. Human decisionmakers are creatures of habit who learn by trial and error. Ontogenetically we learn by getting hurt, phylogenetically by dying off (Weber 2013). We come equipped

with emotions that serve as an early warning system and are easier to use than analytic risk analysis. If something scares us we run away; if it feels good we come back for more. On other occasions, we employ rules of thumb or moral or professional rules of conduct to guide our actions (Weber and Lindemann 2006; Krosch et al. 2012).

Homo sapiens is a richer version of Homo economicus—not just in the sense of having more ways or modes of making decisions (affect- and rule-based, in addition to calculation-based), but also in having a much broader number of goals and objectives (Weber 2006). The problem is typically not that we do not know what we want; instead decisions are often difficult because we want too many and at times conflicting things (Weber and Johnson 2009). We obviously have material goals for ourselves—the rational self-interest assumed to underlie all economic decisions. But our needs and goals do not stop there. We have a need for affiliation and, consequently, social goals (what the economists refer to as other-regarding preferences, which include but are not restricted to altruism), we are concerned about our children, grandchildren, and more abstract future generations (just not all of the time!), and we have environmental goals (we care about our flora and fauna and feel some stewardship for earth, be it religious or secular in nature).

In addition, we have process goals. Feeling in control is something that is important to us—we need to feel in control and to feel effective to motivate our actions; not feeling in control and effective has negative physical and psychological consequences (Rodin and Langer 1977). Note that climate change is something that makes us feel out of control because of the issues I raised before: the problem is so large; what can any individual, any country do in isolation? Another human psychological characteristic is the desire for certainty and predictability. Knowledge of simple deterministic causal connections enables us to avoid risks and danger, to minimize losses and to maximize positive returns in our actions. It is this instinctive aversion to uncertainty and probabilistic thinking that makes self-serving appeals to the inherent "uncertainties" (the probabilistic nature of our knowledge) about physical, technological, and social phenomena related to climate change so

effective, allowing people to use them as a license to turn their attention away from it.

Given the multiplicity and abundance of human goals, it is neither surprising nor unavoidable that goals will, at times, be in opposition and conflict with each other. Some apparent conflicts can be resolved or reduced. For example, apparent conflict between a material goal (comfort) and an environmental goal (reduced CO_2 emissions) can be reduced by increasing the energy efficiency of heating or cooling rather than advocating energy use curtailment. Another example is the apparent conflict between economic development and sustainability, which can be lessened by redefining superordinate concepts like prosperity and well-being to include elements of both (Helliwell, Layard, and Sachs 2013). There remain, however, many situations where conflicting goals mean that trade-offs need to be made; a situation disliked by human decisionmakers since we like to keep the illusion that we can "have it all" or that we can "have our cake and eat it too." Many heuristic decision rules that have been observed in decisionmakers across a broad spectrum of domains, like the lexicographic rule (where options are evaluated one criterion or dimension at a time, starting with the most important dimension, and where options not meeting a certain requirement get eliminated before moving on to the next dimension), can be seen as mechanisms that allow us to avoid conscious awareness of tradeoffs across criteria, albeit at the cost of prematurely eliminating some options that would have made us better off (Payne, Bettman, and Johnson 1993). The lexicographic decision rule does so by sequentially activating potentially conflicting goals.

A more general takeaway from this example is that goal conflict is only perceived as such when the two conflicting goals are simultaneously active. Activation of different subsets of goals at different points in time explains why our decisions sometimes look contradictory (for example, making plans to go on a trip months in advance, but then wishing the arrangements had never been made the night before departure) (Trope and Liberman 2010). More generally, a goal

only influences a decision if and when it is active at the time of decision. This suggests possible interventions if we think about how to change behavior (our own or that of others) as discussed in greater detail below. In particular, it suggests that we can change or modify our decisions by changing which goals are active at the time of decisions, as further discussed in the section on choice architecture.

WHY IS CLIMATE CHANGE ACTION SO HARD?

