

# Introducing humanitarians and environmentalists to ‘decision science’ insights and applications

**(And lose a day off if you don’t read this!)**



*An educational decision-making game being played during the 2014 Development and Climate Days at the COP 20 UN climate talks in Lima. (Photo: Alex Wynter/Climate Centre)*

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# Key messages

An increasing number of scientific disciplines focus on understanding how and why people make decisions and behave the way they do – issues of great significance to humanitarian and environmental organizations working on climate change, risk management and other issues. Applying the principles of *decision science* – a collective term for research in fields such as behavioural economics, social psychology, cognitive science and conservation psychology – could improve the effectiveness of humanitarian campaigns and strategies such as building awareness, crafting policies, providing information and reinforcing positive behaviours.

A first step in considering whether and how to incorporate this emerging scientific understanding into an organization's strategy is to raise the awareness and interest of staff and volunteers. A powerful and effective way to do so is to engage people in activities in which they experience cognitive biases and other predictable yet often unanticipated phenomena that affect decision-making and behaviour, with real-world consequences.

This paper describes how humanitarian and environmental organizations can raise staff and volunteer awareness of decision science, using as a case study the experience of one such organization. A highly interactive two-day retreat – which included experiential activities, games, stories, brainstorming, and a formal assessment of the retreat's immediate and long-term impacts – sparked enduring knowledge and interest in decision science, catalysed the creation of a new social scientist position, and led to changes in organizational practices.

Materials for designing experiential learning activities about decision science are available via a wide variety of sources, including peer-reviewed literature, popular science articles, the internet, and papers like this one. The most effective learning experiences will use examples and activities that are carefully tailored to participants and their work.

Exploring and learning about decision science can raise important philosophical issues, including the ethics of using research findings to change behaviour. Groups should be prepared to acknowledge and discuss differing values, perspectives and goals.

Decision science involves complex concepts and scientists' understanding remains incomplete, especially in environmental domains. Groups that wish to incorporate decision science findings into their work should partner with academic researchers to design and test interventions and other strategies. Humanitarian and environmental organizations can also serve as valuable research platforms for advancing scientific understanding of human behaviour and decision-making.

# 1. Introduction

Much of the science applied to humanitarian and environmental problems like climate change focuses on understanding the impacts of human activities on physical, biological, and human systems. It is just as important to understand the human decisions and behaviours that drive these activities so that effective solutions can be developed and implemented.

However, far fewer resources are devoted to the study of *why* people and institutions engage in environmentally harmful behaviours. Policies, awareness campaigns and other strategies to change such behaviours often use models of decision-making that assume people are rational agents. This approach focuses on the *results* rather than the process of making choices: it assumes that optimal outcomes are pursued regardless of how the decision process is framed.

Yet a very substantial body of evidence shows that real-world decision-making often violates the rationality assumption: our decisions seem to be fundamentally sensitive to context, framing, and systematic anomalies in choices. Strategies based on a solid understanding and rigorous study of the forces influencing human decision-making and behaviour seem likely to be more successful in changing behaviour than strategies based on faulty and/or untested assumptions.

The broadly shared mission of humanitarian and environmental organizations is to promote decisions and behaviours that protect human well-being and the environment. Different groups take widely different approaches to accomplishing this goal and, like any individual or entity, tend to project their own values onto the individuals, organizations, communities and populations whose choices and behaviours they want to influence, or to make assumptions about what motivates their behaviour. The danger of projections and assumptions is that they may not resonate with – or may even alienate – target audiences and potential allies. In addition, policies and interventions based on those assumptions may lead to perverse outcomes. For example, studies show that science-based messaging can actually increase public polarization on climate change, due to cognitive biases and social identity (Hart and Nisbet, 2012).

Researchers have found perverse outcomes in other environmental domains as well. For example, conservation strategies aimed at reducing fishing effort by subsidizing alternative livelihoods are based on an assumption that fishing is motivated entirely by economic gain. Such strategies can succeed in employing more fishermen in alternative livelihoods. However, fishing can actually increase because the alternative livelihoods make fishermen better off, leaving them with more leisure time to do what they really want to do: *fish* (Walsh et al., 2010).

Research in fields such as behavioural economics, social psychology, cognitive science, and conservation psychology (collectively termed *decision science* here) has been focused on understanding how humans make decisions and why they behave the way they do. Many research findings in these disciplines appear to have a direct bearing on humanitarian and environmental organizations' work on climate change and other environmental issues. For example, social norms are strong determinants of behaviour (e.g. environmental behaviour of friends and neighbours that affects your own), and people have many cognitive biases, such as a disproportionate aversion to losses relative to gains and a tendency to interpret information in ways that confirm existing beliefs. Group decision-making, which involves variations of these individual-level phenomena, is not discussed here but is also likely to be highly relevant to humanitarian and environmental organizations.

