

Behavioral Change and Science Communication: Same Planet, Worlds Apart

February 28, 2022



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When faced with a natural or human-made crisis—[climate change](#), pandemics, and even the eventual comet or asteroid impact—people call upon scientists to reach out to the public with accurate and up-to-date information. After all, a well-informed person is better equipped to rally resources and devise support programs and policies that protect themselves and the rest of society.

In the past, effective science communication has indeed inspired the global population to address real and urgent threats. In the mid-1980s, for example, climate researchers discovered an alarming decrease in stratospheric ozone over the Antarctic, a worrying trend that, if left unchecked, would lead to significant health risks for humans and perhaps the entire biosphere. In studying this decrease, scientists eventually discovered that chemicals known as chlorofluorocarbons (CFCs), which were commonly used in hair sprays and refrigeration systems, tended to linger on polar stratospheric clouds, where they ripped apart ozone molecules in the upper atmosphere. This finding was touted as the “smoking gun” of ozone depletion.

“We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology.”

Carl Sagan

In the years that followed, many members of the public changed their behaviors and purchasing habits, and policymakers enacted new regulations aimed at slowing this trend. Perhaps most importantly, there were no appreciable counterarguments by ozone-hole skeptics and deniers, although these individuals certainly existed. The result was that over the past few decades, behavioral change and international accords on CFCs and other ozone-damaging chemicals have helped stop the growth of the ozone hole.

This example suggests that the public can effectively digest and act on complex scientific information. A single case study, however, does not predict responses to similar crises, such as climate change more broadly.

As early as the late 1800s, scientists, including Swedish chemist Svante Arrhenius, identified the role of carbon dioxide in Earth's greenhouse effect and the potential for human activities, such as burning fossil fuels, to seriously harm the planet. Since that time, the impact of rising levels of atmospheric carbon dioxide has been remarkably well studied, directly observed, and even identified as a grave national security threat that must be addressed quickly.

Yet broad public support to slow climate change akin to that around ozone depletion is harder to rally and sustain. More concerning, political self-identification can accurately predict an individual's trust in the well-established science related to climate change. Against this background of entrenched and vocal resistance to significant action, calls for better communication about climate change have echoed loudly in academia and in advocacy circles. But is this lack of action and acceptance of science a failure of science communication?

Recent psychological science studies suggest that the answer is no: There are many more factors at play than a dearth of accurate science outreach. Beliefs and behaviors, particularly those related to group identity (as is the case with global warming), are highly resistant to change merely based on authoritative information and public outreach.

“The rejection of sound evidence in public health literally costs lives. A disregard for the findings of climate science erodes our capacity to act in a timely fashion. These are but a few critical examples that require different, more engaged approaches to communicating science to address some of the most pressing challenges of the 21st century.”

Laura Lindenfeld, Alan Alda Center for Communicating Science

This was clearly demonstrated in a [recent study in *Psychological Science*](#), which revealed that explaining the meaning of “scientific consensus” countered false beliefs about the safety of genetically modified foods but was less effective in convincing skeptics that climate change is real and caused by humans. The paper's lead author, Aart van Stekelenburg, a communication scientist at Radboud University in the Netherlands, believes one possible explanation for this difference is that people, particularly in the United States, have less trust in climate scientists than in biomedical scientists. “It may be that because there is less trust, the emphasis on consensus among climate scientists has also had less influence on the convictions of climate naysayers,” he said in an interview with the *Observer*.

Although the issue of trust is certainly important, other obstacles could also undermine the influence of science communication. In the United States, at least, proponents and opponents of climate-change science tend to be on opposite ends of the political spectrum. This puts the scientific consensus about anthropogenic climate change at odds with feelings of identity and group dynamics, making behavioral change much more challenging.

When behavioral change is less susceptible to factual communication, broader public relations tactics may have better luck persuading naysayers. Alas, the scientific community tends to rely on the credentials of its research to carry its message rather than determining what messages resonate, which spokespeople are trusted, and what barriers exist with the community of science skeptics. These are the elements that would form the foundation of a comprehensive public relations campaign.

Perspective From Across the Pond: Q&A With Andreas Olsson

COVID-19 is a global pandemic, and misinformation is a global problem. To broaden our perspective, the *Observer* asked Andreas Olsson, professor of psychology and director of the Karolinska Institute Emotion Lab, for his insights on COVID-19 misinformation in Europe.

