Communicating with Skeptical Audiences

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ABSTRACT

As a science teacher and youth minister from a predominantly white evangelical community in rural Appalachia, I have had many opportunities to teach the science of global warming to climate change deniers. In this manuscript, I share some of the lessons I have learned to make my presentations less contentious and help those I teach be more accepting of accepted science content. Specifically, I focus on the importance of language, the prioritization of feelings over facts, and the fact that there is no single effective way to communicate climate change to all learners.

Editors' Comments

Matthew Groves (2019-2021 Fellow) is a self-described devout Christian from Southern Appalachia and a physics teacher. He has spent many years communicating the science of climate change with skeptical audiences in schools, churches, media, and professional conferences. His insights into effective communication with climate change deniers are critically important to science teaching in the age of the Anthropocene, especially in light of the current war on science and the politicization of scientific issues so prevalent in the U.S. We hope this manuscript will prove helpful to our readers who teach critical science content such as climate change.

Introduction

In the many years since James Hansen - then the Director of NASA's Goddard Institute for Space Studies - testified to congress in 1988 warning about the dangers of human-caused global warming, the scientific community has made many strides in our knowledge about climate change (Shabecoff, 1988). The UN's Intergovernmental Panel on Climate Change has produced five massive documents compiling the hundreds of thousands of hours spent in climate research, laying the case bare for all to see: the climate is indeed changing, it is indeed due to human activity, and it is a serious problem. However, many in the climate community ask themselves over and over: "*why have we done so little to address this? The data is so clear! The results are overwhelming! How can they not see?*" Despite some positive trends in public opinion and the modest successes of various national governments, it is indeed hard to avoid the impression that humanity is losing the fight for climate action.

Having grown up in a white evangelical community in rural Appalachia, I have personally come across quite a few people who might be called *climate deniers*. In my time as both a youth minister and a science teacher, time and again I have experienced a small-scale version of the problem: *the data is clear, so how can people remain unconvinced?* I came to realize that the in-house methods of science communication that I was taught in university - with an emphasis on data, process, and rigor - routinely failed me in conversations with skeptics. Instead, I leaned into the communication skills I developed as a teacher and a pastor and have found significant successes with audiences of all ages,

denominations, and acceptance levels of climate science. I hope to share my lessons learned about language, emotion, and strategy with the aim of letting you learn from my tedious mistakes and help the American scientific community move towards a more productive and effective approach in the years to come.

Language Matters

Language is an area where educators can grow to more effectively reach out to others. Any type of communication is a subtle, complex endeavor. We have all been misunderstood, or agonized over word choice in a delicate message. Even when disregarding topics that carry political baggage, science education can be fraught with difficulty when communicating technical knowledge to a non-specialist. Within a specialist community, we develop specialized language to refer to incredibly precise topics quickly. By itself, jargon is a good thing! It allows for efficient communication within the community. However, we often come to rely on this specialized vocabulary to such an extent that we forget that others lack knowledge of the words and concepts they describe.

Communicating with non-specialists without using your own terminology is a necessary skill for climate change, but it's also a good activity in general. Perhaps a few words are worth the effort to explain, but overall we should strive to avoid all language used purely in our field. Although there may be some exceptions, the maxim holds true in general: if you truly understand your work, you should be able to explain it to a child. The rise of [Plain Language Summaries](#) is a very welcome trend on this topic.

Using esoteric language can be even more ostracizing for non-specialists than we may realize; this is why many activists rightly focus on language and its consequences. However, it is also true that placing a high premium on using correct language will limit your ability to be heard; if the language you rely on is something you learned in graduate school, anyone without a masters degree will be hard-pressed to understand your talking points.

These gaps in technical literacy appear in surprising places. As a current high school science teacher, I can anecdotally confirm studies like [this one](#) pointing out that most adult Americans cannot accurately read logarithmic graphs, despite their widespread use in displaying COVID information throughout the pandemic. If my high schoolers struggle to master some of the finer points of graph analysis, how can we expect someone to do better if they haven't closely analyzed a graph in decades? Our audience members may even be specialists in a type of language that is directly tied to climate action (financial policy, or agriculture, etc), but not in another. Especially when we add in other layers of technical language tangentially related to climate - like justice and ethics, risk, economics, policy, or health impacts - we risk using multiple sets of jargon simultaneously, and we lose audiences.

