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Harnessing the Power of Communication and Behavior Science to Enhance Society's Response to Climate Change

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Abstract

A science-based understanding of climate change and potential mitigation and adaptation options can provide decision makers with important guidance in making decisions about how best to respond to the many challenges inherent in climate change. In this review we provide an evidence-based heuristic for guiding efforts to share science-based information about climate change with decision makers and the public at large. Well-informed decision makers are likely to make better decisions, but for a range of reasons, their inclinations to act on their decisions are not always realized into effective actions. We therefore also provide a second evidence-based heuristic for helping people and organizations change their climate change–relevant behaviors, should they decide to. These two guiding heuristics can help scientists and others harness the power of communication and behavior science in service of enhancing society's response to climate change.

- Many Earth scientists seeking to contribute to the climate science translation process feel frustrated by the inadequacy of the societal response.

- Here we summarize the social science literature by offering two guiding principles to guide communication and behavior change efforts.
- To improve public understanding, we recommend simple, clear messages, repeated often, by a variety of trusted and caring messengers.
- To encourage uptake of useful behaviors, we recommend making the behaviors easy, fun, and popular.

INTRODUCTION

Like us, many scientists and other people working to address climate change are frustrated by the inadequacy of the societal response. We want to see policy makers, business managers, civic and faith leaders, people in every profession, and members of the public make better decisions about climate change—and we want them to act on those decisions. The obvious question then is, What can professionals and students in the range of disciplines relevant to climate change do to more effectively promote wise, science-informed decision-making and actions in response to this situation?

We answer that question here in the form of two guiding heuristics. These guiding heuristics are not magic bullets, and even if consistently applied, they won't magically transform society. Rather, they are key insights from the social sciences that can help guide the actions of those who are seeking to promote climate science–informed decision-making and action. One of the heuristics pertains to improving communication—our efforts to share what is known about climate change and climate solutions—with the aim of helping people make better decisions. The other heuristic pertains to helping people and organizations change their behavior.

These heuristics are, by design, simplifications of the insights in the social science literature. We offer these simplifications of what is known about human communication and behavior—which is, in reality, very complicated—in the spirit of Albert Einstein's recommendation: "Everything should be made as simple as possible, but no simpler." While his advice was intended for physicists, as readers of this review will soon see, it's equally relevant for people addressing challenges associated with climate change and other topics in science. Our evidence-based heuristics are offered to readers in service of practicality: We contend that people in any science, technology, engineering, and mathematics (STEM) discipline—at any stage of their career—and any STEM institution can become more effective in their science translation efforts by applying the two heuristics.

The heuristic for effectively communicating what is known is *simple*, *clear messages*, *repeated often*, *by a variety of trusted and caring messengers*. The heuristic for helping people—and organizations—take actions is to *make the recommended behaviors easy*, *fun*, *and popular*. In this review, we unpack these heuristics with the aim of making them practical.

SIMPLE, CLEAR MESSAGES, REPEATED OFTEN, BY A VARIETY OF TRUSTED AND CARING MESSENGERS

The Importance of Simple, Clear Messages

People are surprisingly limited in how much information they can process effectively (Fiske & Taylor 1984). Too much information—especially complex information—tends to have the paradoxical effect of undermining the effectiveness of communication and learning.

This paradox is a result of the fact that people have two modes of thinking. One mode is a rapid and effortless form of thinking based on processing firsthand personal experiences and media representations of the world; it leads to intuitive judgments about how the world works. The

other mode is a slower and effortful form of thinking that is based on analysis; it leads to reasoned judgments about the world (Chaiken 1980, Kahneman 2003, Strack & Deutsch 2004). In his book *Thinking, Fast and Slow*, Daniel Kahneman (2011) calls these two information processing systems System 1 and System 2. While these two modes of thinking are complementary, they can lead to conflicting conclusions. Most people, in most situations, privilege System 1 thinking (experience over analysis) because it's easy and tend to have greater confidence in intuitive conclusions over analytical conclusions.

While people differ in their need for cognition [i.e., how much effort they are willing to devote to effortful thinking (Petty et al. 2009)], in most situations most people operate as cognitive misers, reducing the mental effort necessary to make decisions by using mental shortcuts. These mental shortcuts help people make decisions within the constraints of their mental capacities, task environments, and the information that is available to them—a concept known as bounded rationality (Simon 1989, 1990). However, when the stakes are understood to be high, people are generally willing to exert extra cognitive effort to gain confidence in their decisions—a concept known as the sufficiency principle (Chaiken 1980, Chen et al. 1999).

Mental shortcuts are taken both intentionally and unintentionally. At times we decide to use them, invoking general rules of thumb such as "my smart neighbor said so," "experts know best," and "high consensus implies correctness" (Fischhoff 1989, Chaiken & Ledgerwood 2012). At other times we do so automatically in specific ways that are now well understood by social scientists including the availability bias (privileging easily recalled information), representativeness bias (making assumptions based on potentially irrelevant prior beliefs), and anchoring and adjustment (the undue influence on subsequent estimations of starting with one potentially irrelevant piece of information) (Tversky & Kahneman 1974).

The downside of mental shortcuts, however, is that they can lead us to biased selection and interpretation of information, and conclusions that are unhelpful (Kahneman 2011). When people simplify, they examine information less thoroughly, spend less time searching for potentially relevant information (in memory and elsewhere), look for fewer alternatives, and rely on easily accessible but potentially misleading cues to help guide their judgments (Shah & Oppenheimer 2008, Chaiken & Ledgerwood 2012, Klein & O'Brien 2018).

People's reliance on mental shortcuts can be particularly problematic in the context of science communication—which typically aims to activate the audience's effortful mode of thinking (System 2). When science communication is too complicated, people stop paying attention (Lupia 2013); reach wrong conclusions by simplifying inappropriately (Downs et al. 2008); become hostile to the information or the messengers (Schnepf et al. 2021); and fail to develop coherent mental models or schema, which makes subsequent learning less effective (Bruine de Bruin & Wong-Parodi 2014, Kraft et al. 2015). Furthermore, complex information is hard to remember, hard to recall at the times when it can be useful, and hard to put into action (Ratner & Riis 2014). Complex information is also more likely to make people feel disempowered (O'Neill & Nicholson-Cole 2009) and less trusting, which is fundamentally unhelpful.

When done well, however, science communication can motivate people to engage in additional information seeking and learning (Griffin et al. 2013)—which is especially beneficial when the issue at hand is complex and when adaptive management strategies are necessary. Sometimes referred to as a broaden and build approach, communication that creates interest, curiosity, and perhaps even awe can lead to additional information seeking, exploration, learning, and understanding—ultimately helping people to apply their knowledge and become more capable of coping with difficult and unfamiliar situations (Fredrickson 1998).

In summary, people are more likely to understand, trust, remember, apply, and develop interest in information that is presented simply and clearly.