Climate change action is a really tough nut to crack or, as scientists prefer to say, a "wicked problem" (Conklin 2005). If we can figure out ways to motivate behavior change in the domain of environmental action toward sustainability, every other looming social issue will also become tractable—insufficient pension savings, smoking, or the obesity epidemic—because for all of these decision situations, the challenges are very similar, and much more extreme for climate change. This, in particular, is the structure of these problems: the costs of protective or mitigating action are upfront, immediate, concrete, tangible, and certain; in contrast, the benefits of action are uncertain, disputed by some vocal self-interested parties, in the future and geographically remote, all reasons to discount them and to discount them in ways that go far beyond rational discounting (Gong, Krantz, and Weber 2014; Hardisty and Weber 2009).

Climate change action is difficult because our focus, evolutionarily, is on the here and now, and in the here and now reside the costs of action, not the benefits. The benefits lie in the future, but because we have finite processing capacity as well as emotional capacity (Weber 2006), it makes sense to husband our limited capacity carefully. Therefore, to focus on the here and now makes sense because if we do not survive today, there is little sense in planning for the future. And yet, as our problems have become more complex, we have to learn (either individually or collectively—by outsourcing different types of decisions) to distribute our attention with a greater focus on the future and with a broader focus than just on a single class of solutions.

Another way in which we deal with scarce attention is to consider different choice options sequentially. As further described below, this process leads to a status quo bias. Before examining how status quo bias—a strong preference for things the way they are and a strong opposition to any kind of change—comes about, it is worth thinking about why Homo sapiens might have evolved processes that result in it.

WHY IS THERE STATUS QUO BIAS?

Typically we persist in what we are doing because that is the safe or safer course of action. We know what we have (the devil we know), and any kind of change has inherent uncertainties. Uncertainty in turn is aversive to most individuals, as it makes life unpredictable and contains the possibility of negative consequences. While it is thus true in many contexts that status quo bias results in safer outcomes, the pernicious thing in the case of climate change is that inaction and status quo bias are the most dangerous options. If we persist in business as usual, the consequences of our carbon emissions will, in 50 to 100 years, seriously challenge our current way of life with increases in the frequency and intensity of droughts, floods, hurricanes, and other extreme weather events, along with their political, economic, and social consequences. Already there are wars and conflicts in Africa and the Middle East that have been triggered at least in part by sustained droughts in the region, and such conflicts over water and other basic resources are going to increase.

Is the growing scientific certainty about the serious and increasingly irreversible consequences of status quo bias in the face of climate risks an argument for scaring people into action? The end of the last paragraph attempted to do this, to some extent, and there are many prominent examples in the form of movies (*The Day After Tomorrow*), television programs (*The Years of Living Dangerously*), and the Al Gore lecture campaign. The dramatic apocalyptic images presented certainly get our attention. Fear is a strong focal agent, but it is really only useful if there is a very simple thing that we can do to get us out

of danger. If we have to engage with a range of options over months or years in time, nobody wants to be in that negative mood-state. Otherwise it is quite reasonable to switch channels and think about something else. This is particularly true since, in the climate solution space, there is no silver bullet—only silver buckshot, as discussed earlier: action across a whole range of things. We have a finite pool of worry—we can only worry about so many things at any given point in time. As we worry more about climate change we actually neglect other issues—the state of our marriage or concern about civil rights. The question of what the appropriate balance of attention between different issues ought to be is not an easy one to answer.

HOW DOES STATUS QUO BIAS COME ABOUT?

Another important question to ask is: how does status quo bias come about? Is there a causal process model that brings about perseverance in our current actions? Query theory, developed with Eric Johnson over the last 10 years, describes the process by which we make decisions as a process of arguing with ourselves. We marshal evidence for one action, for another action, and then—depending on the balance of evidence—decide on what to do. Sometimes these evaluations of choice options are conscious, but most of the time they occur automatically and outside of conscious awareness. Evidence arguing for one or the other choice option can come from external sources or from past experience. One important empirical insight is that action alternatives appear to be evaluated sequentially and that, all other things being equal, the first choice option that is considered has a sizable advantage, as people generate more evidence for it (Johnson et al. 2007; Weber et al. 2007).

