Susanna Priest, Jean Goodwin & Michael Dahlstrom (Eds.), Ethics and practice in science communication. University of Chicago Press, 2018.

1

Effective Because Ethical: Speech Act Theory as a Framework for Scientists' Communication

JEAN GOODWIN

Whenever we open our mouths, pick up a pen, or flip up the laptop to start typing, we draw on assumptions about how communication works. These assumptions guide us as we try to figure out what we are going to say and how we are going to say it. Although they usually aren't made explicit, worked out systematically, or grounded in evidence beyond personal experience, these assumptions could be thought of as our personal "models" or "theories" of communication.

The English language has one such theory built into its very vocabulary. Consider phrases like *put* ideas *into* words; *pack* more thought *into* fewer words; thought *content*; *get* an idea *across*; *convey* ideas; make sure the meaning *comes through*; *get* meaning *out of* words; *extract* meaning. These and other ordinary ways of talking about communication reflect what has been called the "conduit" (Reddy, 1979) or "transmission" model of communication. This model invites us to think of communication as primarily information transfer. A communicator is imagined to be packing an idea-object into a suitable linguistic container and sending the package through an appropriate medium (conduit) to the receiver, who then is supposed to unpack the container and add the idea-object to his mental store. This view has been elaborated in explicit communication theory, most famously in Shannon and Weaver's early transmission model (see Shannon & Weaver, 1949). But it is more widespread as an implicit mental model or folk theory. In particular, the conduit model of communication in general becomes the infamous *deficit model* when applied to the communication of science: the constantly reemerging, generally unstated assumption that the main task facing a scientist communicating with a nonexpert audience is to put her knowledge into understandable and interesting words in order to fill an audience's mental void.

As noted in the introduction, the failings of the deficit model of science communication are many and long understood. Of particular interest to readers of this volume, the deficit model follows its parent conduit model in being ethically impoverished. Both models imply that the communicator has only the limited ethical responsibility of making sure that the transmission system works. She is responsible for choosing packaging that will make it through the conduit and be frustration-free for the audience to open. We might summarize this by saying that under conduit/deficit assumptions, a scientist is communicating *ethically* if she is communicating *effectively*. Beyond this core duty to be an effective transmitter, she has no particular responsibilities to receivers, who are imagined in this approach to play only a passive role.

But is this all a scientist is responsible for? Wynne's classic case study (1989) showed how real audiences react when they are treated as empty-headed unpackers. Scientists who communicated about the dangers of Chernobyl fallout in the Lakes region of Great Britain succeeded mostly in generating distrust among affected sheep farmers because of failures of respect. The scientists didn't try to find out what the farmers knew about the locale, didn't consult farmers about how plans would impact their interests and practices, and didn't consider the troubled history of prior interactions between scientists and farmers. "Distrust" and "disrespect": these are ethically freighted words. Their presence reveals that there are ethical dimensions to science communication that go beyond the assumptions of the deficit model.

Many have called for replacing communication based on deficit model assumptions with approaches that emphasize dialogue or engagement between scientists and nonexpert audiences. While the ideals expressed in such calls are legitimate, one difficulty is that "dialogue" and "engagement" do not provide alternatives to the straightforward, intuitively compelling vision that the conduit model offers. "Dialoguing" just isn't as vivid as packing and unpacking, and ordinary English doesn't give us many metaphors for "engagement." So even scientists and science communication professionals who aim higher tend to find deficit model assumptions sneaking back unrecognized into their theories and practices (Brossard & Lewenstein, 2010; Davies, 2008; Wynne, 2006).

In order to stop reinventing the deficit model and to realize the promise of engagement, we need to cultivate a different set of assumptions—a different folk theory of communication. This alternative viewpoint needs to respect the audience's active role in communication; needs to allow for the development of a richer communication ethics; needs to fulfill the hopes ex-

pressed in talk of dialogue and engagement; and needs to be grounded in ordinary intuitions about how communication works. In the remainder of this chapter, I sketch how a perhaps surprising candidate—the philosophical theory of speech acts—can fulfill these four goals. A "speech act" is communication that in itself accomplishes a specific action, such as making a promise or lodging a complaint. As we will see, thinking of science communication as taking place through speech acts encourages us to pay attention to the ethics of communication.