Words also mean different things in different contexts, which is especially tricky if there is a cultural gap between the communicator and the audience. Knowing more about your specific audience (see part 3 below) will certainly help, but I also have learned to choose my words very carefully. One solution for this is to avoid tripwire words. How we say things really matters, even if the underlying concept is the same. This lesson is used often in politics, as speechwriters often try to avoid words with negative connotations, but we can certainly apply the lessons to climate change as well. Some people I talk to are still very hung up on the distinction between global warming and climate change, believing that the shift in vocabulary reflects the shakiness of the underlying science. To get around this problem, oftentimes I completely avoid using these terms. I often finish a full hour Sunday School class without using either, but end up in a place that's much closer to where I want our conversation to culminate. We spend time talking about humanity's relationship with God, each other, and nature, and therein I've been able to spark much more interesting conversations, which are fundamentally tied to climate change, than if I had started with throwing in those words initially and triggered someone's sensitivities. If we can arrive at the conversations we want without tripping people up, all

the better! This isn't being dishonest, it's just smarter communication. In my own work, if I walk into a church and trigger every audience member by leading with the climate-related issues that are sticking points for this community, no one will listen to me. This is true regardless of how central those tangential topics really are to solving the climate crisis - like its intersections with race, economics, gender, etc. When I plan my lessons, I think to myself: *"Here are the 8 words that will stop half of the audience from listening to me. How can I cover these concepts without saying those words?"*

In summary, language matters and we should try to avoid language that has bad connotations - as jargon, or because of its political/theological baggage - for our audiences. This not only helps us communicate towards better climate action, but also contributes to a better public understanding of science more broadly, which in turn benefits public health, scientific funding, and recruitment for the sciences.

Feelings and Facts

Science is deeply concerned with the pursuit of objective, statistically-sound, data-driven conclusions. Unfortunately, people are not. As scientists, we have been trained to think a certain way, with certain assumptions about things like peer-reviewed literature, certain ways of communicating, and a certain etiquette. The realization that others are not only indifferent, but perhaps even hostile to the foundations of your life work can be demoralizing.

History has made clear that the answer for building support for climate action is *not* providing the public with more graphs. The people who were going to be convinced by data have already been convinced by data years ago. What we sometimes call the *fact deficit model* - in which we simply need to shout facts to people ever more loudly - does not seem promising. Over three decades have passed since Director Hansen's testimony before Congress announced to the public that humans are responsible for global warming; although our scientific understanding has certainly become more robust since then, the basic scientific story has not changed in 30 years. If this was purely a scientific issue, we would have solved it years ago. But the lay public does not respond to scientific data in the way that scientists do, so we need a different approach.

This is why it is not effective to arrive at a class for non-specialists (like the Sunday School classes I teach, or meetings for politicians, or non-major students, or the public) with a slide deck with dozens of graphs from recent literature, because *they won't care.* This can be incredibly disheartening, but is true. But what is our alternative?

The [Climate Reality Project](#), founded by former Vice President Al Gore and one of the largest climate non-profit organizations in America, provides a good example of fruitful next steps. Al Gore frequently presents [the most famous slideshow in the world](#), which is over 90 minutes. There are significant amounts of data in the presentation, which you can [view online](#), but they are almost always paired with pictures of people showing how the data affects their lives. This approach is shared by organizations like the Climate Visuals, who have reached this conclusion from [significant research](#).

If we lead with data and only data, anyone who isn't a specialist will quickly lose interest. Before we have even properly begun we have already lost our most important target audience members. Perhaps they feel embarrassed because they cannot read the chart, or don't remember how the axes work, and are not brave or invested enough to ask a question. These may be people with high school or even college educations who simply never analyze data - data analysis is a skillset that can be lost, just like a language.

As an example, this [visualization](#) from the Wall Street Journal shows the overwhelming effectiveness of the measles vaccine in preventing infections (DeBold & Friedman, 2015). It elegantly conveys a significant amount of data - 26 states over nearly a century - organized into a central argument: the vaccine worked. However, it's also a disorienting graph for people without practice in analysis. The x-axis is time, which is a common enough choice. But what is the y-axis? Nothing. To

condense so many states into one visual, the editor abandoned the simple choice - a linear y-axis referring to the number of cases per year in each state and producing one graph per state - in favor of a colormap for the dependent variable. Is this a bad graph? Of course not. I'm actually rather fond of it. But it does require more effort from lay people than we might expect, and more often than not those laypeople will not provide the effort. Instead of leading with data like this, I have had much more success by leading with connections to other sectors of human life. For my audiences, this often means the Bible. I walk into Sunday School carrying my thick, red, well-worn [New Oxford Annotated Bible](#) - the default Bible for academics - and make sure to mention that I went to seminary. I open with a prayer and stay for the coffee hour or worship service afterwards. In short, I show them that I care about what they care about. This can be anything! If they have any kind of humanitarian interest, or fascination with nature, or like to ski or fish. Or perhaps they farm, or vacation at the beach, or have allergies. Because climate change affects so many parts of our world, it allows almost infinite possible approaches. Find one that applies to your audience and use it.