This makes the following the million dollar question: which choice option gets considered first? One important answer to that question is: the status quo. This makes a lot of sense. If the status quo is a behavioral one, we have been doing something for a while, it has not killed us yet so it cannot be all that dangerous, and we probably had some good reasons to do it in the first place. If it is a recommendation

by a trusted entity, it also makes sense to consider it first. Either way its privileged consideration leads to an accumulation of extra arguments for this course of action and results in lack of imagination because we anchor on the current way of doing things. As Henry Ford apocryphally observed: "If I had asked people what they wanted they would have said faster horses." This cognitive process interpretation of how status quo bias comes about is not just a diagnosis but also suggests an intervention, namely to change the status quo.

WHAT HAPPENS WHEN WE CHANGE THE STATUS QUO?

In hindsight, from the perspective of carbon-based fuel consumption, we might have been better off with faster horses, but certainly at its time of invention the automobile was a good idea and a bold introduction of an alternative mode of transportation. Nobody was forced at the time to switch from horses to cars, of course, but if the status quo had been changed, there is little question that there would have been strong opposition against it. There are two contemporary examples of bold policies that were introduced and enforced as changes in status quo. The first one was the Smoke Free Air Act, proposed by New York City Mayor Michael Bloomberg in 2002, which expanded the city's current smoking ban to eliminate smoking in all workplaces. Controversially, his proposal included bars and small restaurants, smoky symbols of New York's famous nightlife. Passed by the City Council in November 2002 and implemented in March 2003, the smoking ban was closely associated with the mayor. The initial reaction from smokers and bar owners was strong and negative. Bars and restaurants feared loss of business. People did not want to be told what they could or could not do in public spaces. Bloomberg's approval rating dipped below 35 percent (Quinnipiac 2002–2005), and the viability of his political future was questioned.
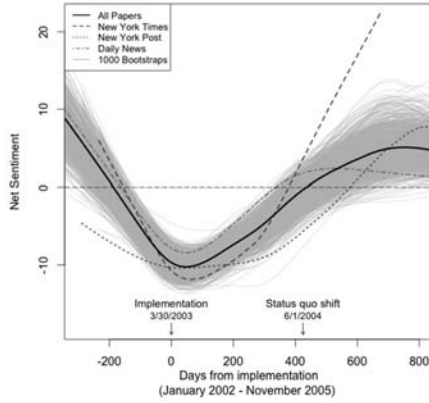
The second example of a bold change in status quo occurred in 2007, when the Canadian province of British Columbia (BC) announced a carbon tax on the purchase and consumption of fossil fuels, including gasoline, diesel, natural gas, heating fuel, propane, and

coal. Center-right Liberal Party Premier Gordon Campbell proposed the introduction of a carbon tax in 2007, intending it to raise BC's profile as an environmental leader in anticipation of Canadian and US cap-and-trade legislation. The tax was designed to be revenue neutral, meaning that all revenues raised by the carbon tax are returned to tax-paying individuals and businesses through tax reductions and rebates. In July 2008 the tax was implemented at a rate of $10 (Canadian) per ton of CO_2e emissions, and increased by C$5 per ton of CO_2e every year since its implementation until capped at C$30 per ton of CO_2e on July 1, 2012 (British Columbia Finance Ministry 2011).

In both cases there was huge opposition to the mandated change in status quo. In the face of widespread status quo bias, political reform often requires political courage. Politicians can lose their jobs if opposition to a policy they introduce does not shift to acceptance before the next election. Query theory and several other theories of human judgment and choice from psychology and behavioral economics predict that a change in status quo will meet initial opposition, followed by a gradual acceptance of the policy as the change in state becomes the new status quo (see Treuer et al. 2012). Treuer et al. (2012) conducted content analyses of articles in three local newspaper published before, during, and after implementation of the smoking ban in New York City and the carbon tax in British Columbia to examine whether there was evidence for this pattern in aggregate public opinion for these two changes in status quo intended to increase public welfare. As shown in figures 1 and 2, net public support (positive sentiment minus negative sentiment) drops between the announcement of the policy and its implementation. Support then increases following implementation, becoming net positive quickly enough to allow political reformers to achieve reelection in both cases.
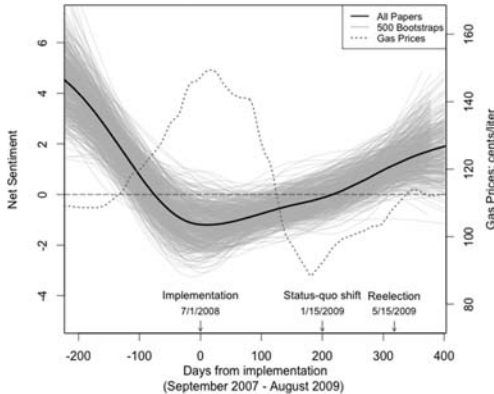
Earlier discussion covered the multiple ways in which we make decisions—sometimes with our heads (weighing costs and benefits), sometimes with our hearts (following our feelings), and sometimes by the book (following rules of conduct). We also delegate decisions, going to a doctor to get a medical diagnosis or to a lawyer with our