How to Develop Simple, Clear Messages

Baruch Fischhoff (1989) nicely summarizes the goal of science communication: "People simplify. Our job (as science communicators) is to help them simplify appropriately." Developing simple, clear messages is the first step in helping people simplify appropriately.

Most fundamental to the task of developing simple, clear messages is avoiding technical terms to the extent possible. The use of jargon—words or phrases used by a particular group of people, professions, or industry that are difficult for others to understand—to communicate about science topics not only undermines people's comprehension, interest, and engagement in the topic but also undermines their social identification with the scientific community (Shulman et al. 2020). Most people don't understand even basic climate-related terms frequently used by climate experts such as carbon neutral, mitigation, or adaptation (Bruine de Bruin et al. 2021).

In their excellent book *Made to Stick*—which we recommend to all readers—Chip and Dan Heath (2007) suggest a useful way to think about the process of developing simple, clear messages: Identify the most important information, i.e., the key ideas, and then develop ways to convey it as succinctly as possible. This is easier said than done, in part because of a phenomenon known as the curse of knowledge in which experts on a given topic tend not to be good at identifying the key ideas that are most likely to help nonexperts simplify appropriately.

In their book *Risk Communication*, M. Granger Morgan and colleagues (2002) suggest a method for sidestepping the curse of knowledge by identifying which information is most likely to help nonexperts simplify appropriately. Called a mental models approach, the process involves identifying the full set of key ideas that experts on a topic think are important, which is then compared to what nonexpert audience members know about the topic. Through iterative steps of testing with audience members, the key ideas that help audience members simplify appropriately are identified (Pidgeon & Fischhoff 2011).

Effective communication responds to and builds on what people already know, feel, and value. Audience research—as illustrated above—is a powerful tool for developing effective messages because it helps communication planners understand what an audience knows, feels, and values. In-depth interviews, population surveys, and message testing experiments are commonly used approaches to gaining this understanding.

Audience segmentation is another important research tool for science communication planning. By grouping people together based on what they know, feel, and value—and perhaps by what they are currently doing—communication planners can come to understand them as a more-or-less motivationally coherent group of people (i.e., an audience) and can design messages and/or educational experiences that are optimized to meet the needs of that audience. For example, we use an audience segmentation analysis called Global Warming's Six Americas that divides the US adult population into six distinct audiences (Maibach et al. 2011). Over the past decade this approach has been used to plan myriad climate communication initiatives (Roser-Renouf et al. 2015, Leiserowitz et al. 2021b), and a brief survey tool to identify the prevalence of the Six Americas in any given population has been made available for anyone who wishes to use it (Chryst et al. 2018). Similar audience segmentation research is available for Australia, India, Singapore, Brazil, and other countries (see Detenber & Rosenthal 2020).

We're not suggesting that readers of this review become experts in audience research. Rather, we suggest an approach first recommended by Baruch Fischhoff (2007): To develop simple, clear science communication messages, build a science communication team. A science communication team has at least three positions that need to be filled: a content expert (who understands the relevant scientific content to be shared), a social science expert (who understands how people process information and can help simplify complex information into simple messages), and

Figure 1

Five simple messages about global warming.

a communication expert (who understands how to reach intended audiences with the messages). Working together, these teammates have all of the necessary skills to not only develop simple, clear messages that will help audience members simplify appropriately but also create communication opportunities to convey the messages to their intended audience. To appreciate just how practical this recommendation is, imagine creating a climate communication team composed of just three faculty members (or students), one each from the atmospheric science, psychology, and communication departments. An effective science communication team can start with a single email to two colleagues with complementary skills—and a shared interest in a science-based topic.

The Climate Matters program—which is discussed throughout this review—is an example of a team-based approach to science communication. Climate scientists, meteorologists, social scientists, and communication practitioners at various universities (George Mason, Yale), nonprofit organizations (Climate Central, American Meteorological Society), and government agencies (National Oceanic and Atmospheric Administration, NASA) came together to develop and distribute broadcast-quality, localized climate reporting resources to TV weathercasters. Their aim was to help weathercasters report on the impacts of climate change in their area. The approach has proven to be highly effective at increasing local reporting on climate change and at increasing public understanding of climate change as a locally relevant problem (Feygina et al. 2020, Myers et al. 2020, Maibach et al. 2022).

A set of simple messages about climate change that were developed by our climate communication team, and are now being used by many in the climate communication community, are shown in **Figure 1**. People's understanding—or acceptance—of these five key facts is strongly associated with how concerned they are about climate change, and what, if anything, they are doing in response (Roser-Renouf et al. 2015, Leiserowitz et al. 2021a).

The Importance of Message Repetition

Research from the field of health communication is rich with insights into the challenges of mounting effective science communication campaigns. Health communication scholars point to

two important qualities of effective public health information campaigns: well-designed messages and achieving a sufficient level of message reach and frequency (i.e., repetition) for the messages to have their intended effect (Hornik 2002, Abroms & Maibach 2008).

The insight that repetition is the mother of all learning both is ancient (as expressed in the ancient Latin proverb *repetitio est mater studiorum*) and has been described as one of the most robust findings to have ever emerged from contemporary scientific approaches to mass communication research (Lang 2013). The persuasive power of message repetition comes from the fact that it increases message effectiveness both cognitively (by increasing salience and availability of the information) and affectively (by increasing positive feelings about the message) (Pechmann & Stewart 1988, Chong & Druckman 2013).

Message repetition also enhances communication effectiveness through both fast and slow thinking processes (i.e., System 1 and System 2). Familiarity with a message is created through repetition and can increase systematic processing of the message because message repetition makes it easier (i.e., less cognitively taxing) for people to engage in deliberate and thoughtful processing of information (Cacioppo & Petty 1989). In turn, deep engagement with messages (through deliberate, System 2 processing) increases the potential for messages to lead to durable attitudinal changes (Krosnick & Petty 2014). Even superficial (i.e., fast, System 1) processing of repeated messages is important in that it leads people to see those messages as more credible [through a process known as the truth effect (Koch & Zerback 2013)] and more likable [through a process known as the mere exposure effect (Montoya et al. 2017)].

In a contested communication environment such as climate change, message repetition has an additional benefit. Repetition of key facts—for example, "more than 97% of climate scientists are convinced, based on evidence, of the reality of human-caused climate change"—reminds people of those key facts, keeping the facts more salient in their minds. The increased salience of the facts, in turn, helps inoculate people against (i.e., make them less susceptible to) misinformation that conflicts with the facts (Cook 2016).

Further, as all advertisers know, the effects of commercial messaging tend to wear off rather quickly. This is also true of science and health communication messages (Palmgreen et al. 2001, Nyhan et al. 2022). Message repetition helps to overcome this problem. Through repeated exposures people are more likely to retain and use the information (Jones et al. 2012, Shi & Smith 2016).