In the following section, I summarize an interdisciplinary body of scholarship that draws inspiration from philosopher Paul Grice's original work, and show how speech act theory provides a general conception of communication that emphasizes the communicator's ethical responsibilities toward an active audience. I next demonstrate the power of speech act theory by using it to provide accounts of four quite different speech acts of special relevance to scientists contributing to public discussions: *exercising authority, reporting, advising,* and *advocating.* I close with a brief summary of the progress made, and a comparison of the speech act approach with the deficit model. In particular, I will wrap up by justifying my title: in the reverse of the view implicit in the deficit model, in the speech act approach science communication is only *effective* because it is *ethical.*

Speech Act Theory

To develop an alternative conception of communication, a good place to start is by considering what would happen if we allotted the receiver in the conduit model—that is, the audience—a more active role in the communication process. The conduit model assigns the audience the task of unpacking the message and adding it to their mental storehouse. But now let's give audience members some power: let's assume they are *autonomous* (they think and decide for themselves, relatively independent of outside influences) *agents* (they can make choices and do things that affect the world). Autonomous agency in the conduit model will become most apparent when the audience acts "badly" and interrupts the smooth transmission of information. For example: perhaps the audience refuses delivery of the message, or, on receipt, immediately tosses it in the trash.

These are not unusual ways to treat incoming messages. We do in fact dump junk mail in the basket right by the front door, fast forward through commercials, pay no attention to the flyers on the wall, and so on. Even when we invest attention, we often reject what salespeople, politicians, and pundits

say. We even resist messages from those who have our interests at heart—our doctors, family members, or colleagues—when we don't like what they are telling us.

The conduit model invites us to take the transmission mechanism as just a given, with the main job of communication to be clearing away obstructions to it. To develop a better model of how communication manages to work, even facing an audience of autonomous and perhaps recalcitrant agents, we need to strip away this "given" status. We need to ask: what reasons does an audience have for paying attention at all, and if they pay attention, for trusting the quality of the message someone else is pushing on them?

Speech act theory offers an answer to these questions. In the approach to speech act theory developed by Grice (1957, 1969), extended by Stampe (1967), and applied to public discourse by Kauffeld (1998, 2001a, 2002, 2003, 2009), communication is fundamentally an *act*: something a communicator does with a reasonable expectation that it will change the world in some way.[1] Although we can use communication artifacts to change the physical world—like when we stack books to prop up a shelf—in general, communication does its work by affecting other people. These other people are presumed to be just as much agents as the communicator herself. They will only be willing to be affected by a message if they have good reasons to do so. Thus a key task facing any communicator is to provide her audience such good reasons for accepting her communication—that is, for trusting what she says. And the main way she accomplishes this is by openly taking responsibility for the quality of her message. Here is how it works.

Consider the very basic speech act of *saying* something. A communicator puts forward a sentence to an audience—for example, "Glucosamine pills help with the pain of knee arthritis."[2] We assume that it's not given that the audience will trust her. After all, believing is risky for the audience: the communicator could be mistaken or even lying (maybe she's a shill for a supplement manufacturer). Perhaps the audience has already heard of a study that found glucosamine no better than a placebo. Can they be confident that the communicator has put in the time and effort to verify her statement? Is she

1. Speech act theory originated in the work of Austin (1962), whose compelling argument that utterances do much more than just assert information opened the new field. For general overviews, see Green (2014) and Kauffeld (2001b).

2. The term "speech act" suggests that the communication is oral and my examples may have an oral flavor—I am a teacher of public speaking, after all. But in fact speech act theory aims to cover communication in any medium: oral, written, electronic, visual, and those yet to be invented.

lazy, negligent, or careless? In sum, the audience has plenty of good reasons to distrust what the communicator is saying—to resist it, to be recalcitrant.

