

Research Materials

Pre-retreat Questionnaire: Version A¹

You will earn your team a point by completing the following questionnaire. Points are not based on your answers, so please answer the following questions according to your own personal opinion. Don't think too hard about each question - simply answer with your gut.

- 1) How do you think the Pleasantville Transportation Safety commission should divide its budget between improving auto safety (seatbelts, bumpers, etc.) and highway safety (guard rails, interchanges, etc.)? Choose one of the following options:
 - a. 70% auto safety and 30% highway safety
 - b. 30% auto safety and 70% highway safety

- 2) A shortage has developed for a popular model of car and customers must now wait two months for delivery. A dealer has been selling these cars at list price. Now the dealer prices this model at \$200 above list price. In your opinion is this acceptable or unfair?
 - a. Acceptable
 - b. Unfair

- 3) Think about the percentage of African countries that are members of the United Nations. Could it be more or less than, say, 10%? Write down what percentage of African countries you think are a member of the United Nations. _____

- 4) Imagine you are taking a poetry class and your teacher tells you that he will be doing a 15-minute poetry reading next door after class that costs \$2 to attend. At the end of class, your professor announces that actually, the reading will be free to attend. Do you go to the reading?
 - a. YES
 - b. NO

- 5) You are perusing around Home Depot looking for a new, state-of-the-art BBQ. You spot a great one, marked down to \$1,999.99 from the original price of \$2,499.99. Is this BBQ too expensive?
 - a. YES
 - b. NO

¹ Note for organizers: EDF used SurveyMonkey.com for this activity. Half of the participants should complete Version A and the other half Version B. Each participant who completes the questionnaire earns a point for her/his team. The results of the questionnaire, which should demonstrate the expected biases, can be used in the final contest. Sources and expected results are explained below.

Pre-retreat Questionnaire: Version B

You will earn your team a point by completing the following questionnaire. Points are not based on your answers, so please answer the following questions according to your own personal opinion. Don't think too hard about each question - simply answer with your gut.

- 1) How do you think the Pleasantville Highway Safety commission should divide its budget between improving auto safety (seatbelts, bumpers, etc.) and highway safety (guard rails, interchanges, etc.)? Currently, 70% goes to auto safety and 30% to highway safety.
 - a. 70% - auto safety
30% - highway safety
 - b. 30% auto safety
70% highway safety

- 2) There is a shortage for a popular model of car that you desperately want to show off to all your friends, but you have to wait 6 months for its delivery. A dealer in your town has actually been selling these snazzy cars at a discount of \$500, but now that he sees the demand, he is selling the car at list price. In your opinion is this acceptable or unfair?
 - a. Acceptable
 - b. Unfair

- 3) Think about the number of African countries that are a member of the United Nations. Could it be more or less than, say, 65%? Write down how many African countries you think are a member of the United Nations. _____

- 4) You are a graduate student in literature and your professor tells you that he will be doing a 15-minute poetry reading next door after class and that he will pay you \$2 to attend. At the end of class your professor announces that instead, he will not pay you but that the reading will be free to attend. Do you go to the reading?
 - a. YES
 - b. NO

- 5) You are perusing around Home Depot looking for a new, state-of-the-art BBQ. You spot a great one that costs \$1,999.99. Is this BBQ too expensive?
 - a. YES
 - b. NO

Pre-Retreat Questionnaire: Sources, Expected Results, and Explanations

- 1)** Source: Modified from Samuelson and Zeckhauser (1988). Expect more people to choose (a) (70% auto, 30% highway) when they are taking Version B, due to status quo bias.
- 2)** Source: Kahneman et al. (1986). Expect more people taking Version A to feel it is unfair, because of loss aversion: imposing a surcharge (likely to be judged as a loss) is considered more unfair than eliminating a discount (reduction in a gain).
- 3)** Source: Tversky & Kahneman (1974). Expect people taking Version A to give lower answers than those taking Version B, because the hypothetical percentage in the question (10% vs. 65%) acts as an anchor.
- 4)** Source: Modified from Ariely et al. (2006). Expect more people taking Version A to answer “yes” because of a variation on anchoring known as “Tom’s law,” in which people’s initial reactions (whether or not to attend based on if they will be paid or charged) affects their second response (whether or not to attend if it’s free).
- 5)** Source: James (2009). Expect more people taking Version A to answer “no” because the original price acts as an anchor.

“Answer With Your Feet” Exercise: White Sheet

- 1) 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, and comment on how tempting the snack looks.

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)

- 2) 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.

	Social Contact	Daily Travel Time
Present Office	Much pleasant social interaction	80 min
Office 1	Limited contact with others	20 min
Office 2	Moderately sociable	60 min

Do you choose office E or office F?

- Office 1 (Walk west)
- Office 2 (Walk east)

- 3) 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?

- 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)

“Answer With Your Feet” Exercise: Yellow Sheet

- 1) 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, and comment on how tempting the snack looks.

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)

- 2) 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.

	Social Contact	Daily Travel Time
Present Office	Isolated for long stretches	10 min
Office 1	Limited contact with others	20 min
Office 2	Moderately sociable	60 min

Do you choose office E or office F?

- Office 1 (Walk west)
- Office 2 (Walk east)

- 3) 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?

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

Pub Quiz: Quizmaster Script²

Split your team into squads of 6-7 people each. Assign a number to each squad and have them put the number at the top of their quiz sheets (or you can do this in advance).

Read each question aloud, then give squads about 30 seconds to choose and record their answers.

Round 1

Each correct answer is worth 1 point. Correct extra credit answers are also worth 1 point. Everyone's scores will contribute to our collective team's total.

- 1) An experiment was conducted in a women's restroom in a New Orleans bar. In scenario "A", whenever a bar patron came out of a stall, a researcher who was stationed in the restroom would start washing her hands and talking to the other woman. In scenario "B" the researcher would start talking on her cell phone and avoid eye contact.

In which scenario did more women wash their hands? Please circle your answer.

- A. Researcher washed her hands
- B. Researcher talked on her phone

For extra credit: What percentage of women washed their hands in each scenario? You get credit if you are within 10 percentage points of the correct answer.

- 2) Between 2000 and 2006, US hybrid vehicle sales increased from 3,000 to 250,000. Which type of tax incentive had the greatest effect on demand for hybrids? Please circle your answer.

- A. \$2,000 income tax credit
- B. \$1,000 sales tax waiver

- 3) Which "get-out-the-vote" campaign message was more effective?