The role of decision science in humanitarian and environmental work has been explored to some extent in the academic literature. For example, Suarez and Patt (2004) combined the theory of decision science and evidence from a project with farmers in Zimbabwe to draw lessons on climate-risk communication from the perspective of status quo bias, loss aversion, and other observed decision patterns. Other researchers have shown that exposure to statistics on the scope of a large problem, such as the number of victims of a genocide, elicits “psychic numbing” and does little to motivate people to volunteer for or donate to humanitarian organizations. In contrast, highlighting the impact on one victim elicits powerful emotional responses and motivates action (Slovic, 2007).

Similarly, subtle changes in the wording of conservation appeals can affect behaviours such as household energy use (Schultz et al., 2007). Venkatachalam (2008) reviewed the implications for environmental policy of specific behavioural anomalies such as the “endowment effect” and “time-inconsistent behaviour”. Much more is being published, but the rate of knowledge creation is vastly outpacing the ability of humanitarian and environmental organizations to absorb and use that knowledge. We believe that the humanitarian and environmental community could benefit from exploring and incorporating decision science approaches and findings into their own work. This is not an easy task, given the systematic work overload and the many demands for additional learning within organizations’ comfort zones, such as climate science or monitoring and evaluation. Moreover, all staff and organizations already have conceptual models of how to influence human decision-making and behaviour, such as the “information-deficit” model (i.e. all that is needed is more knowledge) (Moser and Dilling, 2011).

Abandoning these models in favour of a new one based on scientific findings requires time, energy and a willingness to engage in a critical examination of sometimes deeply embedded assumptions. An important first step in deciding whether and how to incorporate any of the insights of behavioural science into a group’s work is to raise awareness and inspire interest. Here we describe an effective way of doing so, using as an example an event we organized for Environmental Defense Fund (EDF).

EDF is a science-based international environmental organization whose principal approach to achieving its mission is to align market forces and economic incentives with environmental protection. This approach is based, in part, on the assumption from classical economic theory that individuals and institutions seek to maximize financial self-interest. EDF has always acknowledged that this model of the rational actor can be unrepresentative of human decision-making and that non-financial incentives can be as powerful as, or even more influential than, economic incentives for behavioural change. Accordingly, EDF has tracked the development of decision science disciplines, especially as those fields have begun to turn their attention to environmentally relevant questions.

The organization recently began studying these fields more formally and identifying ways to incorporate social science research and findings into its work. That process included a small workshop with decision science experts in September 2010 and a highly interactive retreat for 341 staff members in June 2011. The goal of the retreat was to introduce concepts from decision science that are potentially applicable to EDF’s work, spark interest in the material more broadly, and catalyse discussions about possible applications.

Here we describe the retreat, covering our participatory approach, results, and lessons learned, with a particular emphasis on insights for humanitarian and environmental groups interested in exploring the potential relevance of decision science to their work.

### **Glossary: decision science concepts covered in the staff retreat**

**Anchoring:** People rely on known information (“anchors”) in making judgments and decisions. These anchors strongly affect final choices.

**Behavioural economics:** The study of the cognitive, emotional and social aspects of economic decision-making.

**Decision science:** The study of how and why people make decisions; it includes a diversity of disciplines.

**Framing:** People’s choices tend to be affected by how information is presented (“framed”).

**Loss aversion:** People hate to lose things. In fact, they tend to be hurt more by giving something up than they are pleased to acquire the same thing.

**Motivated reasoning:** People tend to interpret information in ways that confirm pre-existing beliefs and values.

**Rational choice theory:** This posits that people make choices by comparing costs to benefits and maximizing personal advantage.

**Representativeness:** People tend to jump to conclusions based on how similar (or “representative”) a situation or person is to a preconceived notion.