Newspaper coverage of the NYC smoking ban

Figure 1. Net sentiment toward the New York City smoking ban: pro–ban minus anti-ban statements in each article published between January 2002 and November 2005. Cubic spline smoothing of net sentiment for each paper and a nonparametric bootstrap resample of the entire sample show that sentiment is most negative near implementation (March 30, 2003) and takes approximately 14 months to become net positive.

Newspaper coverage of the BC carbon tax

Figure 2. Net sentiment toward the British Columbia carbon tax: pro-tax statements minus anti-tax statements in each article published from September 2007 to August 2009. Cubic spline smoothing of net sentiment and a non-parametric bootstrap resample show that sentiment is most negative near implementation (July 1, 2008) and takes approximately 7 to 8 months to become positive.

legal issues. Elected officials and the domain experts they appoint are, at least in principle, in place to do the long-time planning and to enact the long-term policy for which we as society realize we lack the attention, foresight, and time horizon. While it is true that delivering on this charge and reelection prospects can at times be in conflict for elected officials, analyses of initially unpopular changes in status quo, like the two provided above, suggest that public opinion is malleable. Initial opposition even to policies that increase public welfare should be expected but, under the right conditions, may not continue for long after implementation.

CHOICE ARCHITECTURE INTERVENTIONS AND QUERY THEORY

If mandated change of the status quo seems too drastic and single-minded an intervention to improve public welfare, a better understanding of human decisionmaking along the lines outlined above also provides us with less paternalistic tools that provide greater flexibility (Sunstein and Thaler 2003). As mentioned earlier, query theory provides evidence for the fact that any choice option that gets considered first is at an advantage (all other things being equal), which raises the question of what determines people's order of processing available options. Processing of the status quo option first was one important answer to that question, but not the only one. Other important answers transfer readily into interventions that change the choice environment in subtle ways ("choice architecture") that should not affect decisions, but frequently do. This final section will discuss two additional determinants of processing order, namely, which option is the choice default and which option looks or sounds more attractive.

Many decisions have a default option (that is, an option that gets implemented in the absence of an active choice). Unless a citizen decides to go out and vote on Election Day, not voting is the default option. No-action defaults have been shown to affect many consequential decisions, including people's willingness to be an organ donor, which is higher when the default option is that one is a donor

unless decided otherwise ("opt-out") than when the default option is that one is not a donor unless decided otherwise ("opt-in") (Johnson and Goldstein 2003). Query theory explains a significant part of the choice advantage that a default option holds, because arguments for the default option are generated first. Dinner, Johnson, Goldstein, and Liu (2011) demonstrated this effect in the context of a decision that has important energy use and CO_2 emission consequences, namely between incandescent and compact fluorescent lightbulbs (CFLs). As shown in figure 3, which displays the information about the two types of lightbulbs with which participants in a study were provided, CFLs cost more up front but have a longer life and use far less energy, making them very cost effective in the long run. Nevertheless, the higher up-front cost and consumer myopia about future savings, among other things, have made their uptake less than optimal. Some countries, including Germany, have outlawed incandescent bulbs, changing the status quo for German consumers. Dinner et al. (2011) explored how effective it would be to keep both options on the market, but to change which bulb was the no-action default. Half of their respondents (a fairly representative sample of American consumers) saw the scenario shown in figure 3, which makes the incandescent bulb the default option. In this group, 49 percent ended up with the incandescent bulb. The other half of respondents received the identical information about the two types of lightbulbs, but for them the CFL bulb was the no-choice default. In this group, only 24 percent ended up with the incandescent bulb, a significant and sizable difference in choice, and an effect that was mediated by the order in which arguments for the two choice options were generated, which in turn resulted in a different balance of evidence, as predicted by query theory.