- A. "More than 12.5 million Californians voted last year. In the upcoming primary election this Tuesday it is almost certain that many millions of California citizens will vote, just as millions have in the other recent elections. We encourage you to join your fellow California citizens. Please get out and vote!"

² Note to organizers: This activity requires a "quizmaster" and someone to tally scores. This appendix includes the script and flyer for a quizmaster and answer sheets for all the squads taking the quiz. We produced the script to ensure that our volunteer facilitators would provide exactly the same information to all teams.

- B. “More than 15 million California citizens did not vote last year. In the upcoming primary election this Tuesday it is almost certain that many millions of California citizens will again fail to vote, just as millions have failed to vote in other recent elections. We encourage you to buck this trend among your fellow California citizens. Please get out and vote!”
- 4) Which sign was most effective in preventing theft in Petrified Forest National Park?
- A. No sign at all.
 - B. “Please don’t remove the petrified wood from the park.”
 - C. “Your heritage is being vandalized every day by theft losses of petrified wood of 14 tons a year, mostly a small piece at a time.”

For extra credit, which sign does the Park use? Please fill in the blank.

- 5) Which card was most effective at getting hotel guests to re-use their towels?
- A. “HELP SAVE THE ENVIRONMENT. You can show your respect for nature and help save the environment by reusing your towels during your stay.”
 - B. “JOIN YOUR FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT. In a study conducted in Fall 2003, 75% of the guests participated in our new resource savings program by using their towels more than once. You can join your fellow guests in this program to help save the environment by reusing your towels during your stay.”
 - C. “JOIN YOUR FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT. In a study conducted in Fall 2003, 75% of the guests who stayed in this room participated in our new resource savings program by using their towels more than once. You can join your fellow guests in this program to help save the environment by reusing your towels during your stay.”

That's the end of Round 1. We will now collect your answer sheets and score them while we explain the answers. We will then announce the scores and begin Round 2.

Here are the answers for Round 1:

- 1) **Answer:** A (more women washed their hands when the researcher washed her hands). This researcher was demonstrating a social norm and reminding people that they should wash their hands after using the restroom. **Extra credit:** 56% of women washed their hands when the researcher washed her hands and only 27% washed their hands when the researcher talked on her cell phone. (*Source: Hayes 2002*)
- 2) **Answer:** B (the sales tax waiver). People tend to prefer immediate gratification. Even though the tax credit was larger, waiving the sales tax is immediate and easy to do. (*Source: Gallagher & Muehlegger 2011*).

- 3) Answer: A (“Join your fellow citizens...”) By describing what other people are doing, each message suggests what the norm is. Since people tend to follow the herd, they’re more likely to vote if they hear that lots of other people are voting, than if they hear that lots of people are staying home. (Source: *Gerber & Rogers 2009*)
- 4) Answer: B (“Please don't remove the petrified wood from the park”.) People tend to pay more attention to what scientists call “negative injunctives.” In other words “DON’T” gets their attention. Answer C (“Your heritage is being vandalized every day...”) unfortunately makes stealing petrified wood seem like a social norm: it’s highlighting how many people are stealing. In fact, in this study, sign C had the highest theft rate, four times higher than sign B. The Park Service knows this. But the extra credit answer is that they still use sign C. (Source: *Cialdini et al. 2006*)
- 5) Answer: C (“75% of guests who stayed in this room...”) Again, same principle as #4, but it's not just describing what other guests at the hotel have done. It’s describing guests who have stayed in the same room. You are more likely to follow the social norms of a group that you identify with more closely. In this scenario, people identified more with guests who had stayed in the same room. (Source: *Goldstein et al. 2008*)

Announce the scores from Round 1, then begin Round 2. Read each question aloud, then give squads about 30 seconds to choose and record their answers.

Let’s start Round 2.

- 1) More patients choose to have a procedure when they hear:
 - A. “Of 100 patients who have this operation, 90 are alive after 5 years.”
 - B. “Of 100 patients who have this operation, 10 are dead after 5 years.”
- 2) To maintain public parks in Washington State, drivers renewing their driver's licenses are charged an additional \$5 unless they opt out of paying the fee. In the old system, people were not charged the fee unless they chose to pay it, and the state generally collected about \$65,000 dollars per month.

How much did the state collect in the first month under the new system?

- A. \$60,000
 - B. \$100,000
 - C. \$600,000
 - D. \$1,000,000
- 3) *[Hold up flu vaccine flyer]*
 In a study about “myth-busting” public education campaigns, how soon after reading a Centers for Disease Control pamphlet on “Flu Vaccine Myths & Facts” did some people start mixing up myths and facts about flu vaccines?
 - A. Immediately after reading the flyer.

- B. Half an hour after reading the flyer.
 C. Three days after reading the flyer.
 D. Never.
- 4) A conference experimented with their default menu options. The first year they offered meat as the default, and 83% of attendants chose to eat meat. The next year they offered vegetarian as the default option. What percentage of attendants chose vegetarian?
 A. 20%
 B. 55%
 C. 80%
- 5) During the 2010 Winter Olympics, a Vancouver newspaper reported that fans who had paid a few hundred dollars for men's hockey final tickets were only willing to re-sell them for several thousand dollars (if at all). This is an example of which decision science concept?
 A. Status quo bias
 B. Loss aversion
 C. Social norms
 D. Availability
- 6) You're selling do-it-yourself balloon animal kits on eBay. Which pricing plan is likely to be most successful and sell the most kits?

	Balloon animal kit	Shipping
A.	\$5.00	<i>FREE!</i>
B.	\$2.50	\$2.50
C.	<i>FREE!</i>	\$5.00

We are now finished with Round 2. We will now collect your answer sheets and score them while we explain the answers. We will then announce the scores, the winning squad, and our whole team's point total. Here are the answers for Round 2.