The summer 2015 release of Pope Francis's climate change encyclical, *Laudato Sí*, provides a case study of the importance of message repetition. In *Laudato Sí*, the Pope made a primarily moral argument for climate action—an argument that many Americans had not previously heard. By fall 2015, in response to the encyclical—or to news stories and church conversations about it—a significant number of Americans who had not previously seen climate change as a moral issue came to see it that way. Specifically, there was a 6 percentage point increase in seeing climate change as a moral issue among all US adults, and a slightly larger increase among Catholics, 8 points (Maibach et al. 2015). However, over the next year those increases evaporated, retreating to pre-encyclical levels. This drop was likely due to the lack of sustained repetition of the Pope's message in the news and in the pews after 2015 (Roser-Renouf & Maibach 2018).

A recent meta-analysis of studies of the mere exposure effect (i.e., the beneficial effect of multiple message exposures) estimated the optimal number of exposures at 62 (Montoya et al. 2017). Research by Potential Energy, a climate communication organization, sought to answer a question even more directly relevant to this review: What is the ideal message frequency when trying to actively engage people on the issue of climate change? Using data from 14 online ad campaigns—a total of approximately one billion online ad exposures—they found a strong positive relationship between the number of ad exposures and communication effectiveness. They estimated the

optimal frequency of repetition to be approximately 80 exposures per month (Marshall & Lu 2022).

It's important to note that the messages need not be identical to be effectively reinforced through repetition. Indeed, variations on the message theme can be helpful, both for communicators (to reduce their potential fatigue associated with repeatedly saying the same thing) and for audience members (to reduce their potential fatigue associated with repeatedly hearing or seeing the same message) (Kim & So 2018).

How to Achieve Message Repetition

Veteran climate communication strategist David Fenton (2020) nicely summarized the challenge: "A lot of us hate simplicity, and we hate repetition, but that's what works." Few people enjoy repeating themselves, scientists especially. Scientists are trained to focus on novelty and innovation, although repetition is necessary to effectively share what we know.

It's important to understand that message repetition isn't the sole burden of any one person or organization; message repetition is most effectively achieved when many messengers use their trusted voices to convey the same messages, consistently, over time. People and organizations involved in communicating about climate change can work together to design and use a shared set of messages specifically intended to help audience members reach appropriate conclusions. Science organizations can forge communication partnerships with other science organizations—professional societies, universities, and government agencies—to enhance message reach and frequency. They can also partner with civic organizations (e.g., Rotary, 4-H, Garden Club of America) and corporations (including media companies) if doing so will enhance message reach and frequency without undermining trust (see the next section). Organizations are composed of people. In addition to the official channels that organizations can use to communicate their messages, every person in the organization is potentially a channel who can be activated to further the reach and frequency of shared messaging.

Communicators have many options to convey their messages. Paid media (e.g., ads, sponsorships, product placement) has the obvious advantage of producing high levels of message reach and frequency, and the obvious disadvantage of being expensive; regrettably, most science communication initiatives have limited or no access to paid media. Owned media (communication channels that are owned by the communicator, including newsletters, blogs, email lists, magazines, museums, classrooms, onsite signage, public presentations by employees, etc.) has the advantage of being low cost, but it often has limited ability to reach a wide range of audiences. Earned media (getting one's messages into the news and/or entertainment media) can be both low cost and highly effective, but it's beyond the direct control of the communicator. Conversely, social media is completely within the control of the communicator and can be highly effective at times.

The Climate Matters program is an example of an earned media strategy. The Climate Matters team produces broadcast-quality graphics and other locally relevant reporting resources and distributes them to interested TV weathercasters at no cost. The outreach has proven to be highly effective: On-air reporting about climate change by weathercasters has increased more than 100-fold since the program launched—from 55 stories in 2012 to 5,672 stories in 2021 (Maibach et al. 2022). This increase in climate reporting has also had a measurable impact on improved public understanding of climate change (Zhao et al. 2014, Feygina et al. 2020, Myers et al. 2020).

The news business is rapidly evolving, and people are increasingly getting their science news and information from the internet. In 2018, 57% of Americans cited the internet as their primary source of information about science and technology, up from only 9% in 2001 (Besley & Hill 2020). By 2021, about half of Americans were regularly getting their news from social media

platforms (Walker & Matsa 2021). This creates a unique opportunity for scientists to engage directly with large public audiences via social media (Nisbet & Markowitz 2016).

Although participating in social media has some obvious downsides [including making oneself open to verbal assault—and threats (Nogrady 2021, Avaaz 2022)], we're convinced that it's an important, democratic science communication tool (Bik & Goldstein 2013, Pavlov et al. 2018) that every climate expert (including students) should consider using. What we say in social media, and how we say it, is entirely under our own control—and it costs nothing. Each social media post is a way of sharing important information and an opportunity to test new presentations of well-established scientific facts (with new words, new metaphors, new visuals, etc.)—a cheap but good opportunity to conduct audience research.

Scientists can opt to participate in social media actively or passively. Passive participation can involve as little as sharing social media content posted by other trusted people and organizations, thereby amplifying (i.e., repeating) the information. Active participation—such as posting and commenting on relevant research papers and news articles, stating opinions, responding to comments, and even having some fun (by posting selfies or other nonscientific content)—is more time-consuming but can also be more rewarding. Doing so is a way of starting two-way conversations with interested members of the public, listening to and learning what's on people's minds, and exposing a larger and broader audience of people (including, potentially, policy makers and cultural "influentials") to important science-based information (Vraga 2019, Martin & MacDonald 2020, Zeng et al. 2021).

The Importance of Trusted and Caring Messengers

Unsurprisingly, people are more likely to accept information and recommendations from people they deem to be credible. Decades of social science research has illuminated the fact that how we perceive other people's credibility is informed by our assessments of them on three broad dimensions: expertise, trustworthiness, and benevolence. Perceived expertise involves seeing the other person as having the knowledge, skills, and competency required to provide accurate information (Pornpitakpan 2004). Perceived trustworthiness involves seeing the other person as having a truthful intent (Hovland et al. 1953). Perceived benevolence involves seeing the other person as possessing goodwill and having our best interests in mind—i.e., caring about us (McCroskey & Teven 1999).

Each of these factors is important in influencing the success of science communication. However, it's important to recognize that none of these factors are inherently objective—at least not in the minds of audience members. Who we see as having expertise, who we see as trustworthy, and who we assume to have our best interests at heart is highly subjective. For science communication to be effective, expertise must be established, trust earned, and caring demonstrated—not assumed (Goodwin & Dahlstrom 2014).

It's also important to recognize that the three dimensions of credibility—expertise, trustworthiness, and caring—are not independent of one another. For example, people's assessments of trust in a communicator are influenced by their perceptions of the communicator's expertise (Pornpitakpan 2004), motives (Siegrist et al. 2005), and assumed biases (Eagly et al. 1978), as well as by perceived shared similarities between the communicator and audience (Fiske & Dupree 2014), and even the communicator's perceived attractiveness (O'Keefe 2002). Failure to establish any one of the dimensions of credibility can undermine the others as well.