In other decisions there is no no-action default. What determines the order in which choice options get examined there? Advertisers appear to spend large amounts of money to influence the apparent attractiveness of advertised products over competitors. Hardisty, Johnson, and Weber (2011) wondered whether the label of a choice

Imagine that you are undergoing a significant amount of remodeling on your home. On the last day of work the contractors clean up all leftover dust, dirt, and paint. Before leaving, one of the workers tells you that the head contractor will be back tomorrow for a final inspection of the house.

Tomorrow evening the head contractor comes by your home to discuss the last aspects of the addition. After showing you one of the newly installed light fixtures he mentions that all 18 bulbs in the new fixtures have been outfitted with incandescent bulbs, which cost a total of $9. He then asks you if these bulbs are ok, or if you would prefer Compact Fluorescent (CFL) bulbs which will cost $54. If you prefer to switch, he will send over a contractor to switch the bulbs tomorrow. There will be no labor charge for switching the bulbs.
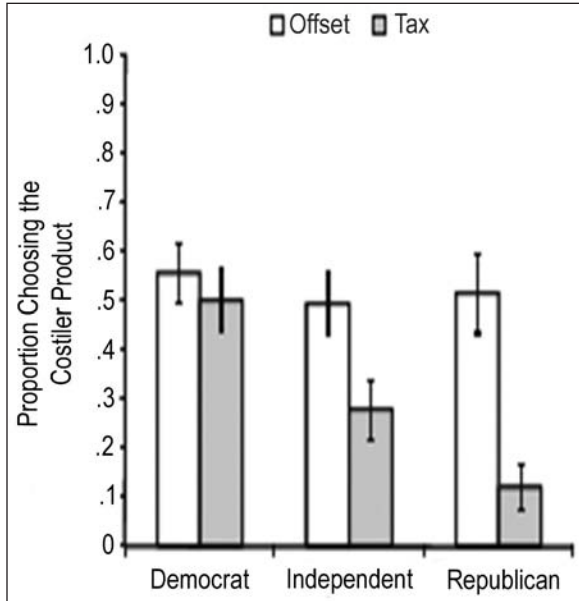
	You Now have:	You may switch to:
	Incandescent Bulb	**Compact Fluorescent Bulb**
	(60 Watts)	(14 Watts)
Attributes	- Light quality is often considered "warm" or "soft." - Full brightness arrives immediately. - Turning bulbs on and off won't affect lifetime of incandescent bulbs - Incandescent bulbs can be disposed of anywhere - Bulbs last roughly 750 hours - Costs $49 in electricity per 10,000 hours.	- Light quality is sometimes considered "cold" or "bluish" - Full brightness takes 1-3 minutes to achieve - Lifetime of a CFL bulb is *significantly* shortened if it is only turned on a few minutes at a time. - Contains Mercury, so must be disposed of with caution. - Bulbs last up to 10,000 hours - Costs $11 in electricity per 10,000 hours of use
Cost	$0.50 per bulb $9 Overall	$3.00 per bulb $54 Overall

Figure 3. Choice options from Dinner, Johnson, Goldstein, and Liu (2011) for condition in which the incandescent bulb was the choice default (reproduced from the appendix of Dinner, Johnson, Goldstein, and Liu 2011).

option could serve as either an attractor or repulsor of initial processing attention. They were puzzled that there seemed to be considerable opposition to a carbon tax in the United States, while at the same time carbon offsets that can be purchased when flying across the country or for other activities that involve carbon emissions had been rising in popularity, in fact doubling in popularity each year since they had been introduced. Both a carbon tax and a carbon offset are a carbon user fee, but the two words have different connotations.