Q: In the United States, there are several characteristics that are associated with a person's support or resistance to vaccination, including political affiliation and susceptibility of conspiratorial thinking. Are there similar predictors in Europe?

Olsson: Because our psychologies are, to a large extent, similar, we should expect many similarities, especially with countries in Western Europe. Yet, I see several interesting differences. In Europe, research shows that you'll find vaccine hesitancy/denial across the political spectrum—attitudes toward vaccines are not as strongly politicized as they are in the United States. In Europe, it is important to take the East/West and North/South dimensions into account; for example, you have more hesitancy in the East (and to some degree South), which might be linked to distrust in authorities (including scientists). In contrast, trust in health authorities has traditionally been very high in Scandinavia, for example, where vaccines (including for [COVID-19](#)) are largely endorsed. Pockets of hesitancy/ denial in the West are often linked to suspiciousness toward traditional medicine and big industry/pharma, as well as to regions with a high degree of non-European immigrants.

Q: Do you think those who have so far resisted vaccination will ever change their stance? Is there a message that could help bring about this change?

Olsson: There are many different reasons for why people resist vaccination, and each reason might need a somewhat different approach. Social information is very important. If others in your social network—especially people you trust, identify with, or look up to—get vaccinated (or at least you believe that they are), this increases the chances that you also will. Thus, you should use positive examples and inform people about the high vaccination rates, etc. A related aspect is trust in authorities and scientists (see my reply above).

However, on the individual level, if you decide not to get vaccinated and have yet not contracted the disease, this reinforces your belief you don't need to (simple learning theory). So, it gets harder to convince that person. Seeing or imagining others suffering from COVID can make you overcome your hesitancy.

Q: What have we—the psychological science community—learned about the power of misinformation in the era of COVID?

Olsson: I think we learned a lot. Although much of the knowledge already established in the field about misinformation and [vaccine hesitancy](#) was strengthened and generalized to this new situation, scientists were given an unprecedented opportunity to study these phenomena on a global scale (because the whole planet was hit) and thus to examine how the spread and impact of misinformation was dependent on cultural context. We have also gained important understanding about how misinformation spreads online.

The power of public relations

If you were to order breakfast in any restaurant in the United States, you would most certainly find some variation of bacon and eggs, the epitome of the classic “all-American breakfast.” But have you ever wondered why these two foods are found in nearly every diner, fast-food restaurant, and hotel breakfast buffet? These items were never breakfast staples in the Old West or colonial America—corn mush and honey would have been more common.

Your breakfast preferences in fact have more to do with a publicity campaign orchestrated by Edward Bernays, nephew of Sigmund Freud and public relations pioneer, who, among other things, convinced women that smoking cigarettes was “ladylike” and the public that disposable Dixie Cups were essential in a sanitary home.

To achieve these specific [changes in behavior](#), Bernays used tools from social and psychological science to craft communications campaigns that emphasized planning, public-opinion surveys, and data-driven tactics to achieve clearly defined goals.

The principles and tactics advanced by Bernays changed the way public relations professionals plied their trade and attempted to influence public behavior. His approach has lessons that the scientific community can and should adopt when attempting to influence public behavior.

Roadblocks to persuasion

When it comes to swaying public sentiment and shifting behaviors, there is often more to the equation than piling on fact-based information. If the only audience were the science-trusting lay public, using factual data to change behavior would be a perfectly reasonable approach. But when science becomes heavily politicized, the target audience is something else indeed.

Behavioral scientist Stuart Vyse published his thoughts on behavior and belief as they relate to ardent “antivaxxers.” His article in *Skeptical Inquirer*, “Why Your Uncle Isn’t Going to Get Vaccinated,” presented four key characteristics of the COVID antivaccine crowd in the United States that, in effect, inoculate them from science communication and public health messages. Unsurprisingly to many, being a supporter of Donald Trump is “one of the strongest predictors of your vaccination status.” That is not to say that Trump himself drove the initial skepticism, but his long contention with public-health experts

laid the groundwork for skeptics. Even though the former president eventually tried to urge his followers to get vaccinated—to resounding “boos” from the audience at one event—Vyse believes that it is far too late to pivot on this issue. Vaccine denial is now a defining characteristic of this cohort.