There has been a dramatic erosion of public trust in government and in many professions over the past several decades (Brenan 2021). Fortunately, scientists and health professionals remain the most trusted groups of professionals worldwide, including in the United States—where they

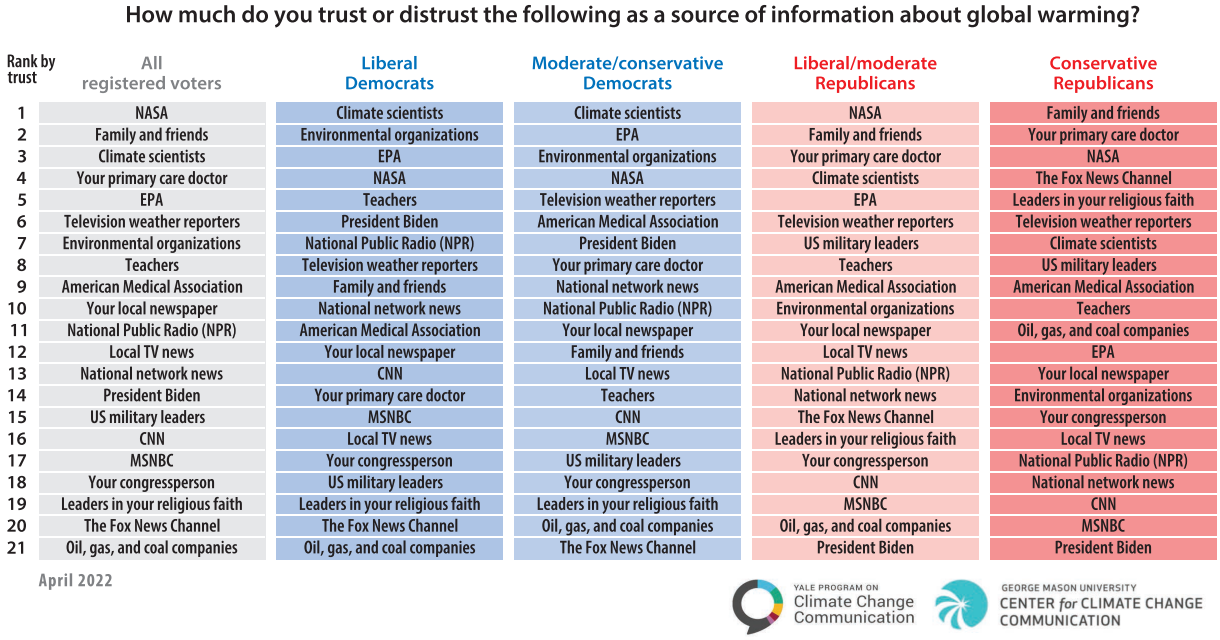

Figure 2

Most trusted sources of information about global warming.

share the top position with members of the military (Ipsos 2021). The relevance of this trust to climate communication is made clear in a recent meta-analysis by Cologna & Siegrist (2020). Across 51 studies, they found a strong positive association between trust in scientists and environmental groups and a range of beneficial climate actions taken.

Although the public's trust in scientists is relatively high, it's important to note that trust is also "fragile and unequally distributed" (Goodwin & Dahlstrom 2014, p. 152). In the United States, for example, trust in scientists rose considerably between 2016 and 2020 but fell sharply in 2021, and there are strong partisan differences such that Republicans are less trusting of scientists than Democrats (Kennedy et al. 2022). Moreover, as shown in **Figure 2**, there are large differences in who Democrats and Republicans trust as sources of information about global warming (Leiserowitz et al. 2022). Climate scientists are the most trusted source by Democrats but less so by Republicans, especially conservative Republicans. Conversely, Republicans are more inclined to trust their family and friends, their primary care doctor, and NASA—which suggests important communication opportunities to activate these trusted voices as climate communicators.

In addition to being trusted and recognized as having expertise, it's important for scientists to be seen as caring and acting in the public's best interest. People who see scientists as caring about the public are more likely to trust them, view them as credible sources of information, and cooperate with them (Peters et al. 1997, Critchley 2008, Beall et al. 2017, Fiske et al. 2002, Poortinga & Pidgeon 2003, Geiger et al. 2022). This is especially important in situations where the scientists are in a position of authority over the public's well-being (Kasperson et al. 1992). In the context of climate change, people are more likely to support climate policies when they perceive that the messenger cares about the impact of the policies on the lives of ordinary people (Geiger et al. 2022).

Unlike health professionals—who are widely seen as highly expert, trustworthy, and caring—scientists as a group are somewhat less likely to be seen as caring (Fiske & DuPree 2014) or as acting in the public's interest (Research!America 2022). In 2022, 68% of Americans indicated they have confidence in scientists to act in the public's interest—down 12% from the prior year (Research!America 2022).

How to Earn Trust, Demonstrate Caring, and Engage with Other Trusted and Caring Messengers

A large majority of Americans across the political spectrum feel that scientists should consider it part of their job to inform the public about their research and its impact on society (80% agree); an even larger majority feel scientists have a duty to inform elected officials (87%) (Research!America 2022). Thus, communication—sharing what we know—is what the public expects of us. How we communicate can have important consequences for how trustworthy and caring we are seen to be.

As noted above, the public accords scientists as a group with relatively high trust and moderately high levels of perceived caring, but it's important to recognize that "scientists" (and all groups of professionals) are an abstraction in people's minds, not a concrete reality. Fewer than 1 in 4 Americans (22%) can name a single living scientist (Research!America 2022). Thus, when an audience doesn't know the scientist who is communicating—personally or by reputation—their trust in that messenger is likely to be superficial, provisional, and vulnerable. Communication mistakes made by a scientist—such as unclear messages, seemingly evasive answers, and perceived lack of caring—can rapidly undermine the public's trust in them. Conversely, science communicators who are willing to make the effort to earn public trust are likely to be repaid in kind. Canadian geneticist David Suzuki provides an excellent example. In addition to being an academic and a prominent environmental activist, David has served as the host of a Canadian Broadcasting Corporation science show, *The Nature of Things*, for many decades. For many years, including as recently as 2019, David has been named as Canada's most trusted person in public opinion polls (Liss et al. 2019). In 2004, he was named as the fifth greatest Canadian of all time, beating out Wayne Gretzky (CBC Media Centre 2022).