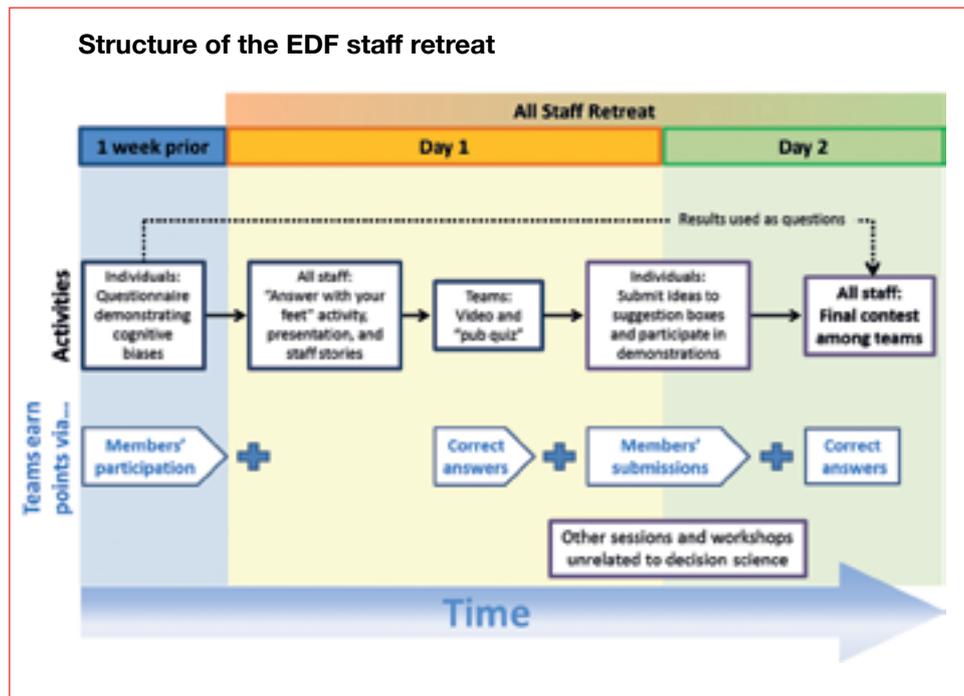
**Social norms:** People tend to follow what they perceive to be rules of behaviour for their social group.

**Status quo bias:** People tend to stick with the current situation.

**Values and emotions:** These affect people’s reasoning and decision-making.

## **2. An interactive introduction to decision science**

EDF holds annual staff retreats, most of which are organized around a central theme. A small workshop with decision science experts in September 2010 generated enough interest among its participants that EDF executives made decision science the theme of its June 2011 retreat. Drawing from a large body of work on the value of experiential learning (e.g. Kolb, 1984), we designed a highly interactive event that maximized staff engagement with the material. The guiding principle was to create a different relationship between participants and decision science content than what happens in a conventional lecture-based setting, which often gives answers to questions that nobody is asking. Our innovation consisted of allowing employees to personally experience many of the phenomena that have been described by decision scientists. These experiences produced among participants the desire to understand perplexing patterns emerging from their own behaviour. In colloquial terms, once we had created the “Huh?” we could deliver the “Aha!” explanation.



*Team competition.* Prior to the retreat (see above), participants were assigned randomly to one of six teams which would compete for points during the retreat. Participants could earn points for their teams by taking part in interactive demonstrations of concepts from decision science and scoring well on quizzes. As a final incentive, each team captain was given a voucher for a Friday afternoon off for all team members. However, when a team was eliminated from the competition, their vacation voucher would be taken away. Research suggests that this would be a more powerful incentive than the alternative (awarding a free Friday afternoon off to the winning team) because people tend to avoid losses (“loss aversion”) to a greater extent than they seek gains of the same magnitude.

*Demonstrating loss aversion and bias in status quo through “answer with your feet”.* At the first session, each employee was given a sheet of paper with three multiple-choice questions relevant to EDF’s work. Half the sheets were on white paper, the other half on yellow. Every sheet asked the same questions, but depending on colour the answer choices were framed in different ways.

The different frames were designed to elicit loss aversion and status quo bias (the tendency for people to stick with existing, default situations). Participants with white sheets were asked to stand in the northern half of the room and those with yellow sheets were asked to stand in the southern half of the room. The facilitator briefly introduced the topic of decision science and explained that staff would experience some basic insights from decision science research through an “answer with your feet” activity. This is illustrated in the box on the next page.

## Survey questions and answer choices for the “answer with your feet” activity

**Q1)** You are representing EDF in a televised debate about proposed legislation that would damage fragile ecosystems across the country. Your opponent is a popular figure known for good debating skills. While preparing for the debate, you learned that this opponent has a mild, non-life-threatening food allergy that leads to slight but noticeable coughing and itching. During the pre-debate conversation with organizers, a waiter brings some snacks to a nearby table. You happen to know a non-obvious fact: the food contains the allergen. You suddenly realize that it would be helpful for your cause if the opponent ate the food. You comment how tempting the snack looks.

[White survey]

Your opponent reaches out to the tray and takes a snack. Do you indicate that the food contains the allergen, and thus try to stop this?

- No. (Walk west)
- Yes. (Walk east)

[Yellow survey]

Do you pick up the tray and offer the snack to your opponent? (You know the offer will be accepted.)

- Yes. (Walk west)
- No. (Walk east)

**Q2)** EDF has to vacate the building where you’re currently working, and you must choose a new office space. You consider two possibilities. They are like your current office in most respects except for the amount of social contact and the convenience of commuting to and from work. To compare the two choices to each other and to the present situation, you have made up the following table. Do you choose Office 1 or 2?

