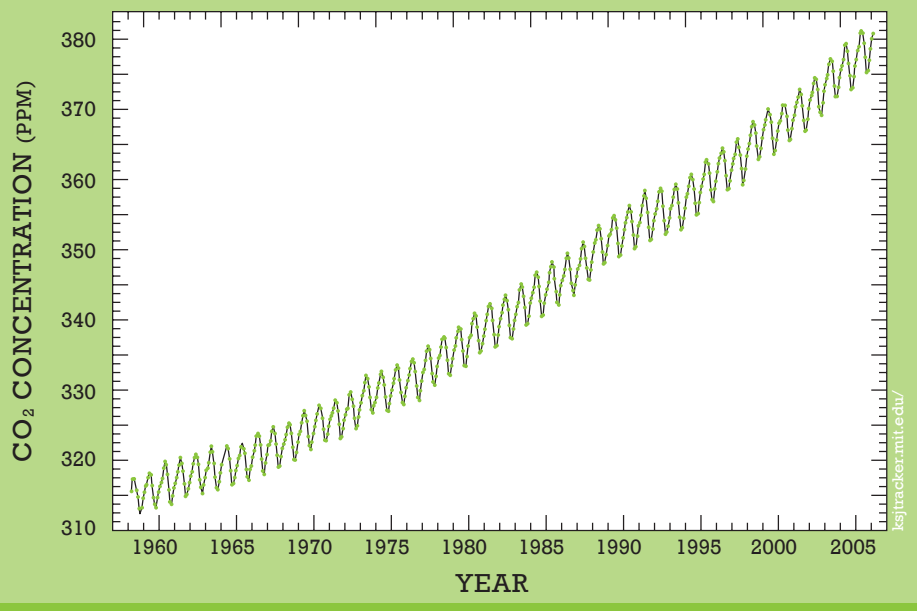
3 Translate Scientific Data into Concrete Experience

The famous "Keeling curve" graph, below, which shows the increasing amounts of carbon dioxide in the earth's atmosphere from 1958 to 2006, set off alarms in the scientific community that continue to ring loudly today. Yet somehow, this same graph does not communicate the immediacy of the climate change problem to lay audiences. Instead, it may actually convey the message that the buildup of carbon dioxide in the earth's atmosphere has been taking place over a long period, thereby erroneously implying that climate change is not an urgent issue.

Similarly, many people have difficulty grasping the importance of projections of higher carbon dioxide concentrations and surface temperatures several decades from now. Part of the problem may be the tendency to discount future events, as described in Section 2. But another part of the problem may be that a global average surface temperature increase of a few degrees does not seem like much to the general public, given the variability in temperature

THE "KEELING CURVE"

Mauna Loa Observatory, Hawaii
Monthly Average Carbon Dioxide Concentration



that most people experience on a regular basis.

But a few degrees do matter. As the 2007 United Nations Intergovernmental Panel on Climate Change (IPCC) report found, numerous effects of climate change are already observable throughout the earth system, and these impacts are likely to grow in coming years.[28] Yet polls taken during the past several years continue to show Americans ranking climate change near the bottom of their list of concerns or policy priorities.[29] Clearly attempts to convey the immediacy of the climate challenge have fallen short of translating climate change into a near-term (as well as a long-term) danger on par with other imminent societal and personal threats.

WHY THE "KEELING CURVE" ALONE DOESN'T MOTIVATE BEHAVIOR CHANGE

Many of the highly publicized graphs and charts showing global climate change data pose a problem for communicators because they fail to inspire a sense of urgency in many audiences. They do not help convey the deep concern scientists have that efforts to abate and adapt to climate change are a near-term necessity if humanity is to avert the worst effects. Despite making this point with increasing frequency and stronger data, the general public shows little concern.

Even when people understand the Keeling Curve, it does not always motivate them to take action. The reason for this disconnect may lie in how the brain works, which climate change communicators need to understand to create truly powerful messages that will inspire action.

HOW THE BRAIN PROCESSES INFORMATION

The human mind is not designed to immediately react to threats that seem to manifest themselves in the distant future, such as climate change. Distant risks do not set off the same alarms that immediate risks do. Human brains struggle to balance long-range worries with the demands of more immediate concerns.[30]

More specifically, the human brain has two different processing systems: the experiential processing system, which controls survival behavior and is the source of emotions and instincts (e.g., feeding, fighting, fleeing); and the analytical processing system, which controls analysis of scientific information. Table 2 on page 16 highlights the key differences between these two systems.