Jean Goodwin and Michael Dahlstrom (2014) have done much to summarize what is known from both scientific and rhetorical perspectives about how climate communicators can earn trust. Steps for earning trust that have arisen from scientific research include establishing your expertise (education, occupation, experience) or having someone establish it for you; sharing information in a clear (simple) and interesting (engaging) manner; citing your evidence; being likable, relatable (similar to the audience), open, and honest; using humor; and demonstrating care for the public's well-being. From a rhetorical perspective, they recommend making yourself vulnerable to your audience (e.g., by engaging with them rather than lecturing at them), empowering your audience (e.g., by making your data available to them), taking responsibility for being wrong (e.g., by admitting when you have been wrong about something in the past), and starting small (e.g., by focusing first on only one narrow issue before progressing to larger issues).

Recently, Cvitanovic and colleagues (2021) put forth 14 practical strategies that climate experts can use to build, maintain, and when necessary repair trust with policy makers and the public at large. Importantly, they stress transparency, responsiveness (to what audiences want to learn and to feedback they provide), patience, and embracing a nondefensive attitude toward any advice offered.

Active listening is also an important element of trust building and effective communication. Listening to understand demonstrates respect, reciprocity, and willingness to welcome people's experiences as their expert contributions, which can increase audience members' engagement by reducing psychological distance (Van Boven et al. 2010, Gustafson et al. 2020a), increasing their risk perception, and strengthening their in-group association (So & Nabi 2013). Creating

opportunities for people to articulate their feelings about climate change—be they skepticism, concern, grief, anger, or hope—can create bonds between storytellers and listeners. In her book *Saving Us*, Katherine Hayhoe (2021) offers thoughtful and practical strategies on how to listen to understand, bond, and connect. Scientists who receive training in public engagement practices such as these become more deeply committed to the role, feel more effective in the role, and feel their university teaching and careers benefit as well (Stylinski et al. 2018).

While scientists and science institutions are trusted, it's important to recognize—and act on the fact—that we are not the only trusted voices in any community or nation. **Figure 2**, for example, displays a range of other groups of professionals and institutions that Americans trust as sources of information about global warming. They include doctors, weathercasters, teachers, and friends and family members. Members of these groups can be our allies in sharing what we know about climate change if we recognize them as such and take steps to encourage and support them as climate communicators.

The Climate Matters example provides an excellent case study of climate experts engaging with members of another trusted community with the aim of enhancing public understanding (Maibach et al. 2022). Prior to 2010, relatively few US weathercasters were communicating with members of their audience about climate change, especially not on-air—where they have the largest reach. By surveying members of the weathercaster community, the Climate Matters team learned that many members of this community of practice were interested in helping their viewers better understand the local realities of climate change, but they lacked some necessary resources to do this reporting (Maibach 2021). The Climate Matters program was created to provide weathercasters with those necessary reporting resources (see the section titled How to Make Recommended Behaviors Easy).

A similar effort was launched in 2016 to engage physicians as trusted messengers to educate the public and policy makers about the human health relevance of climate change and climate solutions. This initiative, the Medical Society Consortium on Climate and Health, currently includes 40 medical societies, who collectively represent about 70% of all physicians currently practicing in the United States (Sarfaty et al. 2022). Physicians can be important allies in communicating about climate change not only because they are highly trusted, including by conservative Americans who in recent decades have become skeptical of climate change (see **Figure 2**), but also because people across the political continuum, perhaps especially moderate conservatives, become more engaged in the issue when they learn about the health harms of climate change (Kotcher et al. 2018) and the health benefits of climate action (Kotcher et al. 2021).

Ultimately, most people's friends and family are their most trusted sources of information on a range of topics, including climate change (see **Figure 2**). In fact, conservative Republicans rate friends and family as their most trusted source of information about climate change. From a science communication perspective, we are wise to take all measures possible to ask and empower friends and family to become our communication allies. Our efforts to develop simple, clear messages will be rewarded when we ask friends and family to consider using their trusted voices to share our messages—because, as discussed above, simple, clear messages are memorable, actionable, and shareable (Ratner & Riis 2014).

If we want to activate a variety of trusted and caring voices to convey our simple, clear messages, we must do everything possible to make it easy, fun, and popular for them to do so.

MAKE THE BEHAVIOR EASY, FUN, AND POPULAR

To limit the world's warming to the extent possible and make communities resilient to climate impacts, many people and organizations—including governments and businesses—must change their current behaviors, ideally based on the best-available science. We made the case above for

using communication to share the best-available science with the aim of helping people and organizations make good decisions. However, it's important to understand that communication alone typically has a limited ability to bring about behavior change (Hornik 2002, Snyder et al. 2004, Goldberg & Gustafson 2021). Why? Changing behavior is hard. Doing so takes effort, persistence, resources, and the ability to overcome obstacles. It's true for people and equally true for governments and other organizations. Effective communication may be necessary, but it's rarely sufficient to bring about behavior change.

Here we make the case that much can be done to make beneficial actions easier to implement, and in so doing, people and organizations become more likely to choose and successfully implement the actions. What we're suggesting is a subtle but important shift in perspective away from trying to change people and organizations, and toward trying to change the actions that we want people and organizations to take—by making the actions better.

This focus on making recommended actions better originated in the field of social marketing, where behaviors are thought of as products (Maibach 2003). Indeed, the heuristic we're suggesting here, *make the behavior easy, fun, and popular*, was developed by a pioneer in that field, Bill Smith (2011). Despite its cheekiness, his heuristic is based on a large body of social science theory and empirical research, and it offers important practical guidance for moving people and organizations to behavior change.

Every day, people take (or fail to take) climate change mitigation and adaptation actions large and small—whether they recognize them as such or not. Examples include where they choose to live; how they choose to power, heat, and cool their home and cook their food; what they choose to eat; how they choose to meet their transportation needs; and which businesses they choose to purchase goods and services from—or avoid. Similarly, business managers take (or fail to take) many of these actions on behalf of their business on a much larger scale. Government officials also take similar actions to run the agencies in their jurisdiction; in addition, they make highly consequential policy decisions that affect the operating conditions for every person and organization in their jurisdiction. We contend that the *make the behavior easy, fun, and popular* heuristic is relevant across all of these distinct groups of people and across all of their behavioral domains.

The Importance of Making Recommended Behaviors Easy

Social scientists have long recognized that even when people have strong positive attitudes about a recommended behavior, their behavior often doesn't change—a phenomenon called the attitude-behavior gap (Ajzen et al. 2019, ElHaffar et al. 2020). Many factors are known to contribute to this disconnect.

Deeply held cognitive biases contribute to the disconnect, including the status quo bias (people's tendency to prefer current conditions over possible alternatives), and loss aversion (people's tendency to prefer avoiding losses over acquiring equivalent gains) (Kahneman et al. 1991). A recent study of public support for carbon mitigation policy provides a compelling example. In the study, participants' average willingness to pay for the policy in question was $420 (per household, per year) if they were told the policy was already in effect, but only $170 if they were told the policy was currently under consideration by the legislature (Lang et al. 2021). Proposed behavior changes must be seen as very compelling to overcome these biases.