	White survey		Yellow survey	
	Social Contact	Daily Travel Time	Social Contact	Daily Travel Time
<b>Present Office</b>	Much pleasant social interaction	80 minutes	Isolated for long stretches	10 minutes
<b>Office 1 (walk west)</b>	Limited contact with others	20 minutes	Limited contact with others	20 minutes
<b>Office 2 (walk east)</b>	Moderately sociable	60 minutes	Moderately sociable	60 minutes

**Q3)** You’re leading an EDF team in charge of protecting fisheries in the developing world. You hear that a Pacific nation is going to pass legislation that will lead to the collapse of its fisheries unless your team intervenes. You have two choices; which one do you take?

[White survey]

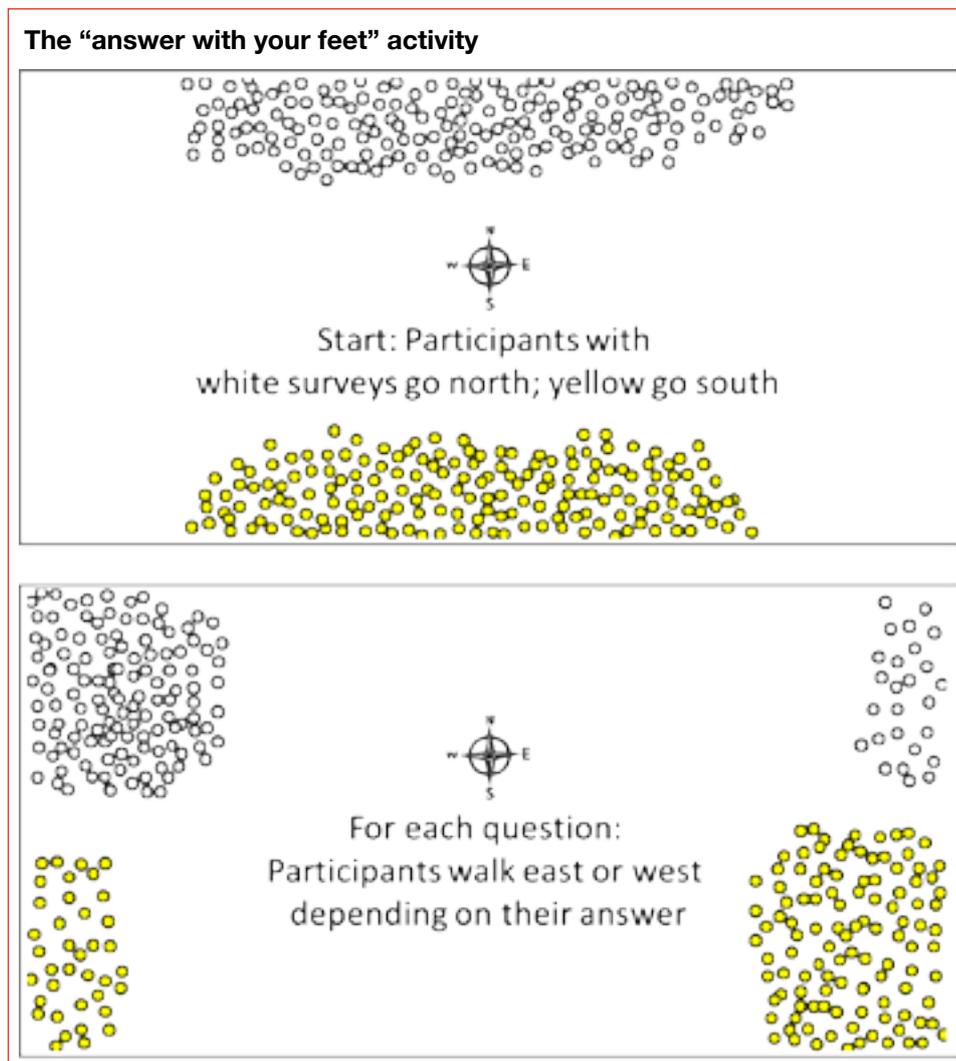
- With this strategy, the fisheries of 40 of the country’s 60 islands will collapse. (Walk west)
- With this strategy, there’s one-third chance that no fisheries will collapse and a two-thirds chance that all 60 will collapse. (Walk east)

[Yellow survey]

- With this strategy, the fisheries of 20 of the country’s 60 islands will be saved. (Walk west)
- With this strategy, there’s a one-third chance that all 60 will be saved and a two-thirds chance that none will be saved. (Walk east)

After some warm-up questions that asked participants to walk east or west depending on their answers (e.g. “Can you explain the basics of climate change?”), the learning activity began. For each question, employees were first asked to read the choices on their sheet and move east or west depending on their answer. Next, they were asked to note the differences between groups’ choices (as evidenced by the number of people in each group who had moved east or west) and, in small groups, compare the wording of the two versions, which were identical in terms of choice, but different in terms of framing – for example, presenting a choice as either a gain or a loss. This is illustrated below.