In an online study with a national representative sample of US consumers, Hardisty et al. (2011) gave people a choice between buying a $385 airline ticket between New York City and Los Angeles that included a carbon fee of $7.70, or the airline ticket without the fee. All respondents saw two pages of text that explained why the charge was what it was, what was going to happen with that money, and how it is going to offset the carbon emissions, information that came from the websites that sell such offsets. The only item that was varied between respondents was the label of the carbon fee. For half of respondents, it was called a carbon tax, and for the other half it was called a carbon offset. Before respondents made their choice, they were told to type out loud what went through their mind as they made this decision, a stream of consciousness that could be coded for the number of arguments favoring the fee-inclusive airline ticket or the other one, as well as for the order in which such arguments were generated. At the end of the study, respondents provided demographic information, including their political affiliation (whether they self-identified as Democrats, Independents, or Republicans).

The results of this study are shown in figure 4. Political affiliation did not affect people's willingness to buy the fee-inclusive ticket when the carbon-use fee was called a carbon offset. About 67 percent of Democrats, Independents, and Republicans bought the more expensive ticket that included the fee. However, for the group of respondents for whom the carbon-use fee was called a carbon tax, political affiliation made a huge difference. The switch in label made no difference for Democrats, but for Republicans willingness to buy the more expensive ticket went down to 27 percent, with Independents being somewhere in between. Just as in the Dinner et al. (2011) study above, in this study differences in choice were explained and mediated by differences in the order in which arguments for the two choice options were generated, which in turn resulted in differences in the balance of evidence for the two choice options, as predicted by query theory. The label of the carbon-use fee interacted with the political affiliation of the decision maker in influencing perceived attractiveness

Figure 4. Proportion of Democrats, Independents, and Republicans who chose the more costly airline ticket that included the carbon-use fee when the fee was described as either an "offset" or as a "tax" (reproduced from Hardisty, Johnson, and Weber 2010).

of that option and hence processing order. For Republicans, "tax" is a dirty word that makes the option containing it immediately repulsive, and processing is switched to the other option.

Query theory and many other behavioral theories provide recipes for subtle changes in which choice options get described that influence attention, perception, judgment, and choice. Warmer than normal days increase our belief in global warming, while snowstorms reduce it, suggesting that our belief is driven more by "local" than "global" observations (Zaval, Keenan, Johnson, and Weber 2014). There are multiple and complex reasons to cooperate or defect in social dilemmas, far richer than predicted by economic game theory (Attari, Krantz, and Weber 2014). Additional examples and details about the underlying theory and evidence can be found in a climate change communications guide published by the Center for Research

on Environmental Decisions (CRED) at Columbia University (Shome and Marx 2009), where it is available to download for free at www.cred.columbia.edu/guide.

CONCLUSIONS AND CAVEATS

This paper argues that it is helpful and, in fact, imperative to consider and use the full range of human motivations and goals and the full range of decision processes available to Homo sapiens as we consider action and behavior change in the context of climate change. For the first time, in its Fifth Assessment Report (FAR), the IPCC considered human cognition and motivation beyond rational choice and the social planner model (Kunreuther et al. 2014). Behavior change can be facilitated by innovative no-choice defaults, changes in the status quo, or the rephrasing and reframing of choice option labels. In addition to providing access to a broader range of choice processes than rational deliberation, a better appreciation of human motivation suggests a variety of appeals (Zaval, Markowitz, and Weber 2015; Weber 2013) and the need to focus on the positive consequences of change. This may involve a new conceptualization of human happiness (Helliwell, Layard, and Sachs 2013), away from the current model that is consumption based which puts us on a hedonic treadmill and endangers the global climate and environment. A positive focus on our long and successful presence on planet Earth can serve as a reminder of how much is at stake and as a way of motivating our investment in the future (Hershfield, Bang, and Weber 2014).

REFERENCES

Attari, Shahzeen, David H. Krantz, and Elke U. Weber. 2014. "Reasons for Cooperation or Defection in Real-World Social Dilemmas." *Judgment and Decision Making* 9: 316–334.

Conklin, John. 2005. *Dialogue Mapping: Building Special Shared Understanding of Wicked Problems.* New York: Wiley.

