Systemic Causation By George Lakoff

Studying cognitive linguistics has its uses.

Every language in the world has in its grammar a way to express direct causation. No language in the world has in its grammar a way to express systemic causation.

What's the difference?

From infanthood on we experience simple, direct causation. We see direct causation all around us: if we push a toy, it topples over; if our mother turns a knob on the oven, flames emerge. Picking up a glass of water and taking a drink is direct causation. Slicing bread is direct causation. Punching someone in the nose is direct causation. Throwing a rock through a window is direct causation. Stealing your wallet is direct causation.

Any application of force to something or someone that always produces an immediate change to that thing or person is direct causation. When causation is direct, the word cause is unproblematic. And we learn direct causation automatically as children because that's what we experience on a daily basis. Direct causation, and the control over our immediate environment that understanding it allows, is crucial in the life of every child. That's why it shows up in the grammar of every language.

The same is not true of systemic causation. Systemic causation cannot be experienced directly. It has to be learned, its cases studied, and repeated communication is necessary before it can be widely understood.

That's right. No language in the world has a way in its grammar to express systemic causation. You drill a lot more oil, burn a lot more gas, put a lot more CO2 in the air, the earth's atmosphere heats up, more moisture evaporates from the oceans yielding bigger storms in certain places and more droughts and fires in other places: systemic causation. The world ecology is a system — like the world economy and the human brain.

As a result, we lack a concept that we desperately need. We need it to understand and communicate about the greatest moral issue of our time — global warming. The ecology is a system operating via systemic causation. Without any everyday concept of systemic causation, global warming cannot be properly comprehended. In other words, without the systemic causation frame, the oft-repeated facts about global warming cannot make sense. With only the direct causation frame, the systemic causation facts of global warming are

ignored. The old frame stays, the facts that don't fit it cannot be comprehended.

The Structure of Systemic Causation

Systemic causation has a structure.

- **A Network of Direct Causes:** (1) Global warming heats the Pacific Ocean. That means that the water molecules in the ocean get more active, move with more energy, evaporate more, and move in the air with more energy. (2) Winds in the high atmosphere over the ocean blow from southwest to northeast blowing the larger amount of high-energy moisture over the pole. (3) In winter, the moisture turns to snow and comes down over the East Coast as a huge blizzard. Thus, global warming can systemically cause major blizzards.
- **Feedback Loops:** (1) The arctic ice pack reflects light and heat. (2) As the earth's atmosphere heats up, the arctic ice pack melts and gets smaller. (3) The arctic ice reflects less light and heat, and more heat stays in the atmosphere. (4) The atmosphere gets warmer. (5) The feedback loop: Even more arctic ice melts, even less heat is reflected, even more heat stays, even more ice melts, and on and on.
- **Multiple causes:** Because of the interaction between the polar vortex and the jet stream, parts of the vortex moved south into central North America causing freezing temperatures abnormally freezing temperatures as far south as Oklahoma and Georgia.
- **Probabilistic causation:** Many weather phenomena are probabilistic. What is caused is a probability distribution. Just as you can't predict whether a flipped coin will come down heads or tails, you can predict that over the course of a large number of flips, that almost exactly 50 percent will come down heads and another 50 percent tails.

Yes, global warming systemically caused freezes in the America south. Yes, global warming systemically caused Hurricane Sandy — and the Midwest droughts and the fires in Colorado and Texas, as well as other extreme weather disasters around the world. Let's say it out loud, it was causation, systemic causation. Network causes, feedback loops, multiple causes — all acting probilistically as part of the global weather system — has been systemically causing weather disasters. Yes, systemically causing untold human harm and billions, if not trillions, in damage.

Systemic causation is familiar. Smoking is a systemic cause of lung cancer. HIV is a systemic cause of AIDS. Working in coal mines is a systemic cause of black lung disease. Driving while drunk is a systemic cause of auto accidents. Sex without contraception is a systemic cause of unwanted pregnancies, which are a systemic cause of abortions.

Systemic causation, because it is less obvious, is more important to understand. A systemic cause may be

one of a number of multiple causes. It may require some special conditions. It may be indirect, working through a network of more direct causes. It may be probabilistic, occurring with a significantly high probability. It may require a feedback mechanism. In general, causation in ecosystems, biological systems, economic systems, and social systems tends not to be direct, but is no less causal. And because it is not direct causation, it requires all the greater attention if it is to be understood and its negative effects controlled.

Above all, it requires a name: systemic causation.

The precise details of Hurricane Sandy cannot be predicted in advance, any more than when, or whether, a smoker develops lung cancer, or sex without contraception yields an unwanted pregnancy, or a drunk driver has an accident. But systemic causation is nonetheless causal.

Semantics matters. Because the word *cause* is commonly taken to mean direct cause, climate scientists, trying to be precise, have too often shied away from attributing causation of a particular hurricane, drought, or fire to global warming. Lacking a concept — a frame — and language for systemic causation, climate scientists have made the dreadful communicative mistake of retreating to weasel words. Consider this quote from "Perception of climate change," by James Hansen, Makiko Sato, and Reto Ruedy, Published in the Proceedings of the National Academy of Sciences:

...we can state, with a high degree of confidence, that extreme anomalies such as those in Texas and Oklahoma in 2011 and Moscow in 2010 were a consequence of global warming because their likelihood in the absence of global warming was exceedingly small.

The crucial words here are high degree of confidence, anomalies, consequence, likelihood, absence, and exceedingly small. Scientific weasel words! The power of the bald truth, namely causation, is lost.

This no small matter because the fate of the earth is at stake. The science is excellent. The scientists' ability to communicate is lacking. Without the words, the idea cannot even be expressed. And without an understanding of systemic causation, we cannot understand what is hitting us.

Global warming is real, and it is here. It is causing — yes, causing — death, destruction, and vast economic loss. And the causal effects are getting greater with time. We cannot merely adapt to it. The costs are incalculable. What we are facing is huge. Each day, the amount of extra energy accumulating via the heating of the earth is the equivalent of 400,000 Hiroshima atomic bombs. Each day!

What Journalists Can Do

Because Systemic Causation has mostly gone unframed and unnamed, journalists have previously been at a loss and have been driven to resort to inadequate and misleading metaphors. Charlie Petit, writing in the Knight Science Journalism Tracker, January 7, 2014, gives a list of such metaphors. Here are some beauts.

- “a weaker polar vortex moving around the Arctic like a slowing spinning top, eventually falling over and blowing open the door to the Arctic freezer”

- this big slug of deadly cryosphere air slipped its North Pole moorings, marauded across Canada, and swept through the eastern US.

- When the winds weaken, the vortex can begin to wobble like a drunk on his fourth martini … in this case, nearly the entire polar vortex has tumble southward”

Responsible journalist can do better.