Each small group discussed why they thought the frames elicited different responses, searching for theories to explain the indisputable but perplexing behavioural anomaly that participants themselves had displayed. After the appetite for an explanation was established, the facilitator described the concept at hand – for example, loss aversion or status quo bias.



*Presentation and staff stories.* Following the “answer with your feet” activity, staff sat down for a short presentation in which the facilitator introduced and explained additional decision science concepts.

Next, five staff members shared brief (three-minute) stories, prepared in advance, about how social, psychological, and/or cognitive factors affected their work on climate change, sustainable agriculture, sustainable fishing, and energy efficiency. The intent of this session was to ground the decision science principles in the experience of peers, in order to make it more salient for EDF staff.

*Video and quiz.* After the plenary, employees split into teams for an hour during which they received a glossary (see Page 5) and watched an 8-minute EDF-produced video about decision science concepts. (A slightly modified version of this video is publicly available [here](#).)

They then participated in a pub quiz that used several surprising and/or funny real-life demonstrations of decision science concepts such as status quo bias, social norms, anchoring, and loss aversion. These were drawn from a variety of sources, such as *Nudge* (Thaler and Sunstein, 2009), *Predictably Irrational* (Ariely, 2008), and the peer-reviewed literature. After the quiz, team leaders explained the decision science concepts behind the answers. Quiz scores were added to the teams' totals.

*Interactive demonstrations.* Staff had the opportunity to participate in two other demonstrations of decision science concepts: a pre-retreat online survey of the sort used in the “answer with your feet” plenary session (with alternative framings of the same questions) and an exercise that elicited anchoring effects (introducing a number or concept, even if completely capricious, tends to anchor responses when there is uncertainty around the real answer). Teams were awarded points for each member's participation.

The results of these activities illustrated the expected effects. For example, there were two versions of a question on the pre-retreat survey about the percentage of African countries in the United Nations. Half of the participants were asked to consider whether the answer might be more or less than 10 per cent; the other half were asked to consider whether it might be more or less than 65 per cent. Participants who were given 10 per cent had lower final answers than participants who were given 65 per cent, as expected due to anchoring (Tversky and Kahneman, 1974). These and other results were used during the final contest as additional examples of decision science concepts.

*Brainstorming and discussion.* For the remainder of the two-day retreat, employees were encouraged to submit observations, ideas, and comments about the material to an online suggestion box. Teams were awarded points for each member's participation.

*Final contest.* The closing all-staff session included a game show-style contest among the two top-scoring teams and a third wild-card team that survived a raucous elimination round consisting of entertaining physical challenges<sup>1</sup> and trivia about the Jersey coast (location of the retreat). The captains of the three teams that were eliminated in this opening round surrendered their vacation vouchers. In the final round, each of the remaining three teams had a representative on stage to answer questions. Contestants advanced in steps across the stage as they answered questions correctly, with the first team to reach the finish line declared the winner. Questions tested teams' understanding of decision science concepts and, in some cases, required contestants to interpret results from the interactive demonstrations described above. More difficult questions were worth more steps. Team representatives could turn to their teammates in the audience, who were not shy about shouting advice when needed. When the winning team crossed the finish line, the captains of the other two teams surrendered their vacation vouchers.

A full set of [research materials](#) from the retreat is available online.

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<sup>1</sup> We used “Mad Dog” and “Hut, Hut, Hike!” from the show *Minute to Win It*. A list of 20 such games is available [here](#).

### **3. Assessing the effect of the retreat on staff attitudes about and knowledge of decision science**

We assessed the immediate effects and longer-term impacts of the retreat in several ways. Immediately before and after the retreat, we conducted quantitative evaluations of staff awareness of and interest in decision science. We also tested how well participants retained the information, using a recall test conducted nearly three years after the event.

Several broader impacts also emerged during and after the retreat, which mirrored the quantitative effects we detected in our surveys. These included marked increases in employee participation in discussions about the social aspects of EDF's strategy, the creation of a new staff position, and the development of partnerships with academic scientists. We describe these broader impacts in greater detail in Section 4. In this section, we present the methods and quantitative results of our pre- and post-retreat surveys.

*Participants.* All participants were EDF employees. Although 341 employees participated in the retreat, most of our analyses are based on 207 participants who completed at least one of the questionnaires used to gather data before and immediately after the June 2011 retreat and 100 participants who completed a survey that tested their recall of the material in February 2014.