Dinner, Isaac, Eric J. Johnson, Daniel G. Goldstein, and Kaiya Liu. 2011. "Partitioning Default Effects: Why People Choose Not to Choose." *Journal of Experimental Psychology: Applied* 4: 332–341.

Edenhofer, Ottmar, R. Pichs-Madruga, Y. Sokona, et al., eds. 2014. *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge, UK and New York: Cambridge University Press.

British Columbia Ministry of Finance. 2011. "Tax Cuts, Funded by a Revenue Neutral Carbon Tax." http://www.fin.gov.bc.ca/tbs/tp/climate/carbon_tax.htm.

Gong, Ming, David H. Krantz, and Elke U. Weber. 2014. "Why Chinese Discount Future Financial and Environmental Gains but Not Losses More Than Americans." *Journal of Risk and Uncertainty* 49: 103–124.

Hardisty, David H., Johnson, J. Eric, and Elke U. Weber. 2010. "A Dirty Word or a Dirty World? Attribute Framing, Political Affiliation, and Query Theory." *Psychological Science* 21:86–92.

Hardisty, David H. and Elke U. Weber. 2009. "Discounting Future Green: Money vs. the Environment." *Journal of Experimental Psychology: General* 3: 329–340.

Helliwell, John, Richard Layard, and Jeffrey Sachs. 2013. *World Happiness Report*. New York: The Earth Institute.

Hershfield, Hal E., H. Min. Bang, and Elke U. Weber. 2014. "National Differences in Environmental Concern and Performance Predicted by Country Age." *Psychological Science* 25: 152–160.

Johnson, Eric J. and Daniel G. Goldstein. 2003. "Do Defaults Save Lives?" *Science* 302: 1338–1339.

Johnson, Eric J., Gerald Häubl, and Anat Keinan. 2007. "Aspects of Endowment: A Query Theory of Value Construction." *Journal of Experimental Psychology: Learning, Memory, and Cognition* 33: 461–474.

Krosch, Amy, Bernd Figner, and Elke U. Weber. 2012. "Choice Processes and Their Consequences in Morally Conflicting Military Decisions." *Journal of Behavioral Decision Making* 7: 224–234.

Kunreuther, Howard, S. Gupta, V. Bosetti, et al. 2014. "Integrated Risk and Uncertainty Assessment of Climate Change Response Policies." In *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, edited by O. Edenhofer, R. Pichs-Madruga, Y.

Sokona, et al. Cambridge, UK and New York: Cambridge University Press.

Kunreuther, Howard, and Elke U. Weber. 2014. "Aiding Decision Making to Reduce the Impacts of Climate Change." *Journal of Consumer Policy*. *37*: 397–411.

Pacala, Stephen, and Robert Socolow. 2004. "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies." *Science* 305: 968–972.

Patt, Anthony, and Elke U. Weber. 2013. "Perceiving and Communicating Climate Change Uncertainty." *WIREs: Climate Change* 5: 219–232.

Payne, John W., James Bettman, Eric J. Johnson. 1993. *The Adaptive Decision Maker*. New York: Cambridge University Press.

Quinnipiac. 2002–2005. "Do You Approve or Disapprove of the Way Michael Bloomberg Is Handling His Job as Mayor?" Quinnipiac University http://www.quinnipiac.edu/news-and-events/quinnipiac-university-poll/new-york-city/release-detail?ReleaseID=657.

Rodin, Judith, and Ellen J. Langer. 1977. "Long-term Effects of a Control-Relevant Intervention with the Institutionalized Aged." *Journal of Personality and Social Psychology* 35: 897–902.

Shome, Debika, and Sabine Marx. 2009. *The Psychology Climate Change Communication: A Guide for Scientists, Journalists, Political Aides, and the Interested Public*. New York: Center for Research on Environmental Decisions.

Slovic, Paul. 1982. "Perception of Risk." *Science* 236: 280–285.

Sokolow, Robert. 2011. "Wedges Reaffirmed." *Bulletin of the Atomic Scientists*. September 27. Accessed February 14, 2014. http://thebulletin.org/wedges-reaffirmed.

