

Gaining trust as well as respect in communicating to motivated audiences about science topics

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Expertise is a prerequisite for communicator credibility, entailing the knowledge and ability to be accurate. Trust also is essential to communicator credibility. Audiences view trustworthiness as the motivation to be truthful. Identifying whom to trust follows systematic principles. People decide quickly another's apparent intent: Who is friend or foe, on their side or not, or a cooperator or competitor. Those seemingly on their side are deemed warm (friendly, trustworthy). People then decide whether the other is competent to enact those intents. Perception of scientists, like other social perceptions, involves inferring both their apparent intent (warmth) and capability (competence). To illustrate, we polled adults online about typical American jobs, rated as American society views them, on warmth and competence dimensions, as well as relevant emotions. Ambivalently perceived high-competence but low-warmth, "envied" professions included lawyers, chief executive officers, engineers, accountants, scientists, and researchers. Being seen as competent but cold might not seem problematic until one recalls that communicator credibility requires not just status and expertise but also trustworthiness (warmth). Other research indicates the risk from being enviable. Turning to a case study of scientific communication, another online sample of adults described public attitudes toward climate scientists specifically. Although distrust is low, the apparent motive to gain research money is distrusted. The literature on climate science communicators agrees that the public trusts impartiality, not persuasive agendas. Overall, communicator credibility needs to address both expertise and trustworthiness. Scientists have earned audiences' respect, but not necessarily their trust. Discussing, teaching, and sharing information can earn trust to show scientists' trustworthy intentions.

public images | scientist stereotypes

Long ago, Aristotle knew that communication is not just about logic and knowledge, but also about emotions and values [differentiating among logical argument (*logos*), demonstrating character (*ethos*), and evoking emotion (*pathos*) (1) and refs. 2 and 3]. As science communicators, we are interested in public belief formation, so we can benefit from understanding the complementary roles of audience respect for scientists' expertise and trust in our character.

Scientists as communicators have earned audiences' respect, but not necessarily their trust, as the evidence will suggest. This Perspectives article begins with climate science as an example of potential misunderstanding between scientists and their audience, and then examines the science of communicator credibility more generally, showing that trust is a critical factor. Next the article describes how people decide which groups to trust, and how scientists rate on that dimension. Finally, returning to climate scientists as a case study, the public has some specific opinions about how they are and are not trustworthy. Conclusions suggest that scientific communication can be more effective by drawing on both dimensions of communicator credibility.

Public Beliefs and Affect

Consider climate change communications as a case study in science communication. Public responses to climate change suggest both good news and bad news for scientists trying to

convey the best available evidence. The discouraging news is that scientists and the public are isolated from each other (4). They inhabit distinct information environments; for instance, sheer attention to political news versus science and ecological news predicts disparate climate risk perceptions and policy support (5). Despite scientific consensus on climate change trends, the public is of two minds, with much nay saying and extreme skepticism, but at the same time being worried and having alarmist imagery (6). How can science communicators reconcile the gap between public ambivalence and scientific consensus? Two social psychological factors come into play here.

First, scientists may misunderstand the sources of lay beliefs: People are no idiots. The public's issue with science is not necessarily ignorance (7). The public increasingly knows more than before about climate change's causes (8). Psychology undergraduates at least can judge both science and nonscience arguments by the amount and reliability of their evidence (9). Different lay people hold different models of science, some more classical (seeking a single, true answer) versus others more Kuhnian (acknowledging multiple answers to negotiate and debate, accepting scientific uncertainty) (10). Hence, potential divides between scientists and the public are not merely about sheer knowledge in any simple way.

The second, often-neglected factor is the other side of attitudes. Attitudes are evaluations that include both cognition (beliefs) and affect (feelings, emotions) (11). Acting on attitudes involves both cognitive capacity and motivation (12). Attitudes show an intrinsic pressure for consistency between cognition and affect (11), so for most attitudes, both are relevant. When attitudes do tilt toward emphasizing either cognition or affect, persuasion is more effective when it matches the type of attitude (13). In the domain of climate change, for example, affect and values together motivate climate cognition (4, 14). If public attitudes have two sides—beliefs and affect—what is their respective role in scientific communication?