Notice, however, that it's not just audience that may be getting into trouble. The communicator is also running a risk. In general, people are responsible for what they do intentionally. When she says something about the health benefits of glucosamine, the communicator intends the audience to believe it. She has thus made herself responsible for that belief; she is blameworthy if that belief is of poor quality, i.e., false. Furthermore, she's soliciting the audience's belief *openly*. If it turns out that glucosamine is ineffective, she won't be able to avoid criticism for lying or negligence; because she was open about her intention, she can't really wriggle out with excuses like "I didn't really mean it—I was just speaking offhand, mentioning something I read online somewhere—I didn't expect you to take me seriously." The fact that she is openly seeking belief thus ensures that the audience will be able to hold her responsible if what she says turns out to be wrong.[3]

Communication thus begins to look like a lose-lose situation: both communicator and audience are running a risk that the exchange will go badly wrong. The audience risks believing something false; the communicator risks being responsible for that false belief. But the communicator's vulnerability to criticism actually opens a way out of the apparent deadlock. The audience can reason as follows: (1) The communicator knows she is running a risk when she openly tries to get us to believe what she says. If her information about glucosamine turns out to be false, we can now hold her responsible. (2) She's a reasonable person; we can presume that she wouldn't put her good name at risk like this—with us, or even with herself—unless she was confident that the risk she faces is low. She must know that that she isn't lying and

3. Those who want to trace speech act theory back to its philosophical roots will find that the summary is an ordinary language rephrasing of the analysis developed by Grice, viz. S(peaker) will have said (and meant) that p, only if S produced an utterance U to A(uditor) with the following complex intention:

(I1) S intends that A respond (R) that p (e.g., they believe that p).
(I2) S intends that A recognize I1.
(I3) S intends that A recognize I2.
(I4) S intends that A's recognition of I1 and I2 provide A with at least part of A's reason for Ring that p.

As Stampe (1967) explains, in I2, S takes responsibility for inducing A to R. In I3, S takes this responsibility *openly,* thereby putting herself in a position not just to *be* responsible, but to be *held* so. This ability to hold responsible is what gives A a reason for his response, i.e., justifies I4.

hasn't cut corners in figuring out what glucosamine will do. (3) So if she's confident that the risk she faces is low, we can be confident that the risk is low for us as well.

The responsibility for the truth that the communicator has undertaken in saying something to the audience makes her vulnerable, and her open acceptance of that vulnerability gives her audience a good reason to trust what she is saying. To put it even more simply, in saying something seriously a communicator is not just transmitting information; she is transmitting information together with a personal guarantee of its truth. Her guarantee serves to alter the "social and moral order" (Kauffeld, 2001b); it changes the world just as effectively as a physical act like a hug. It creates, or at least enhances, a relationship between communicator and audience—a relationship in which the communicator is now responsible for speaking the truth, and the audience has a good reason to count on her to do so.

Saying is only the most basic among a very large set of speech acts. As we will see in more detail in the following section, a communicator's simple guarantee may not provide her audience with a good enough reason to satisfy their legitimate distrust. In such cases, the communicator will need to take on additional responsibilities to meet their additional concerns. Each such package of responsibilities constitutes a distinct speech act. Ordinary English has names for many: *promising*, *accusing*, *requesting*, *complaining*, *proposing*, *apologizing*, *commanding*, *thanking*, *warning*, and *challenging*, to mention only a few of the nearly one thousand verbs referring to things we can do with words (Verschueren, 1985). Despite this variety, the overall moral of speech act theory is simple: whenever you open your mouth to speak, you are opening a hole perfectly sized to fit a particular foot. Your audience can trust you to make sure that that foot gets nowhere near it.

It should be apparent that the fundamental view of communication put forward in this approach corrects two of the unfortunate features of the conduit model. Speech act theory positions audience members as autonomous agents in the communication process. It legitimates as reasonable their unwillingness to be passive recipients of information that's sent their way. All communication must be designed to respect the audience's right to think and decide for themselves, by providing them good reasons to trust what is being conveyed. Speech act theory also shows that communication effectiveness is grounded in communication ethics. In performing a speech act, a communicator undertakes responsibilities to her audience. She thereby sets up ethical standards for herself that she then has to meet, or else face criticism. It is precisely her vulnerability to ethical criticism that gives her audience good reason to trust her. Thus where the conduit model tells communicators to

wrap their messages up in durable and attractive packaging in order to make sure they slide through the conduit with ease, speech act theory tells communicators to establish ethically sound relationships with audiences in order to make sure their messages deserve their audiences' trust.