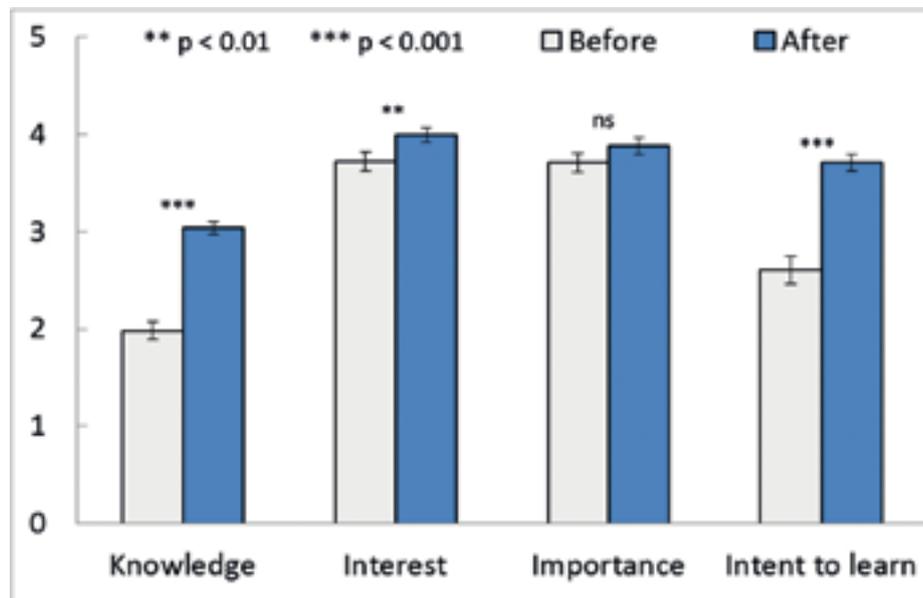
*Pre- and post-retreat measures.* To assess the impact of the training session on participant interest, we used pre- and post-test assessments using self-reporting. At the retreat site, all employees received a paper copy of a study consent form and pre-retreat survey. On the anonymous pre-retreat survey, employees were asked to indicate their gender, level of education, division within EDF, office location, and length of employment at EDF. For each of five terms ("decision science," "behavioural economics," "status quo bias," "loss aversion," and "rational choice theory"), they were asked to rate, on a scale from 1 to 5, how much they knew about it, how interesting it was to them, and how important it was to them.

Participants were also asked to rate, on a scale from 1 to 5, the extent to which they intended to learn more about decision science over the next year. Completed forms were collected at the registration desk before any retreat activities had taken place. The week after the retreat, 137 employees elected to complete an online survey identical to the pre-retreat survey, but without any demographic questions.

*Follow-up test of recall.* In February 2014, we asked staff to complete a survey that tested their recall of the material, via brief announcements on EDF's intranet and an email to individual departments. The online survey included a mix of questions that were presented at the retreat as well as new questions that tested understanding of the same concepts. We expected a modest response rate, given staff turnover and the fact that this test, unlike the pre- and post-retreat surveys, was not associated with a mandatory, high profile event and thus was not likely to be as salient to busy staff. Forty-eight of the 100 staff members who completed the recall test had attended the retreat.

*Results.* The retreat significantly increased participants' reported knowledge of, interest in, and intention to learn more about the material, as shown on the next page. The retreat also significantly increased the value participants assigned to each of the five topics.

Participants' ratings of the material before and after the retreat (5 is highest). Asterisks denote statistically significant differences between pre- and post-retreat responses.



Participants' gender and education influenced the results. Women's ratings of the importance of the material were lower than men's ratings before the retreat, but the difference disappeared after the retreat. Similarly, college-educated employees reported significantly less knowledge of the material than employees with graduate degrees before the retreat, but this difference disappeared after the retreat. No other demographic factors influenced the results.

The retreat did more than capture staff attention and interest: participants learned and retained many of the concepts. We asked two types of questions on the recall test. Some questions were taken from the pub quiz and presented exactly as they had been 32 months earlier. Other questions took the same form as questions that were asked during the retreat's final contest, but their stories and numbers were different. Staff who had attended the retreat performed significantly better on these questions than did staff who had not attended the retreat (72 per cent against 63 per cent correct respectively). This suggests that the concepts were learned sufficiently well that people could identify them in new contexts.

On the recall test, staff who had attended the retreat indicated the same level of interest in decision science as they had 32 months earlier. Staff who had not attended the retreat indicated less interest than those who had attended, but their interest levels were higher than what staff had reported prior to the retreat. These results show that the retreat generated enduring interest among participants. They also suggest that EDF's activities related to decision science and conversations in the ensuing 32 months have inspired awareness and interest among staff who were hired after the retreat, but not to the same extent as the interactive retreat.

Interested readers can find full details about our statistical analyses and results in the online [research materials](#).

## 4. Staff and organizational responses

The online suggestion box received 445 responses over the two-day retreat. The submissions included descriptions of possible applications of decision science to every aspect of EDF's operations and programmatic work, proposals for improving existing strategies based on the concepts discussed at the retreat, and personal stories of decision science in action in employees' professional lives.