Communicator Credibility

Science communicators try to persuade the public that they are honest brokers of scientific evidence, that is, that they are credible. In an attitudes research literature spanning decades, communicator credibility demonstrably has two components. Expertise is only one crucial prerequisite for communicator credibility (15). Perceived expertise entails the knowledge and ability to be accurate.

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Audiences who are operating on automatic (not thinking very hard) are instantly inclined to agree with experts. However, expertise can also trigger close scrutiny, if the audience is motivated and has the opportunity to think hard (16). Scientists presumably can expect their expertise to have these types of effects, depending on the audience.

The other feature of communicator credibility is trust, also according to decades of attitudes research (16). Audiences judge the communicator's apparent trustworthiness as the communicator's inferred motivation to be truthful. Trust most often makes audiences automatically believe in the message's validity (16). We know less about whether scientists are usually accorded trust, making this an open question that our illustrative data will begin to evaluate.

The classic communicator credibility literature provides useful information regarding whom audiences choose to trust. First, people trust similar others, that is, people they categorize as being in their own group (17). People assume "people like us" share their goals and values, so they are motivated to support them as being on their own side. When scientists convey a particular political orientation, for example, they alienate people whose politics disagree. Given liberal political tendencies in universities, conveying those politics is likely to undermine some audiences' feelings of similarity to a scientist communicator.

Second, audiences also trust the sincerity of persistent minorities (11), which may help explain the impact of vocal but minority viewpoints—such as extreme climate change deniers—but that is a topic for another article. Primarily, people focus their trust on their own group; trust being a socially adaptive strategy for getting along in one's group (18, 19).

Identifying Whom to Trust

To fundamentally social beings, trust always matters. People's social interactions are ruled by a known set of five repeatedly cited and supported core motives that together sketch some main drivers of social behavior, including trust (18, 19). Most central of the five motives is the motivation for belonging to a stable set of face-to-face relationships (at the level of dyads and small groups) (20). Arguably, belonging has survival value; humans' health and wellbeing suffers under isolation, and stable relationships protect against mortality (21).

From the fundamental motive for belonging follow other core motives, two more oriented to cognition and two more oriented to affect (18, 19): On the cognitive side, to survive and thrive within a group, people need to acquire socially shared understanding. They also need some sense of control; that is, they need to see some contingency between what they do and what to expect in return. Communicator expertise, for example, contributes to these two cognitively oriented motives by providing valid information about consensus beliefs (socially shared understanding) and about social norms (people's reports about social rules, such as littering).

On the affective side are two other core motives: People also adapt better to group life when they have self-esteem adequate to maintain participation in the group and when their default motive is to trust their own group members. Reasonable self-regard and interpersonal trust lay the groundwork for more efficient and effective interpersonal interactions (18, 19). Together, these core motives suggest that audience priorities are not only cognitive, but also affective.

This last core social motive, identifying whom to trust, follows systematic principles (22, 23). People decide quickly another's apparent intent: Who is friend or foe, on their side or not, or a cooperater or competitor. If seemingly on their side, people deem the other individual or group as warm (friendly and trustworthy). Upon determining intent for good or ill, people then decide whether the other is competent to act on those intents. These rapid perceptions express a warmth × competence space [see Fig. 1 for American data on societal groups (23)].

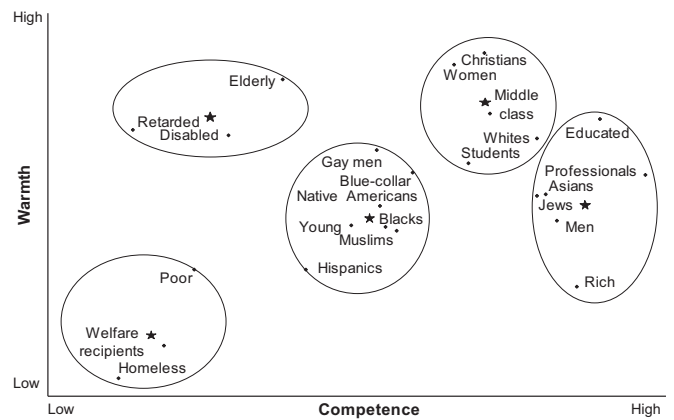


Fig. 1. Five-cluster solution describing American societal groups. Adults completed a survey rating previously nominated common groups each on their public images of being warm and trustworthy, as well as competent and capable. Group mean ratings on the two dimensions are subjected to statistical cluster analysis (23, 24). Note that these data map reported images of social groups, not the accuracy of those images. (Reprinted with permission from Ref. 23.)