If speech act theory provides an account of communication in general that is better than the conduit model, there is hope that it will also help us understand the communication of science in particular better than the deficit model does. In the following section, I take up four speech acts that have historically been of special relevance to scientists who want to contribute their knowledge to the public, especially in potentially controversial decision-making contexts: the acts of *exercising authority*, *reporting*, *advising*, and *advocating*. Table 1.1 offers a preliminary road map.

For each speech act, I draw from previous work on communication in policy controversies to clarify the ordinary situation that calls for the particular speech act and the reasons audiences have for distrust. I then explain the specific responsibility the scientist-communicator must undertake to create a good reason for trust, and sketch briefly how she can design her communication to live up to that responsibility, illustrated with an example. Finally, for each I note ways in which the transaction between communicator and audience can be extended beyond a one-time speech act to con-

TABLE 1.1. Some Speech Acts Characteristic of Scientist/Public Communication

Typical Situation	*Audience's Reasonable Doubt*	*Communicator Undertakes Responsibility . . .*	*Speech Act*	*Some Typical Communication Features*
The audience doesn't know something; the communicator does.	Is the communicator speaking within her field of expertise?	to speak as an expert—and only as an expert.	*exercising authority*	hedging: limitations, caveats, and uncertainties
The audience needs to understand a subject; the communicator is in a position to help.	Is the communicator adapting to our needs?	to empower the audience to assimilate the subject on their own.	*reporting*	a document designed to be explored and tested
The audience is making a decision but has a limited view; the communicator has a wider perspective.	Is the communicator meddling in our affairs?	to help the audience with their concerns.	*advising*	avoid telling; focus on audience's concerns, suppressing one's own
The audience needs to think through a matter; the communicator wants them to reach a particular conclusion.	Is the communicator trying to manipulate us?	to make the strongest possible case.	*advocating*	arguments, including counter-arguments against the always-present other side

stitute something more like an ongoing engagement between scientists and citizens.

Applications: Scientist Communicators and Decision-Making Audiences

EXERCISING AUTHORITY

The ordinary situation that leads to *exercising authority*[4] (Goodwin, 2001, 2010, 2011, 2015; Goodwin & Dahlstrom, 2013) is straightforward and ubiquitous. Non-experts need to know something. The scientist, an expert in her field, knows it. Therefore the scientist conveys her expert judgment, in order to fulfill the audience's need.

The central challenge of exercising authority is equally straightforward and ubiquitous: Audiences just don't like being subject to authority. The psychological theory of reactance suggests that people respond negatively when someone threatens to limit freedom of choice, with anger toward the source and counter-arguing against the message (Dillard & Shen, 2005). The more forceful the threat, the stronger the negative reaction. A scientist can exercise a compulsive force; when she announces her judgment, her non-expert audience really can't speak against it. So it is no surprise to find audiences recalcitrant in the face of messages from experts.

Still, it seems unreasonable for an audience to resist a scientist's judgment—especially when that very audience is paying to support the scientist as she gains and extends her expertise. But an audience can have legitimate concerns, over and above the natural tendency to resist being pushed around. The non-expert is in no position to assess the soundness of the expert's judgment. Or to be more exact, the non-expert *could* gain the capacity to assess expert judgment, but only by becoming an expert himself—something that's far too time-consuming to be worthwhile. This means that the non-expert is at the expert's mercy. The expert may be exercising an illegitimate authority by speaking outside of her field of expertise, either inadvertently or in a self-interested way. Unless the field difference is obvious (e.g., when chemist Linus Pauling promoted vitamin C as a cancer therapy), non-experts are unlikely to be able to catch the expert out. Critical thinking textbooks teach nascent citizens to question authority; they are right.