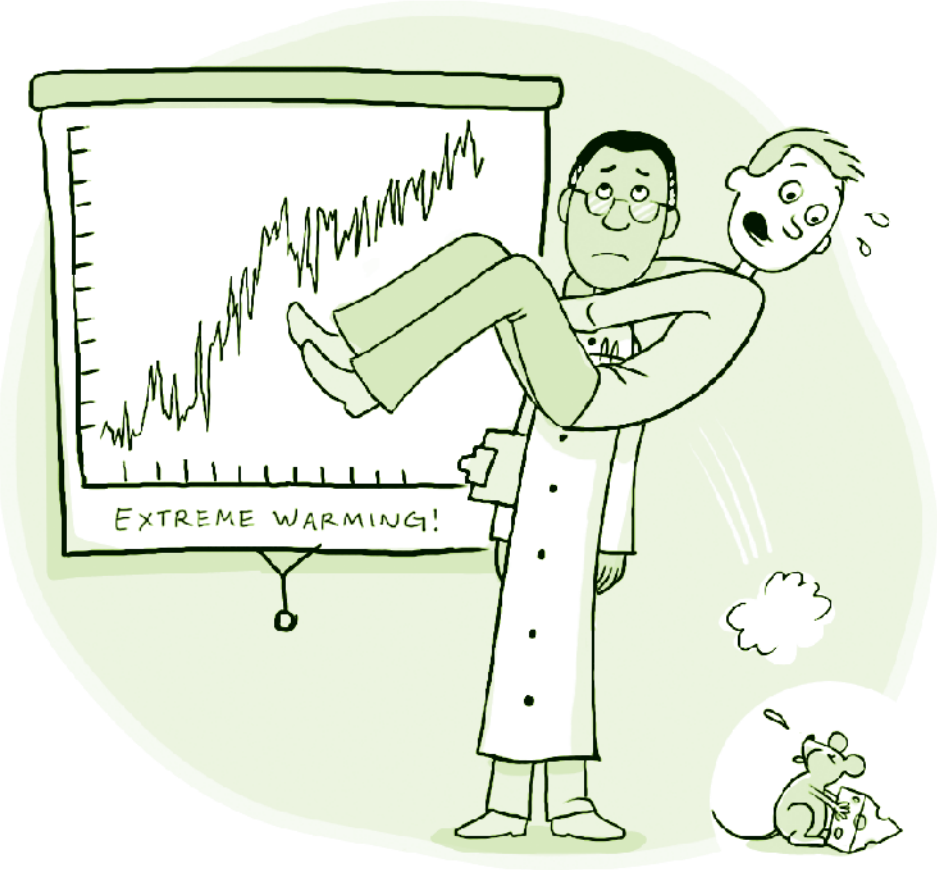


TABLE 2

Two Information Processing Systems of the Brain[31]