- 1) Answer: A ("90 are alive") Even though the information in both of the statements is exactly the same, the framing of statement A feels more comforting and less risky. (Source: Tversky & Kahneman 1981)
- 2) Answer: D (\$1,000,000 in the first month) Requiring that people opt out of defaults tends to increase participation because people generally stay with the status quo. (Source: Washington SHB 2339, 2009)
- 3) Answer: B (Just 30 minutes after seeing the myths vs. fact information, people started to confuse myths and facts.) Their memories were even worse three days later. Conventionally, we try to battle myths with facts, but according to researchers, "attempts to warn people about false information can backfire and

unintentionally increase people's acceptance of false information as truth."
(Source: Schwarz et al. 2007)

- 4) Answer: C (80% selected vegetarian.) Because people often stick with the status quo on default options, they will settle for the option presented to them. (Source: Gunther 2009)
- 5) Answer: B (Hockey ticket holders were showing loss aversion.) People value what they have more than things they can get. According to Carmon & Ariely (2000), "the lowest price at which consumers agree to part from a good (selling price) is often considerably higher than the highest price at which they agree to acquire the same item (buying price)." (Source: Weber 2010)
- 6) Answer: C (a free balloon kit and \$5 shipping) Although the total price is the same for each offer, the idea that something tangible has no cost (or negativity) attached to it, makes people value it more. There is something really attractive about "free" items. (Source: Ariely 2008)

Pub Quiz: CDC Flu Vaccine Flyer (Used in Round 2)



The flyer features a vertical orange bar on the left side. At the top, the words "Flu Vaccine" are written in large, bold, blue letters with a white outline. Below this, the words "Facts & Myths" are written in white, bold, sans-serif font. At the bottom of the bar, there are three logos: a circular logo with a person and the text "Protect yourself. Protect your loved ones. Get the Flu Vaccine.", the Department of Health and Human Services logo featuring an eagle, and the CDC logo with the text "CDC" and "SAFER • HEALTHIER • PEOPLE". Below the CDC logo, the text "Department of Health and Human Services" and "Centers for Disease Control and Prevention" is written in white.

MYTH "The flu isn't a serious disease."

FACTS Influenza (flu) is a serious disease of the nose, throat, and lungs, and it can lead to pneumonia. Each year about 200,000 people in the U.S. are hospitalized and about 36,000 people die because of the flu. Most who die are 65 years and older. But small children less than 2 years old are as likely as those over 65 to have to go to the hospital because of the flu.

MYTH "The flu shot can cause the flu."

FACTS The flu shot cannot cause the flu. Some people get a little soreness or redness where they get the shot. It goes away in a day or two. Serious problems from the flu shot are very rare.

MYTH "The flu shot does not work."

FACTS Most of the time the flu shot will prevent the flu. In scientific studies, the effectiveness of the flu shot has ranged from 70% to 90% when there is a good match between circulating viruses and those in the vaccine. **Getting the vaccine is your best protection against this disease.**

MYTH "The side effects are worse than the flu."

FACTS The worst side effect you're likely to get from a shot is a sore arm. The nasal mist flu vaccine might cause nasal congestion, runny nose, sore throat and cough. The risk of a severe allergic reaction is less than 1 in 4 million.

MYTH "Only older people need a flu vaccine."

FACTS Adults and children with conditions like asthma, diabetes, heart disease, and kidney disease **need to get a flu shot**. Doctors also recommend children 6 months and older get a flu shot every year until their 5th birthday.

MYTH "You must get the flu vaccine before December."

FACTS Flu vaccine can be given before or during the flu season. The best time to get vaccinated is October or November. **But you can get vaccinated in December or later.**

For more information, ask your healthcare provider or call **800-CDC-INFO (800-232-4636)** Website www.cdc.gov/flu

Pub Quiz: Squad Answer Sheet

Team: _____ Squad: _____

---- ROUND 1 ----

Please circle your answers. Fill-in-the-blanks sections are extra credit.

- 1)** An experiment was conducted in a women’s restroom in a New Orleans bar. In scenario “A”, whenever a bar patron came out of a stall, a researcher who was stationed in the restroom would start washing her hands and talking to the other woman. In scenario “B” the researcher would start talking on her cell phone and avoid eye contact.

In which scenario did more women wash their hands? Please circle your answer. (Fill in the blanks for extra credit.)

- A. Researcher washed her hands (_____% of women washed their hands)
- B. Researcher talked on her phone (_____% of women washed their hands)
- 2)** Between 2000 and 2006, US hybrid vehicle sales increased from 3,000 to 250,000.

Which type of tax incentive had the greatest effect on demand for hybrids?

- A. \$2,000 income tax credit
- B. \$1,000 sales tax waiver
- 3) Which “get-out-the-vote” campaign message was more effective?**
- A. *“More than 12.5 million Californians voted last year. In the upcoming primary election this Tuesday it is almost certain that many millions of California citizens will vote, just as millions have in the other recent elections. We encourage you to join your fellow California citizens. Please get out and vote!”*
- B. *“More than 15 million California citizens did not vote last year. In the upcoming primary election this Tuesday it is almost certain that many millions of California citizens will again fail to vote, just as millions have failed to vote in other recent elections. We encourage you to buck this trend among your fellow California citizens. Please get out and vote!”*

4) Which sign was most effective in preventing theft in Petrified Forest National Park?

- A. No sign at all.
- B. “Please don’t remove the petrified wood from the park.”
- C. “Your heritage is being vandalized every day by theft losses of petrified wood of 14 tons a year, mostly a small piece at a time.”

EXTRA CREDIT: Which sign does the Park use? _____

5) Which card was most effective at getting hotel guests to re-use their towels?

- A. “HELP SAVE THE ENVIRONMENT. You can show your respect for nature and help save the environment by reusing your towels during your stay.”
- B. “JOIN YOUR FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT. In a study conducted in Fall 2003, 75% of the guests participated in our new resource savings program by using their towels more than once. You can join your fellow guests in this program to help save the environment by reusing your towels during your stay.”
- C. “JOIN YOUR FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT. In a study conducted in Fall 2003, 75% of the guests who stayed in this room participated in our new resource savings program by using their towels more than once. You can join your fellow guests in this program to help save the environment by reusing your towels during your stay.”

Score: _____ (out of 8)

Team: _____ Squad: _____

---- ROUND 2 ----

Please circle your answers. Fill-in-the-blanks sections are extra credit.

1) More patients choose to have a procedure when they hear:

- A. "Of 100 patients who have this operation, 90 are alive after 5 years."
- B. "Of 100 patients who have this operation, 10 are dead after 5 years."

2) To maintain public parks in Washington State, drivers renewing their driver's licenses are charged an additional \$5 unless they opt out of paying the fee. In the old system, people were not charged the fee unless they chose to pay it, and the state generally collected just over \$600,000 dollars a year.

How much did the state collect under the new system?

- A. \$400,000
- B. \$600,000
- C. \$800,000
- D. \$1,000,000

3) How soon after reading a Centers for Disease Control pamphlet on "Flu Vaccine Myths & Facts" do some people start confusing flu myths as facts?

- A. Immediately after reading the flyer.
- B. Half an hour after reading the flyer.
- C. Three days after reading the flyer.
- D. Never.