The problem seems to be that people don't care enough about the facts they do have, not that they lack facts. We need to find more ways to reach people that don't rely on graphs and Excel tables. This is disheartening for scientists, because that data is our lifework, but we must adapt. Learning from Al Gore's presentation, before using the Wall Street Journal visual during my vaccination talks, I first share a picture of a [Danish tombstone](#), which includes the names of five siblings, ranging in age from 2 to 15 years old, who all died during a diphtheria outbreak in 1903 (McCloskey, 2018). The human suffering conveyed in the photo garners much more audience attention, which makes them much more likely to try and understand the more complex graphs like the WJS visual.

No Silver Bullets

We often sort people into two simple categories: *science believer / acceptor* or a science *denier*. Reality is rarely so simple, and most people don't fall neatly into either category. In my experience, people are much more likely to fall onto a spectrum for many scientific issues in addition to climate change (evolution or COVID are good examples). Yale's Program on Climate Change Communication conveys this excellently in a program they call [Global Warming's Six Americas](#)," which has empirically sorted Americans into six sub-groups: *alarmed*, *concerned*, *cautious*, *disengaged*, *doubtful*, and *dismissive*.

By splitting the country into more than two groups, Yale gets at an important truth: there are many types of denial and each requires its own special type of communication. If we cannot differentiate between groups, we won't be able to reach them well. To borrow a metaphor from my Appalachian roots, there is no single *silver bullet* of climate communication, but rather *silver buckshot*, which is a cluster of BBs cased together that spread out after firing. Instead of one message for all people, we need to recognize the subtleties of specific audiences and tailor our messages to them.
I encourage you to look through the [description](#) for each group and ponder where you would fit in (there is also [a brief survey](#) that will categorize you automatically). But just as importantly, try to think of someone in your life who fits into each category, and how you would try to reach them in different ways. My communication strategies are very different for each group. When approaching a crowd of mostly those in the *concerned* group, I know they will be mostly receptive and perhaps be looking for local opportunities to become more involved. However, for *doubtfuls* and *dismissives* I have to prep extremely well and must be very cognizant of any verbal tripwires that might alienate my audience.

In activism circles there's a common saying, *everyone brings one*, meaning each member should bring one other member to an event, doubling the attendance. I have adopted a twist on the expression: *everyone moves one*, meaning we should focus on moving someone one rung along the Six Americas at a time. Persuading a *dismissive* person to attend a climate rally in one conversation is never going to happen. If that is our expectation, we will always be disappointed. However, we can perhaps

shift someone from *dismissive* to *doubtful* over the course of a few respectful conversations. In my own work, that is a common goal: moving someone from *dismissive* to *doubtful* or perhaps even *cautious* over the course of a Sunday School series.

And if nothing else, I can aim to preserve the relationship and their respect for me. In certain environments, all I can do is leave my audience of *dismissives* thinking, "*Well, he was wrong about everything, but he did seem like a nice young man who loved the Lord, so he can't be all bad.*" That may have only moved them a few decimal points along the ladder, but it has kept open the relationship and made them much more likely to come to me with questions later; I may be their only climate-focused contact, and I can't afford to throw away that possible connection. Over the course of a longer study perhaps I can move them a little and perhaps I can't, but if I don't have my expectations re-oriented, I will always be disappointed. In climate activism, the Six Americas are represented by various organizations. Groups like the Sunrise Movement have shifted many young people from *concerned* into *alarmed*, while organizations like Citizens Climate Lobby have tried to move *dismissives* or *doubtfuls* into *cautious*.

Tailoring our message to specific groups requires us to better understand their moral foundations. Psychologist Jonathan Haidt has written a book (Haight, 2012) and given a TED Talk about the different moral frameworks of conservatives and liberals, and studies confirm that communicators experience success when framing their environmental arguments in terms of traditionally conservative values like loyalty, patriotism, sanctity, and purity.

Some scientists and science educators say, "*I don't care what religion/politics/etc my audience has, science should be objective.*" And of course science seeks objectivity and is true regardless of where you are or your cultural background. But if we are trying to reach someone, they will never receive our scientific knowledge if we cannot reach them personally.

Conclusion

As a concluding thought, I encourage you to reflect on a time when you changed your mind about something important to you. In our line of work, perhaps you did revise a scientific opinion when presented with new data. Bravo! But especially in our personal lives, we are often spurred along by respectful conversations with people we trusted. In my experience, this is also the most effective path for science communication. Prolonged respectful dialogue is certainly the road less traveled in today's culture and much more demanding than other options, but I believe it may be our most promising option for science communication today.

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