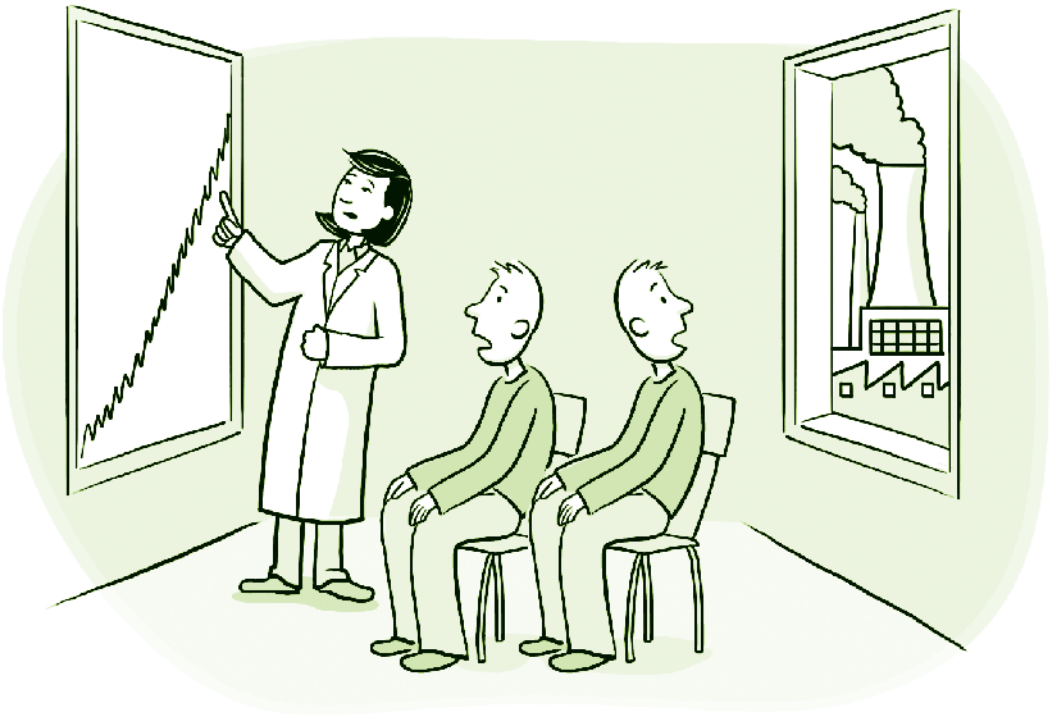
ANALYTIC PROCESSING SYSTEM	EXPERIENTIAL PROCESSING SYSTEM
Logical	Holistic
Deliberative	Intuitive
Analytic	Emotion-driven (fear, dread, anxiety)
Perceives reality in abstract symbols, words, numbers	Perceives reality in concrete images and narratives, linked in associations
Rules and algorithms need to be learned; system needs to be prompted; does not operate automatically	Operates automatically and without any training
Examples • numerical statistics in tables, figures, graphs, charts	**Examples** • images or stories • the experience of outcomes of repeated decisions over time, as in a simulation exercise • emotionally charged and vivid

SPEAK TO THE TWO PARTS OF THE BRAIN: HOW TO MAKE ANALYTIC DATA MEMORABLE AND IMPACTFUL

Traditional statistical presentations of climate change data rarely instill the sense that it is an immediate challenge as well as a future one; that there is a narrow window of opportunity within which effective action can avert potentially devastating future consequences. Many audiences leave such analytically focused presentations with a higher awareness that climate change is happening, but without the matching higher motivation to do anything about it.

Despite evidence from the social sciences that the experiential processing system is the stronger motivator for action, most climate change communication remains geared toward the analytical processing system. Personal or anecdotal accounts of negative climate change experiences, which could easily outweigh statistical evidence, are rarely put into play, despite evidence that even a stranger's past experiences can evoke strong feelings in people, making such communications memorable and therefore dominant in processing.[32]

Yet not all communication about climate change should be emotional, as there are downsides to bypassing analytical reasoning to make an appeal only to the experiential system (Section 4 will address these climate change communication pitfalls).



EXAMPLE

Shrinking Glaciers and the Retention of Facts

L. Chang, commons.wikimedia.org

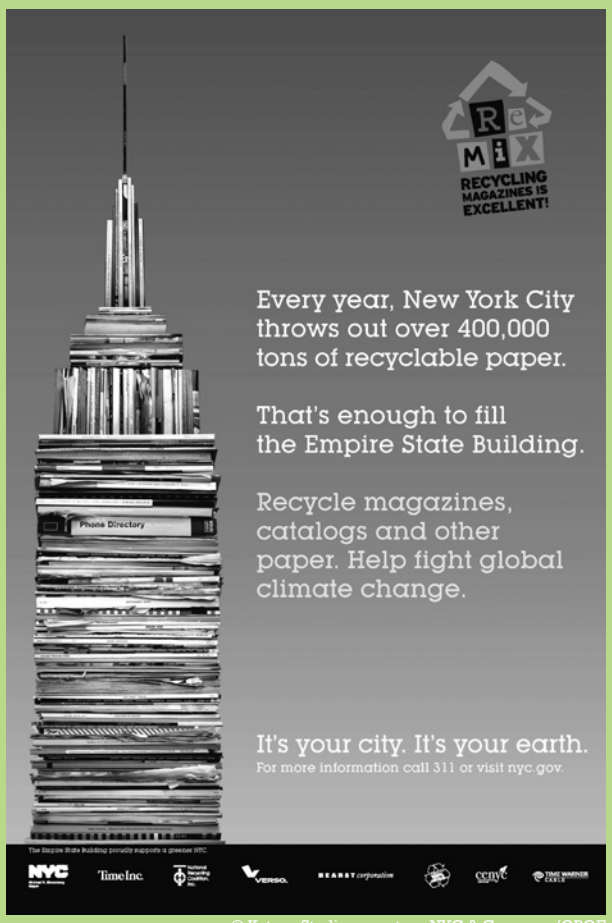
In 2007, CRED researchers developed an interactive computer presentation to show viewers the effect of climate change on the world's glaciers. One module presented information that would appeal to the analytical processing system, such as scientific analysis, statistics, and graphs, to describe the relationship between climate change and shrinking glaciers. Another module targeted the experiential processing system of the brain, using vivid imagery (photographs, videos showing reduced glacier size over time, local news footage) and personal accounts to convey the message. After randomly viewing either the analytic or experiential module on shrinking glaciers, students took a survey that measured their environmental attitudes, perceptions, and behaviors. The purpose was to test the module's effect on memory and the students' decision-making processes. The learning modules examined the extent to which experience-based vs. analytically framed information influenced feelings of worry, risk perception, and the willingness to take action about climate change.