- 4) A conference experimented with their default menu options. The first year they offered meat as the default, and 83% of attendants chose to eat meat. The next year they offered vegetarian as the default option.

What percentage of attendants chose vegetarian?

- A. 20%
 - B. 55%
 - C. 80%
- 5) During the 2010 Winter Olympics, a Vancouver newspaper reported that fans who had paid a few hundred dollars for men's hockey final tickets were only willing to re-sell them for several thousand dollars (if at all).

This behavior exemplifies which decision science concept?

- A. Status quo bias
 - B. Loss aversion
 - C. Social norms
 - D. Availability
- 6) You're selling do-it-yourself balloon animal kits on eBay. Which pricing plan is likely to be most successful and sell the most kits?

	Balloon animal kit	Shipping
A.	\$5.00	<i>FREE!</i>
B.	\$2.50	\$2.50
C.	<i>FREE!</i>	\$5.00

Score: _____ (out of 6)

Suggestion Boxes³

Scavenger Hunt: Choice Architecture

Choice architecture is all around you. List three examples you've seen at the retreat.

Scavenger Hunt: Retreat Sessions & Workshops

List two examples of decision science concepts you recognized at whatever retreat sessions and workshops you attended.

Feedback Loop

What example of decision science has surprised you the most? Which activity has been most effective in helping you learn and think about human decision-making? What was the least effective? Why?

Brainstorming: How Could Decision Science Be Relevant to Our Organization?

Who is the audience (who are we trying to reach)? What do we want them to do? What factors are influencing them – what are some potential decision science-related barriers and/or opportunities?

Staff Stories: How Has Irrational Decision-Making Affected Your Work?

At the opening plenary you heard some co-workers' stories about how decision science is relevant to their work. We're sure there are other stories we can learn from. Please share yours here. What successes, challenges, or failures have you experienced in your work, where "irrational decision-making" played a role? What lessons can we all learn from your experience?

Your Vision: How Should We Use Decision Science?

What do you think is the best way to incorporate relevant insights from decision science into our approach? What should our structure and approach look like five years from now, and how do we get there?

Enquiring Minds Want to Know: Burning Questions About Decision Science

Decision science is a huge, diverse field. Retreat activities have barely scratched the surface, but we hope the material has gotten you interested in learning more. What topics do you think we should track most closely? What question do you think is most important for us to ask (even if researchers don't have an answer yet)?

Problem Solving: Putting Decision Science to Work

Using decision science to make us more effective will take time – but there might be some obvious strategies we can use now, or ideas we should explore as soon as possible. If you've had a "eureka" moment or want to share a bold new strategy for making your team's work more effective, share it here.

³ Note to organizers: Participants can contribute ideas to "suggestion boxes" during the retreat. EDF used Google forms to collect ideas online. Each submission earns their team a point.

Final Contest Questions⁴

- 1) Each team was given a voucher for a summer Friday afternoon off. Those vouchers are being taken away when teams are eliminated from the contest.

The structure of the grand prize is a cruel example of what?

- A. Social Norms
- B. Loss Aversion
- C. Choice Architecture
- D. Status Quo Bias

Answer: B. Loss Aversion. People hate to lose things even more than they like to acquire them.

- 2) A study was conducted in a Chicago movie theater where moviegoers were given free buckets of five-day-old popcorn. People weren't told that the popcorn was stale, but they were definitely unhappy with the taste. In the experiment, half of the moviegoers received a medium-sized bucket and half received a large bucket.

Which group ate more popcorn?

- A) Medium-sized bucket
- B) Large bucket

Answer: B. Large bucket. Even though the people with larger buckets swore that the size didn't affect how much they ate, they just went on automatic and mindlessly ate 53% more popcorn than people with medium-sized buckets. This is an example of how "choice architecture" affects people's actions. (Source: Thaler & Sunstein 2008)

- 3) *Part I.*
Seventy engineers and 30 lawyers were interviewed. Here is a random sample from their interviews:

"He is a twice divorced man who spends most of his free time at a country club. He regrets following in his father's footsteps. He wishes he hadn't spent so much time in college on academics and instead spent more time socializing so he wouldn't be so quick to argue with people."

⁴ Note to organizers: Some of the questions can be tailored using earlier activities such as the pre-retreat questionnaire, as shown in questions 4 and 8. Some questions are harder than others, so point values can be adjusted accordingly.

Which is more likely?

- A) This guy is a lawyer.
- B) This guy is an engineer.

Answer: B. This guy is more likely to be an engineer. The interview was selected at random and 70% of the interviews were of engineers.

Part 2.

Most people answer “lawyer”, even though the correct answer is “engineer”. What cognitive bias is at work?

- A. Social norms
- B. Availability
- C. Representativeness
- D. Messaging and framing

Answer: C. Representativeness bias. To many people, a guy who belongs to a country club and argues often is more similar to, or representative of, their image of a lawyer. Their automatic systems quickly make that connection and answer the question, even though a little reflection reveals the correct answer. (Source: Tversky & Kahneman 1974)

4) *Part 1.*

There were two versions of the pre-retreat survey question about African countries in the UN. Before participants were asked to write down what percentage of African countries are in the UN, half of them were asked to consider whether the number might be more or less than 10%, and the other half of them were asked if it might be more or less than 65%.

What difference did that make in how people answered?

Answer: The group that was asked whether the number might be more or less than 10% gave lower final answers than the group that was asked if it might be more or less than 65%.

Part 2.

Why did that happen? What cognitive bias was at work?

Answer: Anchoring. People make judgments or estimates by starting with some number they know (the “anchor”) and adjusting from there. The “10%” and

“65%” served as anchors. Just stating the number at all influenced the way people answered the question.⁵ (Source: Tversky & Kahneman 1974)

5) *Part 1.*

A business professor at Northwestern University holds a special auction every year in one of his classes. The rules are:

Students bid with real money for a \$20 bill.

Bidding starts at \$1 and goes up in \$1 increments.

The highest bidder pays what they bid and receives \$20.

The second-highest bidder also pays what they bid.

What’s the highest bid he has ever received for the \$20 bill?

- A. \$19
- B. \$200
- C. \$800
- D. \$2,000
- E. \$10,000

Answer: D. \$2,000.

Part 2.

There are a lot of factors at work in the \$20 auction, but one of them is a concept we’ve talked about at the retreat. What is it?

