Central Coast Climate Science Education
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How to Inoculate against "Alternative Facts"

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With the recent deployment of the rather curious phrase "alternative facts", it is timely to ask how one should communicate with climate change skeptics who reject some **actual** facts about climate change.

Recently I re-posted one of Katharine Hayhoe's wonderful short videos whose title was: **"If I just explain the facts, they'll get it--Right?".**

Her point was that facts alone may not get you very far in getting people to accept the scientific consensus on climate change, and indeed may be counter-productive. But she was particularly considering people she termed "hard core dismissers," whose fundamental objections are not rooted in scientific arguments, but rather in their ideology and core identify.

With such individuals, she suggests that talking about the *impacts* of climate change and how it affects interests *they* care about, especially shared interests *you* genuinely care about too, may be useful. But she further suggests it is also important to present realistic *solutions* for dealing with climate change and those impacts as well as the *benefits* that go along with those solutions. She gives several examples of this approach.

More recently, however, I read an essay by Dana Nuccitelli, an environmental scientist who is a frequent contributor to http://skepticalscience.com/ His essay is also accompanied by a video featuring Dr. John Cook, founder of Skeptical Science, whose expertise is in cognitive psychology--how we learn (or why we refuse to). The link to this essay by Nuccitelli is here: https://www.skepticalscience.com/real-facts-beat-alternative-facs-if-boosted-by-inoculation.html and embedded in it is the video with Dr. Cook.

The central idea is that of "inoculation" against misinformation--or if you like, "alternative facts". The concept is based on some results by four cognitive psychologists with expertise in how to effectively communicate with the public about climate science. The concept, and some results from trials of this approach with a sample of people spread across the ideological spectrum, is presented in this paper: http://onlinelibrary.wiley.com/doi/10.1002/gch2.201600008/full (However, this paper is written for academics and some parts are a bit technical.)

The "inoculation" process works like this: *Prior* to presentation of the scientific facts about climate change, people are told that they will be presented with some statements about climate change which are false or are seriously misleading. These statements are then presented--but are immediately followed with an *explanation* of the fallacy and inaccuracy of that misinformation. *Then* they are presented with the factual material.

The initial exposure to the misinformation, with an explanation of *why* it is fallacious then “inoculates” them against accepting the misinformation when they next encounter it. This is analogous to

being inoculated with a weak disease-inducing virus to enable a person to reject the virus when it is encountered.

The authors of the paper tested this idea and found it to be fairly effective across the political spectrum.

By contrast, without the "inoculation", when people were presented with factual material about climate change, their degree of acceptance of its reality first increased compared to what it was prior to receiving this factual information. But then when exposed to misinformation, the positive results of the factual material were almost entirely negated.

Based on my own experience, my advice on this inoculation idea, as well as the suggestions given in the Hayhoe video, boils down to advice anyone who speaks to a group or individuals is always given: Know your audience.

There is a segment of the U.S. population that is so firmly committed to rejection of the scientific consensus about climate change, generally on ideological grounds ("It will lead to more regulations") that a great deal of their time and effort is devoted to reading blogs devoted to attempts to counter the scientific consensus. There is very little chance that their attitudes will be changed.

There is also a segment that is quite skeptical but not close minded about the topic. These individuals may be hunters or fishermen, they may be concerned about national security, they may be able to appreciate the financial or health risks associated with climate change or they may be receptive to the economic opportunities of new energy technology. Such people may respond to the approach that Dr. Hayhoe describes.

But there is yet an even larger segment of the population who are simply not acquainted with the basics of climate science. They may be unclear about the difference between weather and climate. They may be aware of the ice ages and the profound changes in climate that have occurred over past eons, but they do not appreciate the vast difference in time scales between the tens of thousands of years over which these natural variations took place and the extremely rapid changes now occurring from human disruption of the climate system.

For this segment of the population, which I believe to be the largest, the inoculation effect is an important idea. In fact, previous research has shown that if one is not very careful when stating a **myth**, people frequently remember the **myth** as *fact*!

Readers interested in seeing factual responses to many myths are referred to the skeptical science website where over 100 of them discussed.

I have also discussed in detail on this website a few common myths I frequently encounter:
http://www.centralcoastclimatescience.org/misperceptions.html

With all this said, communication of actual climate science faces a real challenge: A larger and larger proportion of the population receives information from tweets, blogs, Facebook and talk radio--sources subject to little or no fact checking and surely not to the peer review process.

In addition, blogs propagating misconceptions are sometimes authored by those with seemingly qualified backgrounds.

As Dr. Hayhoe points out in the video referenced above, they often use technical terms to lend a veneer of authority to their statements. A good example of this was the **myth** by two physicists (!) (but echoed, sadly, by others) that the greenhouse effect does not exist, because if it did it would violate the second law of thermodynamics! I addressed this and other myths related to the greenhouse effect in the video associated with updated tutorial #4 on the greenhouse effect:
http://www.centralcoastclimatescience.org/uploads/5/3/8/1/53812733/topic4_greenhouse1.pdf

A related **myth** in a similar vein is that the extremely high temperature on Venus is not due to the greenhouse effect, but simply due to the "high pressure" of the atmosphere at the surface of Venus. I will address this myth in the next updated tutorial (#5) on the discussion of the most important greenhouse gases and the climates of Venus, Earth and Mars.

This situation makes seeking out information from real climate scientists more important than ever and readers will find sources of this information in the resources section of this website:
http://www.centralcoastclimatescience.org/resources.html

This same situation also makes one-on-one communication with your relatives, friends and neighbors all the more important and I urge readers of this website to become involved in this effort.