Within these warmth-by-competence cultural maps of groups' public images (22), the societal ingroups, reference groups, and their allies typically appear in the top right cluster. These groups are seen as high on both dimensions, perceived warmth and perceived competence: middle class, Christians, whites (and in other samples, Americans). Affectively, people report feelings of admiration and pride toward these groups.

In the opposite end of this diagonal, judged as low on both the warm and competence dimensions, appear poor people, homeless, welfare recipients (and in other samples, drug addicts, immigrants). Affectively, people report disgust and contempt toward these groups. (In the middle cluster are groups whose middling average ratings do not differentiate among these respondents expressing ignorance, indifference, or opposing extremes that cancel each other in the aggregate. See refs. 24 and 25 for examples of decomposing this apparent indifference.)

Compared with existing research on stereotypes, the innovative feature of our research using this warmth-by-competence map (23, 24) is the ambivalent diagonal, groups judged as high on one dimension but low on the other. Groups judged as nice but incompetent include older and mentally or physically disabled people (group names in Fig. 1 are respondent provided). Affectively, people report pity and sympathy toward them. Groups seen as competent but cold include rich people, men, Jews, Asians, and to some extent, professionals. People report envy and jealousy toward them.

Our program of research has gathered warmth-by-competence maps sampled across place, time, and social entities. This space usefully describes a variety of human social perceptions: over US samples, both convenience [students, adults (23)] and representative [adults (24)]; over dozens of countries, using their own social groups (26, 27); over time [Italian Fascists (28); American students since 1933 (29)]; over levels of analysis, from individuals (30) to subtypes of women and men (31), immigrants (32), gay men (25), and African Americans (33); and even over other intent-having entities, such as animal species* and corporations (34, 35). These warmth-by-competence data suggest the bold conclusion that the dimensions are universally descriptive of group images.

*Sevillano V, Fiske ST, Perceived Dimensions of Animals. Society for Personality and Social Psychology Annual Meeting, January 17–19, 2013, New Orleans, LA.

What About Scientists as Communicators?

Perception of scientists, like other social perception, presumably involves inferring intent (warmth) as well as capability (competence). In the context of this Perspectives article, these perceptions may help to understand how the public responds to science communicators. Consistent with our previous methods, we tested this idea in two phases (see *SI* for details). We first asked online samples of adult volunteers to list some typical American jobs, and then we selected the most commonly mentioned 42 jobs, which included scientists, researchers, professors, and teachers.

We then polled a new online adult sample about these jobs, asking for warmth and competence ratings according to how American society views them. This technique yields people's reports of the public images of groups. It also reduces social desirability biases that would occur in reporting one's own individual stereotypes. The data thus generate lay theories of the culture's shared images. Participants rated the various job holders' standing on American society's warmth and competence perceptions, as well as reporting Americans' typical emotional reactions to the job-holder groups. The warmth \times competence data then underwent cluster analysis, generating the map shown in Fig. 2.

In the top right of Fig. 2—the high-warmth, high-competence, “pride” corner—appear professionals who are also caring: nurses, teachers, and doctors. They are rated as having the image of being warm and trustworthy and capable and competent. They are both trusted (warm) and respected (competent). The most-reported emotions are admiration and pride.

In the bottom left—low-warmth, low-competence, “disgust” corner—appear prostitutes, garbage collectors, dishwashers, and fast-food workers. They are rated low on both dimensions and higher on disgust and contempt than other groups are. That is, they are neither trusted nor respected.

The remaining corners of the space are ambivalent in the sense of having mixed images, scoring high on one dimension and low on the other. The ambivalent, high-warmth, low-competence, “pity” quadrant (upper left in Fig. 2) is empty in this dataset, perhaps being reserved for the unemployed (who land there in other datasets), because the current data points all involve groups that have a job.