To meet these reasonable doubts, a communicator in exercising authority

4. That is, *epistemic* (knowledge-based) authority, in contrast to the authority police officers, judges, customs officials, etc., have to give commands; see Goodwin (1998).

undertakes responsibility not just to speak the truth, but also to speak the truth *as an expert*: in her expert role, within her field of expertise. She stakes her reputation as an expert on the soundness of what she is saying. By taking responsibility in this way, the expert opens herself to the risk of losing—or at least, undermining—her status as an expert if what she says turns out to be wrong. Her audience can presume that she would not rashly put her expert status at risk, and can conclude that she is being careful to stay within the bounds of her expertise. The expert's undertaking of responsibility to speak as an expert thus gives her audience reason to trust.

The basic attitude of an expert exercising her authority thus must be "with great power comes great responsibility." And furthermore, with great responsibility comes the potential for great trouble. The expert's sense of responsibility often shows up in her attempts to manage the trouble she may be getting herself into. The exercise of authority is perhaps paradoxically characterized by self-restraint, by phrases such as "no, it's more complicated . . . ," "yes, but on the other hand . . . ," or "we're not *sure*, although. . . ." These and similar caveats, limitations, and declarations of uncertainty are often thought to be carry-overs from scientific prose, unnecessary in public discourse. Instead, the account sketched here suggests that they are vital features of an exercise of authority. When the expert hedges, she shows that she is conscious of the heavy responsibility she is undertaking in speaking authoritatively, and is trying to limit that responsibility to just the matters she is most sure of.

Clear examples of exercising authority abound in health communication. The simultaneous growth of medical knowledge and of the internet has put many of us in the position of being avid yet reasonably skeptical seekers of authoritative information. Cochrane Reviews synthesize the best evidence on the effectiveness of interventions for expert audiences; their attached plain language summaries for non-experts are well designed to survive public skepticism. Both expert and non-expert audiences receive the same mix of judgments and caveats. A plain language summary starts by advancing authoritative statements like this recent one: "Water fluoridation is effective at reducing levels of tooth decay among children" (Iheozor-Ejiofor et al., 2015). But the summary carefully goes on to note that there was "insufficient information" about differential impacts of fluoridation on poorer and more affluent children, there were no studies of the effectiveness of fluoridation for adults, and the presence of methodological problems in virtually all the studies "makes it difficult to be confident of the size of the effects of water fluoridation on tooth decay." It might appear paradoxical: we trust the judgment *more* because its potential weaknesses are made apparent. But the Review's

emphasis on its own limitations confirms our sense that the experts are aware of their responsibility to us, giving us good reason to trust them.[5]

The *exercise of authority* does not necessarily promote an ongoing dialogue between a scientist and her non-expert audience; she may simply announce her view, and then the transaction is done. But at times, one successful interaction with an expert can lead to another. An audience may at first trust an expert because she undertakes responsibility, and later come to trust her because they have through experience found her to be trustworthy, in what has been called the upwards "escalator of increasing trust" (Ensminger, 2001). Interactions begun with carefully managed responsibilities can lead to more open relationships, in which the expert may be able to drop the caveats without losing her audience's trust. Ideally, each of us will experience this with our healthcare professionals.

REPORTING

In the ordinary situation that leads to *reporting* (Kauffeld, 2012), a group (or individual) needs to understand some subject, likely because it is relevant to some judgment or decision they need to make. They aren't experts in the subject. They know they don't know, and thus are interested in being informed. That sounds relatively promising: unlike other audiences, the audience of a report is open to what is said. Reports are commonly solicited—audiences invite experts to draft reports, in a way that they may not invite advocacy or even advice.