- A. Social norms
- B. Availability
- C. Loss aversion
- D. Messaging and framing

Answer: Loss aversion. There are two types of loss aversion going on. First, remember that the second-highest bidder has to pay. Bidders who are in second place don't want to lose ALL the money they've already bid (and must therefore pay), so they keep bidding in order to win the \$20 and offset the monetary loss. Of course, at some point, the top two bidders are both losing money overall, and it becomes a point of pride to “win” the auction. (Source: Murnighan 2002)

⁵ Note to organizers: You can also announce the results from the questionnaire. In EDF’s case, the group that saw “10%” gave an average estimate of 50.7%. The group that saw “65%” gave an average estimate of 68.2%. The actual answer is 100%.

6) *Part 1.*

The Minnesota Department of Revenue tested out different methods to increase taxpayer compliance. They sent one of two informational messages to a random sample of taxpayers in the state.

Here are excerpts from the two messages. Which message increased compliance?

- A. “Your income tax dollars are spent on services that we Minnesotans depend on... so when taxpayers do not pay what they owe, the entire community suffers.”
- B. “Audits by the Internal Revenue Service show that people who file tax returns report correctly and pay voluntarily 93 percent of the income taxes they owe.”

Answer: B (“...people who file tax returns report correctly and pay voluntarily...”)

Part 2.

Why did message B work?

- A. Social norms
- B. Messaging and framing
- C. Anchoring
- D. Loss aversion

Answer: A. Social norms. This message described a social norm: the vast majority of citizens file correctly and pay voluntarily. When people heard this, they responded with even higher compliance. (Source: Coleman 1996)

7) *Part 1.*

Which is more effective in shifting consumer choices toward healthier foods?

- A. Taxes on junk food
- B. Subsidies for healthy food
- C. Neither – people are on automatic

Answer: A. Taxes on junk food. When junk food costs more, people buy less of it and eat fewer calories overall. When healthy foods are subsidized, people eat just as much junk food and their calorie counts actually increase.

Part 2.

Why are taxes on junk food more effective than subsidies on health food?

- A. Loss aversion
- B. Social norms
- C. Availability
- D. Choice architecture

Answer: A. Loss aversion. People don't like to spend, or "lose", more money if they can help it, so they tend to be more responsive to price increases than to price decreases. (Source: Epstein et al. 2010)

- 8) On the pre-retreat questionnaire, you were asked how the Pleasantville Transportation Safety Board should spend its budget. Half of you were told that the current budget was 70% highway safety and 30% auto safety. Here are the results:⁶

In the group that knew the current budget, X% wanted the budget to be 70% highway and 30% auto safety.

In the group that didn't know the current budget, Y% wanted the budget to be 70% highway and 30% auto safety.

Explain this difference.

- A. Anchoring
- B. Social norms
- C. Framing and messaging
- D. Status quo bias

Answer: D. Status quo bias. Simply knowing the current budget (the status quo) influenced people's answers.

- 9) *Part 1.*
During the 2004 US presidential campaign, researchers put Democratic and Republican volunteers into an MRI machine and scanned their brain activity during an experiment. In the experiment, they showed the volunteers pairs of contradictory statements from each of the following public figures: George W. Bush, John Kerry, and Walter Cronkite. Then they asked the volunteers to rate how hypocritical each public figure was, based on the contradictory statements.

What did the scientists find?

- A. Democrats identified contradictions in Bush's statements but not Kerry's, and vice versa.

⁶ Note to organizers: This question is customized based on results from the pre-retreat questionnaire. In EDF's case, X = 44% and Y = 30%.

- B. Republicans and Democrats gave the same hypocrisy ratings for all three figures, but they took twice as long to answer when their party's nominee was involved.
- C. After the study, 19% of volunteers said the experiment had motivated them to switch their vote to the other party.
- D. None of the above.

Answer: A. Democrats identified contradictions in Bush's statements but not Kerry's, and vice versa. People interpret the same type of information differently depending on how much they care about the outcome. In fact, one of the brain areas that's used during motivated reasoning is associated with dopamine release – a chemical that makes you feel good. This might explain why many experiments show that presenting facts that contradict someone's beliefs can actually strengthen those beliefs.

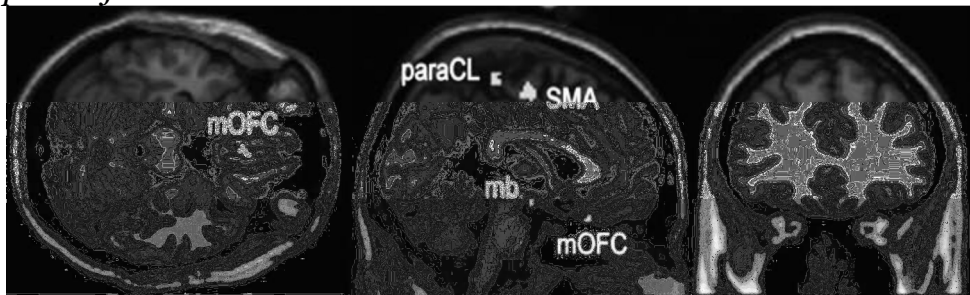
Part 2.

Which decision science insight does this study show?

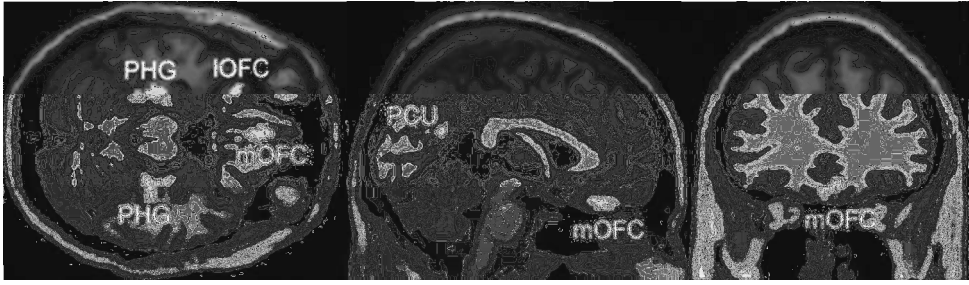
- A. Representativeness bias
- B. Loss aversion
- C. Messaging and framing
- D. Motivated reasoning

Answer: D. Motivated reasoning. People interpret information completely differently when they have a strong emotional stake in the conclusion, for example in politics. They actually use completely different parts of their brains.

Here's a typical brain scan of someone being asked to judge contradictory statements by Walter Cronkite. The labels and bright white areas show which parts of the brain are most active:



Here's a typical brain scan of someone being asked to judge contradictory statements by their party's nominee:



(Source: Westen et al. 2006)

Recall Test⁷

1. An organization holds an all-staff meeting where people are randomly assigned to teams that compete against each other in a series of contests and team-building exercises. After each event, the team that performs worst is eliminated from the competition.