The results showed that people retained more factual information about the presentation after viewing the experiential module as compared to the analytic format. CRED also found that when students viewed the experiential module, they reported both increased levels of worry and willingness to take action.[33]

Unfortunately, the resulting willingness to take action after an appeal to the experiential processing system alone can be short-lived. Section 4 will explore why emotional appeals about climate change can backfire and how to avoid this phenomenon.

EXAMPLE

The Effect of Vivid Imagery on Recycling in New York City



© Katvan Studios, courtesy NYC & Company/OROE

In 2008, the City of New York and partners launched an advertising campaign to promote recycling awareness in the city. Recognizing that the average American may have difficulty processing information if it is presented in a strictly technical format, the campaign used metaphor, analogy, vivid imagery, and comparison to communicate facts such as: "New York City residents discard 800 million pounds of recyclable paper annually." The ads powerfully illuminated how the huge amount of recyclable paper thrown away in New York City annually is enough to fill the entire Empire State Building by creating a picture of the iconic skyscraper composed entirely of discarded magazines and catalogs.

Unlike the more typical city-issued recycling advisory, this ad helped grab the viewer's attention and personalized the message in order to encourage people to change their behaviors.

The most effective communication targets both processing systems of the human brain. Communicators should make use of the following experiential tools in addition to the more common analytical ones when creating presentations on climate change:

- Vivid imagery, in the form of film footage, metaphors, personal accounts, real-world analogies, and concrete comparisons;
- Messages designed to create, recall, and highlight relevant personal experience and to elicit an emotional response.

Analytic products (such as trend analyses, forecast probabilities, and ranges of uncertainty) help people absorb facts and can be valuable tools when people need to make big decisions, but they alone will not compel people to take effective steps to address the climate change challenge, as the example on page 17 illustrates.

The example above shows how information balanced with both analytic and experiential materials may be more likely to have an effect on attitudes and behavior, creating a desire in people to act on their new knowledge.

USE UNDERSTANDABLE LANGUAGE

Another possible reason for the public's lack of responsiveness to climate change messages may be caused by low comprehension of or interest in communications laden with scientific language. When talking to the general public, research shows that communicators should, whenever possible, avoid using jargon, complicated scientific terms, and acronyms. Instead, use words that will make sense to the audience.

Table 3 below contains words or phrases that are commonly used when discussing climate change and alternative words that get the same idea across more simply.

Sometimes only a scientific term is sufficient for getting a point across. In that case, it is important to thoroughly define the term for the audience. Communicators should remember, however, that stringing together too many scientific terms and acronyms may cause the audience to spend their time and mental energy deciphering vocabulary instead of absorbing the overall point.

TABLE 3

Examples of Simplified Scientific Terms

OBSCURE WORD	BETTER UNDERSTOOD WORD
Anthropogenic	Human induced, man-made
Mid-Pleistocene	1 million to 600,000 years ago
CH4	Methane
IPCC	The group of scientists who issue comprehensive assessments on climate science, and were awarded the 2007 Nobel Peace Prize for their work on climate change.
Forcing	Incoming and outgoing (radiation) energy
385 ppm	2008 level of carbon dioxide in the atmosphere
Bifurcation	To divide into two parts
Perturbation	Disturbance
Aerosol	Small atmospheric particle