Nevertheless there are challenges in making reporting work. The expert is being consulted because she is recognized as knowledgeable. But that very status can lead her audience to doubt whether listening to her will prove worth the effort. The audience may be legitimately concerned that the expert hasn't adapted her discourse to their needs. Perhaps the material provided will be too technical, or in an unfamiliar form, so they won't be able to un-

5. I am arguing that communicating uncertainties helps scientists meet the responsibilities they undertake when exercising authority. But will such hedges lead lay audiences to misinterpret the science being communicated? The empirical work on this question is limited and has shown mixed results. For example, there is some evidence that audiences do take advantage of poorly communicated uncertainties to "spin" results to support their preexisting beliefs (Dieckmann, Gregory, Peters, & Hartman, 2016). But at the same time, other work suggests that audiences are skeptical of strongly worded assertions, suspecting them of oversimplification (Winter, Krämer, Rösner, & Neubaum, 2015). Overall, empirical studies provide confidence that lay audiences are able to understand well-communicated scientific uncertainties (Fischhoff, 2012; Fischoff & Davis, 2014).

derstand it. Perhaps there will be too much material, which would waste their time—or too little, leaving them with only a partial view. Worse, the audience may fear that they won't even be able to tell whether the expert is being mis-, over-, or under-informative; not being experts themselves, they don't know enough about the subject to evaluate the accuracy or completeness of what she is saying. All of these are reasons for the audience to ignore, distrust, or even reject the material they themselves invited.

To meet these reasonable doubts, a communicator in reporting undertakes responsibility not just to provide accurate information, but also to do so in a way that will empower the audience to think the subject through for themselves. The reporter commits herself to presenting information that her audience will find accessible, that will put her audience in a position to appropriate the material for their own purposes, and even that will help her audience evaluate the report itself. In making a report, an expert undertakes responsibility to enable an audience to exercise their critical thinking skills, and allows—indeed invites—the audience to turn those skills back on her report. This undertaking gives her audience good reason to believe that the expert's report is adapted to their needs, thus giving them grounds to receive, consider, and trust it.

Reports are designed to fulfill this complex of responsibilities. A generic report has a "pyramidal" structure that allows the audience to go as much in depth as they care to—or as little. A report commonly opens with a brief summary of the most important points; the audience may find that this on its own is enough for their needs. If not, the body of the report develops the material at greater length, helping the audience assess the results by being open about the sources and methods used as well as potential limitations. A report also tends to have multiple roadmaps the audience can consult to find their way through the information: at least a detailed table of contents and cross-referencing between sections, and possibly an index, a glossary, or a bibliography of sources for still further exploration. Even if the report puts forward one conclusion as the best expert judgment of the reporters, considerations on all sides are raised and treated fairly, and sometimes dissenters are even allowed their own sections. To use the term suggested by McKaughan and Elliott (chapter 10, this volume), a good report will "backtrack," identifying all the values, interpretations, and frames relevant to the subject—both the ones the authors rely on as well as alternative viewpoints. All these textual features help the audience follow their own interests and assess for themselves the material being reported. Unlike an advocate's brief, which presses linearly toward one conclusion, a good report empowers each audience member to explore the subject in their own way.

The massive work products of the Intergovernmental Panel on Climate Change show how a good report affords self-directed assimilation and critical testing. It is unlikely that anyone would sit down to read the 1535 large-sized pages of the *Physical Sciences Basis* volume of the Fifth Assessment Report (IPCC, 2013). Instead, a reader is invited to start with the 29-page Summary for Policymakers (SPM). Those curious can go on to the 83-page Technical Summary, which "serves as a starting point for those readers who seek the full information on more specific topics covered by this assessment" by linking the conclusions of the SPM to specific sections of the fourteen chapters that make up the bulk of the report itself. Each chapter mirrors this organization, having its own table of contents, initial executive summary, and detailed discussion. The report facilitates critical evaluation by pointing out major uncertainties in the Technical Summary, by detailing limitations and uncertainties throughout, and by inviting frequently asked questions. Additional sources and data are available on the IPCC website for readers who want to test the report's conclusions in even more detail. Overall, the report acts as a sort of miniature universe, allowing non-expert readers to explore independently the evidence, theories, and controversies that make up our current understanding of climate change.