The fourth corner lists the ambivalently perceived high-competence, low-warmth, “envied” professions: lawyers, chief executive officers, engineers, accountants, scientists, and researchers. They earn respect but not trust. Being seen as competent but cold might not seem problematic until one recalls that communicator credibility requires not just status and expertise (competence) but also trustworthiness (warmth). People report envy and jealousy toward groups in this space. These are mixed emotions that include both admiration and resentment (23, 24). Science communicators arguably need to know about this possible type of response to them.

What is more, other research indicates the risk inherent in being enviable. People rated other types of envied outgroup members (e.g., rich people). Participants reported feeling slightly good and not so bad, when mundane bad events (splashed by a taxi, sitting on chewing gum) happen to these groups. This malicious glee at others' misfortunes is known as Schadenfreude. The same emotion also appears in electromyography of the cheeks' smile muscles (zygomaticus major) when bad things happen to envied people. All other quadrants (ingroup, pitied groups, disgusting outgroups) elicit more happiness and smiling to good events rather than bad ones (36).

In sports rivalries, likewise, Schadenfreude toward envied group members is reflected in neural reward centers, also correlated with self-reports of aggression (taunting, food throwing, fistfights) toward envied rival teams' fans (37). Being enviable may entail respect, but also entails some degree of dislike and

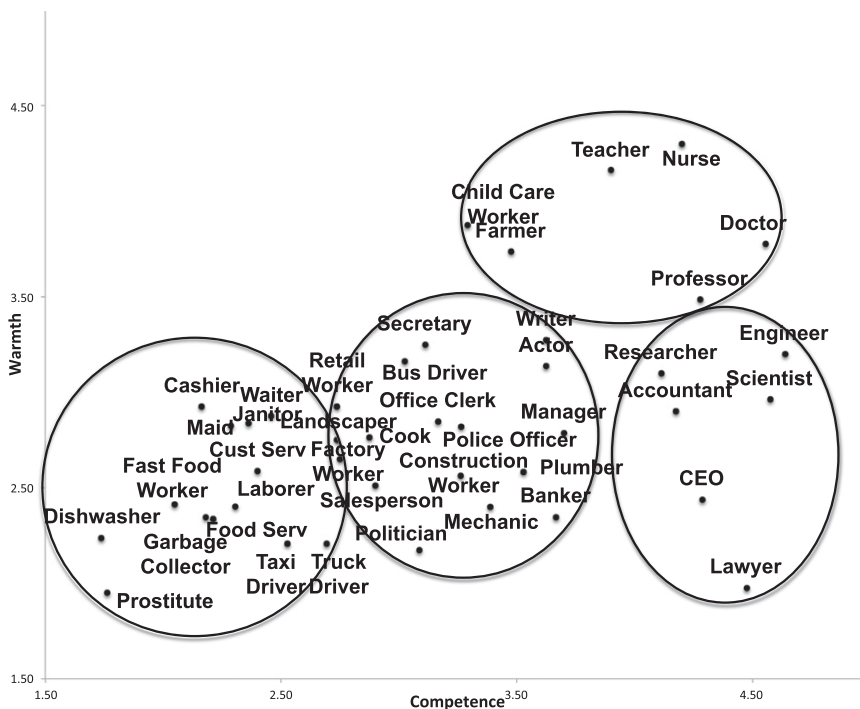


Fig. 2. Warmth–competence ratings of commonly mentioned jobs. Four-cluster solution describes American job holders. Adults completed an online survey rating previously nominated common jobs on their public images of being warm and trustworthy, as well as competent and capable. Jobs' mean ratings on the two dimensions are subjected to statistical cluster analysis (see *SI text*). Note that these data map reported images of job groups, not the accuracy of those images. Although not the focus here, the middle cluster averages are relatively neutral on both warmth and competence, as well as emotions (see *SI text*).

distrust. Therefore, even if scientists are respected as competent, they may not be trusted as warm. Recall that the warmth/trustworthiness judgment assesses the other's perceived intent for good or ill (friend or foe). Scientists, in this view, may seem not so warm. Their intent is not necessarily trusted, maybe even resented.