Moreover, changing a behavior often requires people to engage in effortful (System 2) thinking, which, as noted above, is something we tend to do only sparingly. When faced with a choice between a habitual behavior (governed by System 1) and a new behavior (which requires System 2 thinking), people are likely to opt for their habitual behavior to avoid the mental exertion (Kahneman 2011, pp. 20–38). In a telling example, a recent study found that when given a choice between performing a cognitively demanding task and being inflicted with physical pain, many

participants choose to receive the physical pain rather than exert the cognitive effort (Vogel et al. 2020). People are more likely to change their behavior if the cognitive demands required to do so are light.

Cognitive biases and aversion to mental effort can be thought of as unmodifiable barriers to action. A wide range of other barriers to action are potentially modifiable, however, and can be addressed to reduce the disconnect between attitudes and behavior. Building on research by Terlau & Hirsch (2015), we suggest three broad categories of such barriers: personal, social, and situational. Personal barriers are individual-level attributes that impede a person's ability to perform a behavior—such as lack of actionable knowledge. Social barriers pertain to the influence exerted by other people, explicitly or tacitly, that discourages performance of the behavior—such as unsupportive social norms. Situational barriers are nonsocial, external factors that affect the person's ability to perform the behavior—such as the lack of necessary resources including time or money. Removing these barriers will make it easier for people to perform the behavior and more likely that they will do so.

Consider a hypothetical example: A county councilwoman understands that requiring government agencies in her county to purchase 100% renewable energy will reduce air pollution and improve public health in her community—objectives that she supports. Nevertheless, she's unsure how to craft such a bill in a manner that will survive legal challenges (an individual-level barrier), she's uncertain if her constituents and peers support such a bill (social-level barriers), and she's currently too busy with other legislative priorities to invest time in writing the bill (a situation-level barrier). To address these barriers, her staff could identify similar existing bills in comparable jurisdictions, and her constituents could demonstrate their support by calling her office staff or sending an email.

How to Make Recommended Behaviors Easy

In *Fostering Sustainable Behavior*, Doug McKenzie-Mohr (2011) presents detailed guidance on how to remove barriers to make recommended behaviors easier. His process starts with an important prior step, however: determining which behaviors are most worth recommending based on an assessment of their net benefit (e.g., see Wynes & Nicholas 2017). Audience research is then conducted to determine how willing people are to perform the recommended actions—because there is limited point in promoting behaviors people aren't interested in performing (Dietz et al. 2009)—and to identify the barriers that are most likely to impede their performance. This information can be used to develop and pilot-test a strategy for reducing the barriers identified (see Vandenbergh et al. 2010 and Wynes et al. 2018). If the pilot-test proves successful, the strategy can be implemented on a larger scale; if not, the approach can be redesigned and pilot-tested again. This "design, pilot-test, scale-up" approach is precisely how the Climate Matters climate reporting resource program for TV weathercasters was developed (Maibach et al. 2022).

In *Switch*, Chip and Dan Heath (2010) provide a useful metaphor that clarifies McKenzie-Mohr's approach. People can be thought of as a rider (representing their System 2 reasoning self) atop an elephant (representing their System 1 emotional self) traveling a path (representing the social and situational environment in which they are currently operating). To make it easier for people to travel a new path (i.e., perform a new behavior), it helps to tweak that path by removing the personal, social, and situational barriers. Moreover, to encourage people to leave the current path (i.e., the current behavior), they recommend creating new social and situational barriers on that path. Putting a price on carbon emissions is a useful example of this latter strategy.

Choice architecture—also called behavioral nudging—is another way to make some paths easier and others harder (Sunstein & Reisch 2021). When people have a choice between behaviors—for example, the choice between the standard option (coal-powered electricity) and

the alternative option (solar- or wind-powered electricity) from their utility company—how the choice is presented can have a large impact on which option is selected. Selecting the recommended choice for them (i.e., opting them in), while offering them the opportunity to opt out, greatly increases the odds that they will stay with the recommended option. In Germany, for example, by automatically opting consumers into a clean energy purchasing program (making that path slightly easier and the alternative path slightly harder), participation in the program increased from approximately 1% to 90%—even though consumers had the opportunity to opt out of the program at any time (Sunstein & Reisch 2021). Even behavior as deeply entrenched as food choice can be profoundly influenced by behavioral nudges. For example, Campbell-Arvai et al. (2014) found that 90% of diners in a university dining hall ate the vegetarian meal if it was automatically offered to them, whereas only 40% did so if they had to request it.

Even without behavioral nudging, improving how choice information is presented can make people much more likely to choose the recommended option. For example, when online shoppers are presented with a choice between faster (more carbon intensive) and slower (less carbon intensive) delivery options, 71% opted for slower delivery when the choice was presented to them in simple, clear terms they could understand (Heffernan 2021).

Knowing an action is beneficial is different from knowing how to take the action; teaching people "how to" is an important step in making actions easier. Modeling demonstrations—when relatable people teach how to perform the behavior and how to avoid pitfalls—are an especially effective way of teaching operational knowledge. Modeling of this type and removing barriers increase audience members' sense of self-efficacy (i.e., their confidence in their ability to perform the behavior), which, in turn, increases the odds they will try, persevere when initial attempts fail, and ultimately succeed in performing the behavior (Bandura 2004).

It's important to acknowledge that what's easy for some people isn't easy for others. This can be due to a range of factors including age, disability, language spoken, education, and household income—and it poses important ethical as well as pragmatic considerations (Howard et al. 2017). A study of hurricane evacuation behavior provides a good example: Many people who don't evacuate lack the means to transport themselves and/or a safe place to evacuate to (Petrolia & Bhattacharjee 2010). An effective and equitable approach to municipal hurricane evacuation planning must therefore make the recommended behaviors feasible (i.e., easy) for all members of the community, especially those who are most vulnerable to harm (Trujillo-Falcón et al. 2021).

In 2010, when planning the Climate Matters program, audience research revealed that approximately half the nation's weathercasters were interested in reporting on the local implications of climate change, although only a handful were doing so at that time. Many of the interested weathercasters indicated they faced many barriers that made the behavior difficult for them to perform, including time to research and produce stories, access to local data and visuals/graphics, knowledge about the topic, and access to trusted scientific information (Maibach et al. 2010). The Climate Matters team used their resources to reduce those barriers (Placky et al. 2016). One set of barriers—time, access to local data and graphics, and access to trusted information—was addressed by producing localized story packages (including broadcast-ready graphics, clearly stated key findings, data from trusted sources, and access to experts who can be interviewed) and distributing them to interested weathercasters. Lack of knowledge was addressed by offering interested weathercasters an ongoing series of professional education sessions via webinars and at their professional meetings. These strategies proved to be highly successful: Participation in the program grew rapidly (approximately 1,100 weathercasters currently participate in the program), and the number of on-air climate stories reported by weathercasters skyrocketed (Maibach et al. 2022).