Suggestions included conducting a decision-science audit of EDF's operations, communication, and advocacy strategies, organizing regular seminars and other training opportunities, and hiring decision scientists from a variety of disciplines. Staff also commented on the value of the material to their work. Some examples:

- “Decision science is painfully relevant to climate change policy. The sudden polarization of climate change as an issue, the attacks on and distrust of the science, the failure of ‘more and better science’ to convince people are all vivid examples of how the psychological biases described in decision science shape people’s worldviews, beliefs and actions.”
- “I do a lot of climate change science communication. There is definitely motivated reasoning [the tendency to fit facts into a pre-conceived belief system] among climate deniers! They have a view and they are sticking with it, even if it means elaborate interpretations of scientific data and basic facts to confirm their preconceived conclusions. Facts are not working.”
- “In my work on climate and air legislation, I see Congressional decisions all the time based not on the facts, but on every item on the list of decision science.”
- “My work in the South Atlantic shows the strength of status quo bias. Existing management has been a slow disaster for fishermen and the resources. Nonetheless, many fishermen cling to existing management approaches and oppose new ideas. Framing has been important to changing some minds.”
- “I think it’s become very clear [that decision science] can be a very powerful tool. What I loved most was how effective choice architecture and framing can be for messaging and communications issues. Knowing there’s real science behind how we frame and promote issues makes it incredibly helpful. I hope it’s an extremely integral part of [our] structure going forward.”

Although teams won points for simply submitting material, so many of the suggestions were unique and well thought-out that we believe the level of response reflects genuine interest in the material. Furthermore, staff continued to generate ideas and advocate for change well after the end of the team competition.

Immediately following the retreat, employees organized a decision science listserv that, three years later, remains an active forum for sharing research results, news stories and ideas. Staff also formed a task force to consider how EDF should respond to the material. That task force made recommendations to the executive team of how to incorporate decision science into EDF's everyday work, many of which have since been adopted.

One of the task force's major recommendations was to retain a social scientist who would be tasked with integrating different disciplinary perspectives into the organization's work and ensure the scientific rigour of that work, with an early emphasis on climate-related projects. A year after the retreat, EDF hired a social and personality psychologist to carry out this work.

In addition, several different departments have convened expert workshops for their staff to discuss with leading academic researchers the social and psychological aspects of EDF's work and to identify science-based strategies for understanding and overcoming challenges. These partnerships with academic researchers have done more than hone EDF's understanding of its target audiences and enhance the effectiveness of its strategies. They have also provided decision scientists with a valuable new research platform on which to expand their scientific work.

Thirty-two months after the retreat, the recall test demonstrated that participants had learned and retained decision science concepts. In addition, taking the recall test prompted staff to reflect on their experiences at the retreat. After we asked staff to fill out the anonymous survey, several individuals contacted us to share specific lessons they learned at the retreat and stories of how they had applied those insights to their work. One even suggested how we could apply lessons from social norms research in emails we sent to staff reminding them to take the recall test. Still others wrote positive and enthusiastic notes: "It was fun rehashing/refreshing some of the learning we all did during the decision science retreat," said one.

## **5. Designing decision science learning activities: insights and recommendations**

Given the experience of the retreat and the analysis of the related data, we argue that humanitarian and environmental organizations can benefit from greater familiarity with decision science. The application of decision science principles could improve the effectiveness of many of the elements of any environmental or humanitarian campaign or strategy, such as building awareness, crafting policies, providing information, and reinforcing positive behaviours. Sparking staff interest and building a shared knowledge base are important steps toward using this research to improve success. Experiential learning can be a powerful way to catalyse that process; in this case, it generated an enormous return on the investment of just two days of staff time. Our experience also yielded important lessons.

*Be ready to invest resources on planning.* We hope that our experience and the materials we have made available will shorten the time required for others to organize similar activities. Nevertheless, it is essential not to underestimate the importance of investing time in preparation. Two staff members and an intern spent about a third of their time for four months conceiving the structure, identifying quiz questions, and designing the activities. The keynote speaker and facilitator also invested time preparing for, travelling to, and leading the plenary session and participatory activities. Producing the video took additional staff time and we had to enlist employees to lead the staff teams, run the breakout sessions and produce the game show.

EDF invests in an all-staff retreat every year, so no extra funds were necessary to hold this meeting. Not all organizations will have that luxury, but fortunately it is possible to modify many of the activities for smaller, dispersed groups (like departmental retreats or regional offices). For example, the survey that elicited cognitive biases was conducted online, the video presenting decision science concepts is publicly available, and the pub quiz was designed for small groups.

The “answer with your feet” activity could also be conducted online or via real-time text polling if it is impossible to bring large groups together in person. One caveat is that, due to limited sample sizes, the results from small groups may not show expected patterns.