Sunstein, Cass R., and Richard H. Thaler. 2003. "Libertarian Paternalism is Not an Oxymoron." *The University of Chicago Law Review* 70: 1159–1202.

Treuer, Galen A., Elke U. Weber, Kristin C. Appelt, Apollonia E. Goll, and Ray D. Crookes. 2012. "Weathering the Storm: Status Quo Adjustments Explain Successful Policy Implementation." Center for Decision Sciences. New York.

Trope, Yaacov, and Nera Liberman. 2010. "Construal Level Theory of Psychological Distance." *Psychological Review* 117: 440–463.

Weber, Elke U. 2006. "Experience-based and Description-based Perceptions of Long-term Risk: Why Global Warming Does Not Scare Us (Yet)*." Climatic Change* 77: 103–120.

———. 2013. "Doing the Right Thing Willingly: Behavioral Decision Theory and Environmental Policy." In *The Behavioral Foundations of Policy*, edited by E. Shafir, 380–397. Princeton: Princeton University Press.

Weber, Elke U., and Eric J. Johnson. 2009. "*Mindful Judgment and Decision Making." Annual Review of Psychology* 60: 53–86.

Weber, Elke U., E. J. Johnson, K. Milch, H. Chang, J. Brodscholl, and D. Goldstein. 2007. "*Asymmetric Discounting in Intertemporal Choice: A Query Theory Account." Psychological Science* 18*: 516–523.

Weber, Elke U., and Patricia G. Lindemann. 2008. "From Intuition to Analysis: Making Decisions with Our Head, Our Heart, or by the Book." In *Intuition in Judgment and Decision Making,* edited by H. Plessner, C. Betsch and T. Betsch, 191–208. Mahwah, NJ: Lawrence Erlbaum.

Zaval, Lisa, Elisabeth A. Keenan, Eric J. Johnson, and Elke U.Weber. 2014. "Understanding Local Warming: How Warm Days Lead to Increased Belief in Global Warming." *Nature Climate Change* 4:143–147.

Zaval, Lisa, Ezra M. Markowitz, and Elke U. Weber. 2015. Forthcoming. "How Will I Be Remembered? Conserving the Environment for Legacy's Sake." *Psychological Science 26:* 231–236.

MICHAEL OPPENHEIMER is the Albert G. Milbank Professor of Geosciences and International Affairs at Princeton University and Director of Princeton's Program in Science, Technology and Environmental Policy (STEP). His research focuses on the science and policy aspects of climate change and its impacts.

JUAN CAMILO OSORIO is the NYC Environmental Justice Alliance's director of research and an adjunct assistant professor at Pratt Institute. He was formerly a senior geographic information systems analyst and planner at the Municipal Art Society and a research assistant at the Massachusetts Fair Housing Center.

KAITLIN T. RAIMI is a social psychologist and postdoctoral fellow at the Vanderbilt Institute for Energy and Environment. Her areas of interest include belief superiority, self-presentation, and the role of knowledge and ideology in the creation and maintenance of belief about climate science and related technology.

CATHERINE SEAVITT is an associate professor of landscape architecture at City College of New York and principal of Catherine Seavitt Studio. Her research focuses on design adaptation to sea level rise in urban coastal environments and explores novel landscape restoration practices given the dynamics of climate change.

PAUL C. STERN is a scholar with the Board on Environmental Change and Society, National Research Council. His research interests include determinants of environmentally significant household behavior, participatory processes for environmental decision making, and the governance of environmental resources and risks.

JOEL TOWERS is Executive Dean of Parsons The New School for Design. He also serves as an associate professor of architecture and sustainable design.

ELKE U. WEBER is the Jerome A. Chazen Professor of International Business at Columbia Business School, and professor of psychology and Earth Institute Professor at Columbia University. She is an expert on behavioral models of judgment and decisionmaking under risk and uncertainty.

CLAIRE WEISZ is a founding partner of WXY and visiting distinguished professor at City College of New York's Bernard & Anne Spitzer School of Architecture. As an architect and cofounder of the Design Trust for Public Space, her projects focus on infrastructure, neighborhoods, and urban ecology.