Soon after the national launch of the Climate Matters program, a social barrier to climate reporting by weathercasters revealed itself when the American Meteorological Society (AMS) asked the Climate Matters team to investigate conflict in the weathercaster community regarding their diverging views about climate change. The team surveyed AMS members to explore the existence and extent of climate-related conflict in the AMS community (Stenhouse et al. 2017). The basis for the conflict was explored—and steps to mediate the conflict taken—in a series of sessions hosted with opinion-leading weathercasters (Schweizer et al. 2014). These sessions revealed that the basis of the conflict was more interpersonal (i.e., feeling disrespected) than scientific (e.g., disagreement about the scientific evidence in support of human-caused climate change). The mediation sessions proved to be effective at de-escalating the conflict among group participants, an effect that carried over into the meteorology community at large.

The Importance of Making Recommended Behaviors Fun

We use the term fun here not in the literal sense of something that provides enjoyment but rather as a metaphor for things that people experience as beneficial, valuable, or rewarding. Climate change mitigation and adaptation actions are recommended by experts not because they are fun per se but because they offer protective value for our climate, our ecosystems, and our species—and experts tend to prioritize their recommendations on the basis of how much protective value they offer. But climate change protective behaviors are human actions; they don't perform themselves.

Behavioral economic research, and social science research more generally, has revealed important insights into what people value and how those values influence their choices (Heath & Heath 2010, Gustafson et al. 2020b). When experts recommend actions, it's important to understand—and respond to—what people on the receiving end of our recommendations value. People are more likely to take the actions they recognize as beneficial, rather than the actions that experts suggest are important.

One such insight is that people are reluctant to incur costs in the present for benefits that accrue in the future; "pay now, benefit later" is rarely an attractive proposition (Rothschild 1999). Conversely, "benefit now and pay later" is an attractive proposition—which explains why many people live with credit card debt. A related insight is that people—including and perhaps especially policy makers—are reluctant to incur costs that primarily benefit other people; investments tend to be more attractive to investors when they benefit the investors.

Unfortunately, many recommended climate change mitigation and adaptation actions tend to fall directly into these behavioral economic traps. People (including policy makers and business managers) feel they are being asked to incur costs today for benefits that accrue primarily in the future, and primarily to other people, elsewhere.

A deeper understanding of human motivation can help resolve this dilemma. In his work *Social Foundations of Thought and Action: A Social Cognitive Theory*—which is arguably the most robust accounting of human motivation and behavior developed to date—Albert Bandura (1986) has identified three qualitatively distinct motivations for taking actions: physical benefits (e.g., physical pleasure, reduced risk of bodily harm), social benefits (e.g., enhanced social standing, rewarding social interactions), and self-evaluative benefits (e.g., thinking highly of oneself as a result of having done the right thing). Bandura makes the case that self-evaluative benefits are the most motivating, and physical benefits the least motivating.

The empirical research on motivators of pro-environmental behaviors is largely consistent with Bandura's theory: Intrinsic rewards and social rewards have been consistently shown to be powerful in shaping people's pro-environmental behavior (Crompton 2011). Intrinsic rewards lead people to feel good about themselves when they take actions they deem to be right actions, whereas social rewards accrue when people feel valued or approved of by others as a result of their action

(Crompton 2011). Receiving positive or encouraging feedback, feeling part of a community, and feeling that one is behaving according to one's own values are all powerful motivators of pro-environmental action (Crompton 2011, Handgraaf et al. 2013, Grilli & Curtis 2021, Vine & Jones 2016).

How to Make Recommended Behaviors Fun

Demonstrating the recommended behavior's present, local, and personal benefits is one strategy to increase the perceived value of the action. The health benefits of climate actions provide an excellent example: While the climate benefits associated with climate mitigation action take years or decades to pay off, and they accrue in a diffuse manner worldwide, the public health benefits of many climate mitigation actions begin to pay off immediately, and primarily in the place where the actions are taken. The Medical Society Consortium for Climate and Health is encouraging and enabling health professionals to educate the public and policy makers in their communities about the health promise associated with five broad areas of climate action: clean, renewable energy; clean and active transportation; climate-smart buildings and homes; climate-smart community environments; and climate-smart food and food systems (Gould et al. 2022). Similarly, in his book *The Big Switch*, Saul Griffith (2022) makes a compelling case for the potential for households and communities in Australia—the intended audience for his book—to prosper economically through decarbonization. The Climate Matters team highlights the present, local, and personal benefits of climate reporting by encouraging and enabling weathercasters to share stories with each other about the positive reactions they are getting from their audience in response to their climate reporting.

Making the recommended behavior social is another strategy to make the recommended action fun. For example, competitions involving households, businesses, and communities have proven to be an effective way of helping people reduce their energy use, which is a set of behaviors that have proven to be difficult to change through nonsocial strategies (Vine & Jones 2016). The "Energy Smackdown" competition between 120 households in three Massachusetts communities nicely illustrates the point (Vine & Jones 2016): Participants in each community cooperated with each other to maximize their energy savings, and they competed against participants from the other two communities. The competition resulted in a 14% average reduction in household electricity use and 17% average reduction in heating oil use. Similarly, Schools for Climate Action—a volunteer effort started by students and teachers in 2019—has developed a hands-on learning and organizing model that makes the process of advocating for climate actions in schools inherently social; their approach has already resulted in 83 school board resolutions, 11 resolutions by state and national educational associations, and 36 student council–led resolutions (Sch. Clim. Action 2022). The Climate Matters program has leveraged the power of social cooperation through skills-building workshops for broadcast meteorologists and journalists. The workshops are designed to harness the influence of social modeling, offer peer feedback, build camaraderie, promote a sense of collective purpose, and, quite literally, be fun; evaluations of the workshops show they are effective, and many weathercasters have participated in more than one workshop.

Linking the recommended behavior to people's identity is a particularly promising strategy in that it can engage people's deepest and most fundamental motivations. In many instances, climate-related behavior and policy support are closely linked to people's identity. In the United States, for example, partisanship is a powerful driver of people's views about a range of issues, including climate change (Dias & Lelkes 2022). So-called eco-right organizations, including republicEn.org and ConservAmerica, are using conservative identity appeals to build active support among Republicans for climate policies derived from free-market ideology—including a revenue-neutral,

border adjustable price on carbon. Older adults tend to have a sense of ancestor identity, with a strong desire to leave a good legacy for future generations (Wickersham et al. 2020); appealing to this identity has been shown to increase people's performance of pro-environmental actions. Professional identity can also be a powerful motivator: The strongest predictor of physicians' willingness to engage in climate advocacy, for example, is their belief that health professionals have a professional responsibility to do so [which reflects their duty to care ethic (Lee et al. 2021)]. People's religious and moral identities can also be deeply powerful motivators of action. For example, exposure to *Laudato Sí*—Pope Francis's encyclical on climate change that highlighted the moral necessity of climate action—had the effect of catalyzing climate action among climate-concerned Americans (Myers et al. 2017).