*Focus on participatory activities.* EDF conducted a survey of staff to gather feedback about the retreat as a whole. Employees were invited to comment on what they liked about the portions of the retreat related to decision science. The response was overwhelmingly positive, with staff repeatedly commenting on how the participatory nature of the activities made the retreat fun and engaging. One employee wrote, “I liked that we were out of our chairs participating physically”; another explained that actually experiencing the concepts as they were being explained “engaged us and piqued our interest”.

Well-designed games in which participants experience the complexity of decisions can help accelerate and consolidate organizations’ learning and dialogue; for a theoretical framework and humanitarian examples, see Mendler de Suarez et al. (2012).

*Tailor examples to the organization’s mission.* We feel this was especially important for questions used in participatory activities, and worth the extra time it took to customize certain aspects of the retreat. We told stories, asked questions, described scenarios, and chose examples that were relevant to EDF’s programmatic work (primarily climate, ecosystems, and oceans) as well as its marketing and communications strategies. Staff commented that these examples helped them make connections to other aspects of their work more easily.

*Consider your audience.* Not everyone will react to the material in the same way. For example, scientifically minded participants will be comfortable with probability and uncertainty, ready to accept complexities, and eager to dive into nuances; others may assume that all examples illustrate ready-to-go solutions, and may disengage when they hear “it depends”.

Similarly, some people believe strongly in free will (that their behaviour and thoughts are predominantly under their control) and feel it is unacceptable to attempt to influence opinions and behaviour; others hold beliefs closer to the deterministic models of behavioural scientists. The majority of people fall somewhere in between. These beliefs can affect participants’ willingness to learn and apply the material. It is important to take these and other factors into consideration, and to tailor activities in ways that make the most sense for people.

*Use strong case studies but beware of oversimplifying.* Using stark, startling or humorous examples to demonstrate some decision science concepts was successful in capturing participants’ attention, especially when treatment effects were particularly striking. However, this approach obscures the complexity of the concepts at hand, the incompleteness of researchers’ understanding (especially in environmental domains), and the lack of hard and fast rules that will work in every context.

In our case, some participants, particularly staff members with no scientific background, were ready to apply what they had learned the minute they returned to work and were frustrated to discover that identifying problems and designing interventions was much more complicated than they had assumed. In retrospect, we would have spent more time introducing and discussing nuances and uncertainties; this probably would have been best done toward the end of the training to prevent participants from disengaging from the material.

*Make room for discussing values, perspectives, and goals.* During the retreat, EDF staff expressed some concerns and discomfort about manipulating people through applications of decision science. Despite their hesitation, staff also realized that this research elucidates factors that affect decisions, many of which may play a role in their existing work. In addition, participants acknowledged that

many organizations and groups, including those that fuel humanitarian problems or actively obstruct environmental progress, are already using these insights to their advantage. In retrospect, it may have been helpful to include time for discussing differences in people's beliefs about how the human mind works and the ethics of different approaches to changing opinions and behaviour.

Acknowledging some basic tenets of decision science, especially the deterministic models of behavioural scientists, may make it easier for some staff to engage with the material. EDF's decision science listserv has been an important forum for these sorts of conversations. We feel it is important to facilitate discussion of such concerns during and after any meeting about decision science and its possible applications to humanitarian and environmental work.

*Be prepared to reach out to experts.* The retreat created a groundswell of interest that generated hundreds of ideas and questions about every aspect of the organization's work, many of which could only be addressed by trained decision science researchers and other experts. EDF has a strong track record of building partnerships with researchers, policy-makers, staff, and other stakeholders, so the organization was able to accommodate many of these needs. Still, it was necessary to prioritize the requests. Organizations that undertake this sort of experiential learning approach should be prepared to field questions that will require conversations with academic researchers. Effective testing and implementation of interventions and other strategies requires assistance from trained experts.

## **6. Conclusions**

Decision science can help humanitarian and environmental organizations understand and address links among information, choices, and consequences. This paper has aimed to share a participatory approach to introduce basic decision science concepts, spark interest in the material, and catalyse discussions about possible applications by any organization concerned with people and their environment. By every measure, the interactive programme succeeded beyond our expectations. Staff interest was so high that the topic truly took on a life of its own.

There are three marks of success that we especially want to highlight. First, EDF hired a social psychologist – a substantial investment for an organization whose expert staff previously only included natural scientists and economists. Second, the recall test demonstrated that participants did more than enjoy an unusual meeting; they retained what they learned. Third, individual employees have reported changing some of their practices and whole departments have organized meetings to further their understanding of the material and run rigorous tests of their strategies.

Mitigating and preparing for climate change and its associated risks – and solving myriad other environmental and humanitarian problems – requires understanding and changing human decision-making and behaviour. We believe it behoves the humanitarian and environmental community to tap into the decision science disciplines that are beginning to study these phenomena. Organizations that are interested in exploring this exciting arena can benefit from adapting the participatory activities we have outlined here.

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