We began this illustrative research to exemplify how audiences may view scientists as communicators, not just as scientists. Science communicators could be less at risk for the envy syndrome than pure scientists and researchers. Note in Fig. 2 that professors' and teachers' images appear warmer than those of scientists and researchers. Scientists whose job involves teaching and communicating may seem warmer and more trustworthy, seeming to show worthy intentions. Audiences as spontaneous intent detectors may attend to the apparently trustworthy goals of teaching (professors) and caring (doctors).

Climate Scientists' Presumed Agendas

Focusing in on our case study of scientific communication, we asked another online sample of adults to describe public attitudes toward climate scientists specifically, to provide a clearer picture of the public's apparently mixed feelings (see *SI text*). On a seven-item scale of distrust, climate scientists averaged a distrust mean of 2.16 (below the midpoint on a five-point scale). For the most part, distrust of climate scientists runs low, but not at the floor of the scale. And of course, responses vary, with some more distrustful than others.

The slight distrust toward climate scientists might seem to contradict the earlier data showing that scientists seem less warm than many other job holders. However, the current result is open to different interpretations. First, this result reflects rating climate scientists *per se*, who might be viewed more positively than generic scientists. Second, climate scientists are rated here in isolation from judging other groups, and absolute ratings (here) may differ from relative ones (the earlier data). Third, this is a scale of distrust, not trust (as before), and participants tend to avoid rating other people negatively as individuals (19). The more individuated (specific) the person, the more reluctant people are to express negativity. Finally, the seven items on this scale differ from the two items on the earlier scale (*SI text*). So strictly speaking, this result says that climate scientists by themselves are distrusted less than the distrust-scale midpoint, whereas the earlier result says that generic scientists are trusted about at the warmth/trustworthiness-scale midpoint. People are inclined to trust other people on average, usually scoring above a positive scale's midpoint (18, 19), so neither result is cause for celebration.

In these ratings of climate scientists (all items being derived from pilot work on scientists' alleged motives), the seven survey items reflecting distrust include alleged motives to lie with statistics, complicate a simple story, show superiority, gain research

money, pursue a liberal agenda, provoke the public, and hurt big corporations. Among these individual distrust items, the only one averaging above the midpoint—gain research money ($M = 3.58$)—stands out as the Achilles' heel: the public's clearest reported reason to distrust climate scientists' motives. Nevertheless, none of the distrust ratings are at the floor.

Turning to the scale of reasons to trust, climate scientists seem to fare well, at least among this online sample (which is slightly better educated, slightly more liberal than the US population). On a three-item, five-point scale of trust, climate scientists averaged 4.35 on motives to educate the public, save humanity, and save the environment. Clearly, these reasons for trust suggest a constructive approach to the public, balancing expertise (competence) with trustworthiness (warmth), together facilitating communicator credibility.

The literature on climate science communicators supports these recommendations to focus on trust-inducing approaches such as education, humanity, and the environment. The public tends to trusts impartiality, rather than persuasive agendas (38). Although scientific communicators may stress persuasion, deliberation would be better (39). Communicating uncertainty is essential to building credibility (40, 41), and trust best predicts attention to scientific experts (42).

The road to communicating climate science starts with some advantages. As noted, the public does have some knowledge. Regarding climate change, the current public mostly understands the changes, understands humanity's role, and advocates changing emissions standards (43, 44). Climate science communicators have effectively conveyed much evidence, which should encourage their continuing to educate and communicate. Our data additionally suggest conveying trustworthy motives as well as expert information.

Conclusions

Science communication, like other communication, needs to convey communicator warmth/trustworthiness as well as competence/expertise, to be credible. People's attitudes' combine cognition and affect, that is, beliefs and values. Hence, communicator credibility needs to address both expertise and trustworthiness.

Our illustrative data are limited by not being a representative sample. Nevertheless, they suggest that scientists may have the respect, but not necessarily the trust of the public. This gap can be filled, we suggest, by showing concern for humanity and the environment. Rather than persuading, we and our audiences are better served by discussing, teaching, and sharing information, to convey trustworthy intentions.

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