Before the competition begins, every team receives an envelope with secret information. For half of the teams, the envelope contains information about the number of events that make up the competition. For the other teams, the envelope contains a voucher for a full week of extra vacation that the team will lose if eliminated. Observers note that the teams that received the voucher are working harder and that the teams with the additional information were all eliminated early in the competition. The additional motivation of the teams with the vacation voucher is probably an example of:

- A. Social norms
- B. Herd mentality
- C. Reward sensitivity
- D. Loss Aversion
- E. Status Quo Bias

Answer: D.

2. Recently, a Brazilian NGO partnered with scholars in the University of Berkeley to design a campaign to promote the use of energy-efficient light-bulbs in poor neighborhoods. Some of the campaign advertisements reported the high percentage of households in similar neighborhoods that had traded traditional incandescent light-bulbs for newer, more energy-efficient models. This campaign used:

- A. Choice architecture
- B. Social norms
- C. Diversification heuristic
- D. Cognitive dissonance

Answer: B.

⁷ Note to organizers: The recall test is a mix of questions participants saw at the retreat and isomorphic questions that follow the same structure as the repeated questions, but with new stories and answer options.

3. *Part 1.*

Jane and Susan are both phone saleswomen. When clients enter the store to buy, Jane usually says “How much are you looking to spend? How about \$200? More?” Susan usually says “How much are you looking to spend? Would \$50 be OK, or are you looking for a free phone?”

Who is likely to sell more expensive phones?

- A. Jane
- B. Susan

Answer: A.

Part 2.

Why?

- A. Anchoring effects
- B. Choice architecture
- C. Directed choice
- D. Marketing Voodoo

Answer: A.

4. A large national university’s bookstore realized that every year, thousands of textbooks could be re-used if students opted to buy used textbooks, but they also learned that students often felt it was uncool to buy used books. The bookstore decided to place actors in the store. Sometimes the actors looked at the shoppers, said hi and smiled, and then proceeded to put a few used textbooks into a shopping basket. Sometimes the actors did not say hi to the students and just took used books and walked away. For some shoppers, the actors did not approach the students. What happened?

- A. When the actors said hi, students were more likely to buy used textbooks than when the actors did not say hi
- B. When the actors did not say hi, students walked away and did not buy used textbooks
- C. When the actors said hi, students were freaked out and avoided the used textbook aisle

Answer: A.

5. Between 2000 and 2006, US hybrid vehicle sales increased from 3,000 to 250,000. Which type of tax incentive had the greatest effect on demand for hybrids?

- A. \$2,000 income tax credit

B. \$1,000 sales tax waiver

Answer: B.

6. Which “get-out-the-vote” campaign message was more effective?
- A. “More than 12.5 million Californians voted last year. In the upcoming primary election this Tuesday it is almost certain that many millions of California citizens will vote, just as millions have in the other recent elections. We encourage you to join your fellow California citizens. Please get out and vote!”
 - B. “More than 15 million California citizens did not vote last year. In the upcoming primary election this Tuesday it is almost certain that many millions of California citizens will again fail to vote, just as millions have failed to vote in other recent elections. We encourage you to buck this trend among your fellow California citizens. Please get out and vote!”

Answer: A.

7. A restaurant manager wants to encourage her waiters to use hand sanitizer every hour. She decides to test four different signs in the area of the kitchen where waiters collect dishes. Which of these should produce the most compliance?
- A. “Wash your hands with sanitizer.”
 - B. “Don’t leave this area without washing your hands with sanitizer.”
 - C. “When waiters do not wash their hands, they are creating a bad impression on clients.”
 - D. “Sanitizing your hands will increase your chances of getting a large tip.”

Answer: B.

8. In a study, researchers mailed 1 of 3 letters to people of Georgia in order to get them to conserve water during a drought. Which type of letter was the most successful in motivating conservation?
- A. “Georgia is dry as a desert and we need you to save some water. It is not a good idea to take long showers and wash your car at home.”
 - B. “Georgia is dry as a desert right now and we all need to do our part to make sure we have enough water to keep our state functioning. The folks in [person’s zipcode] have managed to decrease their water consumption by 20% in the last two months. Please, keep it up!”
 - C. “Georgia is dry as a desert. Help save Georgia’s water reserves! Be a water conservationist!”

Answer: B.

9. More patients choose to have a procedure when they hear:
- A. "Of 100 patients who have this operation, 90 are alive after 5 years."
 - B. "Of 100 patients who have this operation, 10 are dead after 5 years."

Answer: A.

10. Two neighboring countries ask people to make a decision about whether or not they are organ donors when they obtain their driver's licenses. In Country A, everyone is made an organ donor automatically, so those who do not want to be a donor have to request to opt-out. In country B, people have to decide to opt in when they go to the department of motor vehicles. Which country has a higher percentage of organ donors?
- A. Country A
 - B. Country B

Answer: A.

11. In a study about "myth-busting" public education campaigns, how soon after reading a Centers for Disease Control pamphlet on "Flu Vaccine Myths & Facts" did some people start mixing up myths and facts about flu vaccines?
- A. Immediately after reading the flyer.
 - B. Half an hour after reading the flyer.
 - C. Three days after reading the flyer.
 - D. Never.

Answer: B.

12. A conference experimented with their default menu options. The first year they offered meat as the default, and 83% of attendants chose to eat meat. The next year they offered vegetarian as the default option.

What percentage of attendants chose vegetarian?

- A. 20%
- B. 55%
- C. 80%

Answer: C.

13. During the 2010 Winter Olympics, a Vancouver newspaper reported that fans who had paid a few hundred dollars for men's hockey final tickets were only willing to resell them for several thousand dollars (if at all).

This is an example of which decision science concept?

- A. Status quo bias
- B. Loss aversion
- C. Social norms
- D. Availability

Answer: B.

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Full Methods and Results

Pre-retreat measures. When they arrived at the retreat location, all employees received a paper copy of the voluntary study consent form and pre-retreat survey (Figure S1). On the 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,” “behavioral 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. These ratings were entered into a factor analysis, separately for each topic. These analyses confirmed that the items loaded into a single factor (at loadings greater than .40), so we treated them as scales. Table S1 presents the descriptive statistics for each topic. Finally, participants were 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. A total of 159 participants signed a consent form and completed the pre-retreat survey.