The second characteristic of antivax thinking Vyse highlighted is a desire to avoid cognitive dissonance. Over the past months and years, vaccines and other health measures have become linked to particular group identities. The friends and family with whom we identify are likely to be strongly pro- or antivaccine. Shifting one’s stance may require rejecting the beliefs of one’s group. Changing course midway through the pandemic, even with new surges and greater data on vaccines’ safety and efficacy, would create an unpleasant cognitive dissonance in the minds of antivaxxers. And so long as deniers haven’t gotten seriously ill, they can still believe they’re on the right side of this issue.

The third characteristic Vyse identified is a persistent belief, contrary to all evidence, that COVID-19 isn’t that serious. One important reason for this is the hidden nature of the pandemic. The millions of people who have died from COVID around the world and the many more who have been hospitalized have mostly been shielded from public sight. Unless you’ve worked in a COVID hospital ward or cared for a dying family member, the most visible aspects of the pandemic have been the inconveniences endured by the public. Though this is due, in part, to privacy laws that shield patients from public disclosure, it is clearly a point where scientific communication has failed. The pandemic has been communicated in impersonal numbers and statistics. Personal stories are more “real” to most of us, and many believe numbers to be easily falsifiable, as shown in challenges to the last U.S. presidential election.

Consider the *Sunbury Daily Item*, a local newspaper in central Pennsylvania, whose website publishes daily statewide case numbers provided by health officials. This information is accurate, authoritative, and compelling. And yet on a near daily basis, COVID skeptics mock these reports in the comments section.

This is an example of two classic public relations failings. First, it provides information without imagery or a personally relatable context. Second, it is unrelenting to the point of being numbing. The news is the same every day; only the numbers have changed. In the 1950s, heart-wrenching images of children in iron lungs during outbreaks of the far less deadly and less virulent polio virus helped to galvanize support for mass vaccinations. Publishing numbers of new infections is science communications. Publishing images of affected patients is public relations.

Finally, there is the perhaps uniquely American idea that it is better to surrender our lives than to surrender our freedom, however loosely defined. “The theme of liberty and freedom of choice has only strengthened in the current debate over the response to the SARS-CoV-2 pandemic,” noted Vyse in an interview with the *Observer*. As a measure of hope, however, Vyse did mention that mandates could give cover to those who decide to get the vaccine without triggering cognitive dissonance: They could say that they wanted to avoid the vaccine but were forced to get it for their job.

Outreach campaigns

For a complementary point of view, the [Observer](#) asked science-communication expert and political

science professor Jon Miller what most concerned him about the current state of science denial. “I think that the American political right has turned into an anti-academic movement that prefers their own ‘alternative facts’ to authoritative sources like scientists,” he said.

He did, however, have a more optimistic observation about the future: “I think that the most promising development is the increasing proportion of our youngest cohorts that are earning baccalaureate and graduate/professional degrees,” said Miller, who is also director of CPS International Center for the Advancement of Scientific Literacy at the University of Michigan. “Many American scientists do not realize that the United States is the only major country that requires all of its baccalaureate graduates to have a year of general education, including a full year of science. In earlier years, many science departments and faculties wrote these courses off as ‘rocks for jocks,’ but there is a strong liberal education movement to make these courses into important learning experiences. I think it is working,” Miller said.

The question psychological scientists must answer is, does the current lack of trust in science—as expressed in climate-change denial or antivaccination sentiments—stem from a lack of access to quality science information? Public relations professionals, including this writer, would argue the answer is no. As noted in past *Observer* columns on communicating science, efforts to debunk myths and misinformation can just as easily reinforce the bunk, and no one has ever had their minds changed by someone getting in their face and calling them an idiot. And yet, as demonstrated on major social media platforms, these two approaches—debunking and name-calling—are the two most common tactics that science skeptics encounter.

To change minds and affect behavior, the broader science community may need to take a page from public relations. We first need to conduct broad public opinion polls, understand the messages and the voices that *are* trusted by those who do not trust science, and, informed by this research, undertake innovative programs.

Such surveys are expensive and complex. The costs typically exceed research grants and require expertise beyond the scope of Mechanical Turk studies. Public relations campaigns are even more expensive, take longer, and require the combined skills of public relations specialists, marketing professionals, political-science experts, and spokespeople who are both respected by opponents and willing to take some bruises for challenging the antiscience mainstream.

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