The Importance of Making Recommended Behaviors Popular

People are highly sensitive to social norms, defined as what other people are thinking and doing—especially other people held in high regard—and what other people think is the right thing to do. The more normative (i.e., popular) a behavior is perceived to be, the more likely people are to perform it (Cialdini et al. 2006). A recent empirical review of the literature on social norms and pro-environmental behavior concluded that "social norm interventions [i.e., efforts to influence perceptions of social norms] are effective at inducing significant behavior changes," especially descriptive norms (Farrow et al. 2017, p. 10).

There are three distinct types of social norms—descriptive norms, injunctive norms, and dynamic norms—and each can influence people's actions. Actual descriptive norms are the prevalence of attitudes and/or behaviors in a given population, whereas perceived descriptive norms are people's beliefs about the actual descriptive norms; people often underestimate the prevalence of uncommon attitudes and behaviors, and overestimate the prevalence of more common attitudes and behaviors. Moreover, climate "alarmed" people are more likely to take action to influence climate policies to the extent that they believe other people like them are also taking similar actions (Doherty & Webler 2016).

Injunctive norms are defined as people's perceptions of the degree to which their friends, family, and/or community members approve or disapprove of a given attitude or behavior. When people believe that members of their community approve (or disapprove) of a given behavior, they are more (or less) likely to perform the action.

Lastly, dynamic norms are people's belief that a descriptive norm (or an injunctive norm) is currently changing—becoming increasingly or decreasingly prevalent. Awareness of a changing norm, in turn, can lead people to change their behavior accordingly (Sparkman & Walton 2017).

Information about social norms can influence people's behavior for a variety of social reasons including desiring to fit in (or to stand out), seeking social esteem, avoiding social disapproval, and expecting a benefit for conformity (Farrow et al. 2017). Social normative information can offer practical value as well: Other people's behavior can teach us what is functional or effective in a given situation; it can also reduce the cognitive demands of decision-making by allowing us to ignore the complexity of the underlying issue (Farrow et al. 2017, Sparkman et al. 2021).

How to Make Recommended Behaviors Popular

New behaviors often catch on slowly; harnessing the power of social norms and other forms of social influence can accelerate the process and render it more successful (Rogers 2003). One way to jump-start the process before a recommended behavior has started to become popular is to find and draw attention to bright spots—i.e., people or organizations who are already performing the behavior and who thereby provide a "successful effort worth emulating" (Heath & Heath 2010, p. 28). Doing so has value for at least two important reasons: Drawing people's attention to a

bright spot is an effective means of modeling the behavior, which helps other people learn and increases their sense of self-efficacy (i.e., their confidence in their ability to perform the behavior) (Bandura 1986); it also increases the behavior's salience and availability in the minds of people who see the example, making it seem more common (i.e., more prevalent) to them (Tversky & Kahneman 1974).

The Climate Matters pilot-test experience provides a good example of the value of highlighting a bright spot. The year-long Climate Matters pilot-test involved only one TV weathercaster, Jim Gandy (then the chief meteorologist at WLTX in Columbia, South Carolina). At the conclusion of the pilot-test, the Climate Matters team drew attention to Jim's successful efforts at conferences and through news media—especially the fact that his audience responded positively (Maibach et al. 2016). This created interest among other weathercasters that, in turn, led them to request access to the Climate Matters reporting resources. Greta Thunberg is another example of the catalytic potential of drawing public attention to a bright spot. In 2015, the media began reporting on Greta's weekly school strike for climate outside of the Swedish parliament. As her lonely quest gained attention, she inspired young people around the world to organize their own school strikes, igniting a worldwide youth climate movement (Kraemer 2021). Awareness of her actions also increased concerned adults' sense of collective efficacy—the belief that like-minded people working together can protect the climate—making them more likely to participate in collective climate actions (Sabherwal et al. 2021).

Harnessing the power of dynamic norms creates opportunities to make non-normative behaviors more normative (Cialdini & Jacobson 2021). For example, when exposed to information about the increasing number of people who are making efforts to limit their meat consumption (30% in this case), people in university-based dining facilities were twice as likely to select a meatless meal (Sparkman & Walton 2017). Exposure to dynamic norms messages has also been shown to increase audience members' sense of self-efficacy and their belief that the behavior is compatible with their social identity (Cheng et al. 2020).

Identifying and activating community opinion leaders—the people in any given community or social network who have an outsized influence on the opinions of others in the community—can be a highly effective method for increasing adoption of recommended actions (Valente 2012, Contractor & DeChurch 2014). Earning their cooperation as models and endorsers of a recommended action activates a unique form of social influence that has the potential to make or break acceptance of the recommendation among members of their social network. Valente and Pumpuang (2007) offer several techniques for finding and activating community opinion leaders.

When recommended behaviors truly are normative—when a majority of people perform them or approve of them—informing people about the norm can be helpful in reinforcing and growing the norm because people often underestimate the norm. In a recent systematic review of environmental social norms campaigns, Yamin and colleagues (2019) found significant behavior changes in a large majority (89%) of the campaigns that have been evaluated—although the average effect size was relatively small.

Lastly, another potentially promising approach to making recommended behaviors more popular is through referral or invitation campaigns—asking people who already perform the behavior to invite their friends, family members, or coworkers to join them (Berman 2016). Relatively few climate-concerned people take a variety of important actions, although many say they would if a person they like and respect asked them to. For example, while only 9% of American adults have contacted an elected official about global warming in the past year, fully 27% say they would if asked by someone they like and respect; 29% say, if asked, that they would join a campaign to convince elected officials to take action to reduce global warming—although only 1% say they are currently participating in such a campaign (Leiserowitz et al. 2022).

CONCLUSION

We hope these two heuristics provide readers with helpful guidance on climate communication and behavior change strategies. We close, however, by reiterating our recommendation to address these important challenges by joining—or forming—a multidisciplinary team. Bringing together diverse skills and perspectives will enhance the odds of better outcomes. As Fischhoff (2019, p. 7670) explains, "Scientists can overestimate how far their results generalize and offer practitioners unsupported advice or summaries. Practitioners can absorb a fragment of science and exaggerate its value. . . . The two worlds support one another when they do connect, with practitioners helping scientists to identify the results that matter to their audience, and scientists helping practitioners to structure those interactions."

While climate change presents a major challenge to all facets and levels of society, well-designed and well-executed communication efforts hold considerable promise in helping translate the insights of environmental and climate science into more sustainable civilizations across the globe. Communication efforts should make use of simple, clear messages that are repeated often by a variety of trusted and caring sources; behavior change campaigns should strive to make the recommended behavior easy, fun, and popular. With these two guiding heuristics as tools, readers are well-equipped to help bring about the changes that are necessary to mitigate the catastrophic effects of climate change.

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