Post-retreat measures. The week after the retreat, employees were invited to complete an online survey identical to the pre-retreat survey, but without any demographic questions. Scales were computed as for the pre-treatment measures, and the descriptive statistics are presented in Table S1.

On both the pre- and post-retreat surveys, employees were asked to provide the last three digits of their cell phone number, which were used to match pre- and post-retreat surveys for analysis. All staff participated in the retreat activities, but not everyone chose to complete both surveys. Although 137 employees completed the post-treatment online survey, repetition of some of the identifying numbers forced us to discard some data. This reduced the sample that completed both pre- and post-retreat measures to 88. We compared the pre-treatment cases that had no post-treatment data to those for whom we did.

Participants. Of the 207 respondents who completed at least one survey, 97 (46.9%) were women and 51 (24.6%) did not report their gender; 50 (24.2%) did not report the highest level of education they had attained, but everyone else had completed at least a college degree. Seventy-nine (38.2%) respondents had been at EDF for at least 3 years, but 54 (26.1%) did not answer this question. Ninety-one respondents (44%) worked in one of EDF’s programs; the rest were in other departments such as Marketing and Communications, Information Technology, Development, etc.

Pre- and post-retreat comparisons. Of the 207 participants who completed at least one survey, 88 had both pre- and post-data. To test whether the retreat affected participants’ attitudes about decision science, we carried out a simple paired comparisons t-test for each rating. We did this for each respondent’s average rating of knowledge, interest, and importance for each topic, and for each respondent’s rating of knowledge, interest and importance averaged across the five topics (Table S1). Overall, the retreat significantly

boosted participants' knowledge and interest in the topics, and slightly increased their perception that these topics are important (Figure S2). The retreat also significantly increased participants' combined ratings for their knowledge about, interest in, and evaluation of importance of each of the five topics (Figure S3).

Intentions to learn more about decision science (as reported immediately before and one week after the retreat). We asked respondents to indicate their intentions to learn more about decision science (Figure S1). We treated the responses as a scale ranging from 1 = "Not at all." to 5 = "I intend to become an expert on decision science." A paired samples t-test compared the mean ratings before and after the training session. The mean score on this interest index was significantly higher after the retreat compared to before ($M = 3.73$, $SD = .80$ and $M = 2.62$, $SD = 1.31$ respectively), $t(82) = 7.63$, $p < .001$.

Moderators of the retreat's effects. We tested whether gender, level of education, division within the organization, or office location moderated the impact of the retreat, using a repeated-measures ANOVA, testing for each of the possible mediators as a between-subjects factor. Division within the organization and office location did not moderate the effect of the retreat, but education and gender did.

Because of the truncated range of education and the sample size, we dichotomized education into "college degree" and "graduate school degree" groups. A significant interaction emerges between education and the pre-post factor on knowledge $F(1,83) = 9.01$, $p = .004$. There was no interaction like this or a main effect of education on interest or importance ratings, or for the summary ratings for each topic. The interaction effect on knowledge ratings stems from the fact that before the session, participants with a college degree rated themselves as lower on knowledge ($M = 1.70$, $SD = .69$) about the topics than did participants with a graduate degree ($M = 2.18$, $SD = .87$). After the session, the groups did not differ ($M = 3.02$, $SD = .48$, $M = 3.05$, $SD = .67$ respectively), and both groups had statistically significantly higher ratings than before the session.

Gender also moderated some of the impact of the retreat, but only for the ratings of importance. The interaction of pre-post factor and gender was marginally significant, $F(1, 80) = 3.59$, $p = .06$. Women's ratings of the importance of the material increased significantly from pre- to post-retreat ($M = 3.61$, $SD = .86$, $M = 3.92$, $SD = .73$ respectively, $p = .01$), but men's did not ($M = 3.84$, $SD = .73$, $M = 3.77$, $SD = .94$ respectively, $p = .66$).

Neither gender nor education moderated the effects of the retreat on participants' intentions to learn more about decision science.

Recall test performance. Thirty-two months after the retreat, we asked staff to complete a survey that tested their recall of the material. The online survey included a mix of questions: six were presented exactly as they had been at the retreat "pub quiz" and eight new questions tested understanding of the same concepts. The recall test is provided in Appendix 1.

Forty-eight of the 100 staff members who completed the recall test had attended the retreat. We compared the percentage of questions answered correctly between respondents who had been present at the retreat ($n = 48$) and those who had not ($n = 52$). Respondents who had attended the retreat performed significantly better overall than those who had not ($M = 70.54, SD = 13.47; M = 63.19, SD = 11.52$ respectively; $t(98)=2.94, p = .004$). Respondents who had attended the retreat also performed significantly better on the new questions than those who had not ($M = 71.62, SD = 12.30; M = 63.22, SD = 13.20$ respectively; $t(98)=3.28, p = .001$). On questions that were identical to those used in the retreat “pub quiz,” respondents who had attended the retreat performed better than those who had not ($M = 69.10, SD = 18.19; M = 63.14, SD = 18.18$ respectively), but the effect was not statistically significant ($a = .05, t(98)=1.67, p = .11$).

Intentions to learn more about decision science (as reported on the recall test). On the recall test, we asked respondents to indicate their intentions to learn more about decision science. We compared the responses of those who had attended the retreat with those of staff who had not. A chi-square test was not significant, $\chi^2 = 8.31, p = .08$. A multinomial logistic regression was also performed. This model regressed the responses on a dummy for attending the training session, but no effect was statistically significant (all p 's $> .30$). We treated the responses as a scale ranging from 1 = “Not at all.” to 5 = “I intend to become an expert on decision science.” A t-test comparing the responses of those who attended the training session with those of participants who did not shows a statistically significant effect whereby those who attended the event expressed more interest in learning about decision science than those who had not ($M = 3.70, SD = .83$ and $M = 3.19, SD = 1.07$ respectively), $t(98) = 2.58, p = .01$. This suggests that the session raised may have had a lingering effect in interest, consistent with performance on the test effects. Given the responses made by participants to this question before the training session, it seems like the organization is, nonetheless, making decision science part of its tool kit. EDF employees who were hired after the retreat indicate greater interest in learning about decision science than did staff before the retreat. However, the level of interest is not as high as for those who attended the retreat, suggesting the value of the intervention in increasing interest.

Table S1. Paired t-tests comparing pre- and post-retreat ratings. The upper part of the table compares the average ratings made on knowledge, interest and perceived importance of each of the five topics covered in the training session. The lower part compares the average ratings made across topics on each of the three ratings.

	Paired Difference	95% CI of Difference		<i>t</i>	<i>df</i>	<i>p</i> ≤
		Lower	Upper			
<i>Average rating per topic</i>						
Decision Science	0.473	0.635	0.311	5.802	85	0.000
Behavioral Economics	0.260	0.406	0.113	3.526	85	0.001
Loss Aversion	0.890	1.096	0.684	8.598	84	0.001
Rational Choice Theory	0.610	0.805	0.416	6.244	85	0.001
Status Quo Bias	0.655	0.840	0.470	7.035	84	0.001
<i>Average rating across topics</i>						
Self-reported knowledge	1.078	1.235	0.921	13.676	85	0.001
Interest	0.302	0.483	0.122	3.330	83	0.001
Perceived importance	0.181	0.372	-0.010	1.881	82	0.064

Figure S1. Pre-retreat survey. The online post-retreat survey omitted questions 2-6, modified question 8 to read “After coming to this retreat, do you intend to learn more about decision science over the coming 12 months?” and changed the answer choices for question 8 from past to present tense.

1) Last three digits of your cell phone number: ___ ___ ___

2) EDF Division (Circle one)

Development
Executive
Finance/Administration
Human Resources

Information Technology
Marketing/Communications
Programs

3) Gender (Circle one)

Female
Male

4) Office (Circle one)

Austin
Beijing
Bentonville
Boston
Boulder
La Paz

New York
Raleigh
Sacramento
San Francisco
Washington, DC
Other

5) Education level (Circle one)

High school
Some college
College graduate
Graduate school

6) Time at EDF (Circle one)

Less than 1 year
1-3 years
3-5 years
5-10 years
10+ years

7) For each of the terms below, please rate on a scale from 1 to 5 how much you know about it, how interesting it is to you, and how important it is to you.

1 = No knowledge/Not at all interesting to you/Not at all important to you

5 = Expert knowledge/Extremely interesting to you /Extremely important to you

Term	Knowledge (1-5)	Interesting (1-5)	Important (1-5)
Decision science			
Behavioral economics			
Status quo bias			
Loss aversion			
Rational choice theory			

8) Before coming to this retreat, did you intend to learn more about decision science over the coming 12 months? (Circle one)

(1) Absolutely not: I had no plans to spend time learning about decision science.

(2) I intended to learn a bit about decision science just out of curiosity.

(3) I intended to learn enough about decision science to speak about it or even occasionally use it, but not in relation to my work.

(4) I intended to learn a lot about decision science, so I can figure out how to apply its insights to my work.

(5) Absolutely yes: I intended to become an expert in decision science and how it can help EDF's work.

Figure S2 [Figure 4 on page 11 of the main paper]. Mean and standard error of participants' ratings of their knowledge about, interest in, evaluation of the importance of, and intent to learn more about the material, before, and after the retreat (5 indicates the highest level of each). Asterisks denote statistically significant differences between pre- and post-retreat responses.

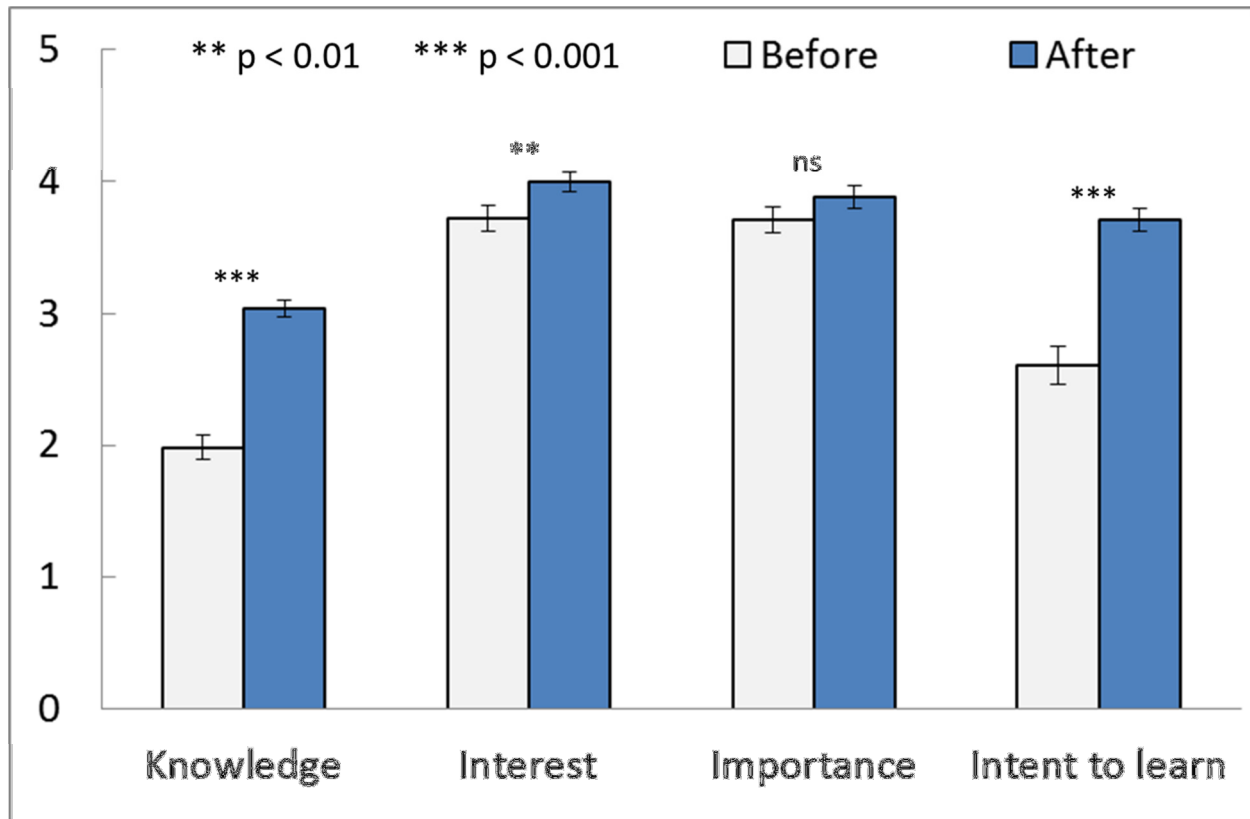


Figure S3. Mean and standard error of participants' combined ratings for their knowledge about, interest in, and evaluation of importance of each term, before and after the retreat. Asterisks denote statistically significant differences between pre- and post-retreat responses. See Figure S1 for the survey format.