Although our attention in acts of reporting is often focused on the single, generally written, artifact that is issued—the report itself—in practice, the reporter's responsibility to the audience often plays out over an extended process. Since a central challenge of a report is that the audience doesn't quite know what it needs to know, the contents of the report are often the subject of an ongoing conversation between the reporter and the audience. In these conversations the goal or focus of the report is negotiated, helping both sides become more clear about what is wanted. The IPCC reports, for example, start with a series of meetings between experts and officials from participating countries to set the scope of the report, and they end with a similar series where the findings are approved, sometimes line by line. The ongoing conversation between reporters and audience can lead to a somewhat ironic result: Despite all the work that goes into them, many reports are never read, or at least not read beyond the executive summary. The process through which the report was created, more than the report itself, may be what helps the audience learn what they need to know. With that assurance, the audience can rely on the final product as an authoritative expert statement, and move on to carry on the affairs they wanted the report for.

ADVISING

In the ordinary situation that leads to *advising* (Kauffeld, 1999), a group (or individual) faces a decision about what to do. In general, a person is responsible for making up his own mind about matters that concern him; people hold themselves out to be autonomous, critical thinkers. Sometimes, however, a person lacks the breadth of perspective needed to make a decision wisely. An advisor hopes to remedy that situation. Often the audience knows that they lack perspective, and actively seeks out advice. At times, however, the lack of perspective extends to self-knowledge as well: The audience doesn't know that they don't know enough. In that case, the advisor may find herself thrusting advice on them.

In either case, the central challenge of advising comes from the fact that the advice is offered from outside. When an individual or group makes a decision, one of the most important features of that decision is that it is *theirs*: It is grounded in their concerns and is something they will have to live with. But advice is offered by *another.* The audience may have legitimate doubts about whether that other is taking their concerns into account. They may suspect the advice is really being offered for the advisor's own benefit. Or they may think that the advisor hasn't bothered to understand their point of view—that she arrogantly believes that she understands the audience's concerns better than they do themselves. In contrast to reporting, which is made difficult by the gap in understanding between reporter and audience, advising is made difficult by the potential for a gap in values between advisor and audience. Advice, including expert advice, can always be taken as intrusive meddling in another's affairs; even when the advice is good, it can deserve the response that "this is none of your business!"

To meet these reasonable doubts, in advising a communicator undertakes responsibility to help the audience determine what to do *about their own concerns.* She commits herself to addressing the decision not from her point of view, but from theirs. By taking responsibility in this way, the advisor opens herself to criticism if she fails to orient herself to her audience's perspective. Her audience can presume that she wouldn't rashly put herself thus at risk, and can conclude that she has given their concerns thoughtful consideration. The advisor's undertaking of responsibility to contribute to their concerns thus gives her audience reason to trust that she isn't just meddling, but is trying to contribute something that she reasonably believes the audience will find useful.

Undertaking the central responsibility of advising places significant limits on the advisor. An advisor will often find that there are many things that she

can't say because they spring from her own perspective, not that of her audience. The experience may be familiar: A student comes in with two ideas for a project. One of them is conspicuously better than the other. But the teacher can't tell him that, because more important than the student choosing the *right topic* is the *student* choosing the right topic. It has to be *his* project. At best, the teacher can lay out the leading considerations (has the topic been done to death? can it be completed in the time available?) and nudge the student to see what is (to the teacher) obvious.

Agricultural extension services in the United States have developed successful advising mechanisms aimed at some of the world's most stubborn advisees: farmers. Extension personnel mediate between university-based researchers and the farmers who could benefit from innovations. They have learned from a century of experience that simply telling farmers what to do is ineffective, even when the answer is clear. Farmers are rightly convinced that they know their own operations—their own land and practices—better than any outside expert ever could. Extension advice is thus better offered through *showing* rather than *telling*, in events like field days where farmers can be given a guided tour of a new farming practice on an experimental plot managed by the university and/or another farmer. The field day not only conveys information, it opens opportunities for the farmer to express his concerns: to ask questions and point out differences between his operation and the one he is seeing. While the extension personnel design the framework for the event, at a good field day much of the communication is driven by the concerns the audience expresses. The audience, more than the advisor, is positioned as the agent.

Advice does not necessarily open the way to an ongoing conversation between the advisor and the audience. Indeed, it may be most appropriate for the advisor to offer the advice and then step back to leave room for the audience to make their own decisions. But at times, an "advising situation" demands a more extended engagement between communicator and audience. In order to credibly claim to be addressing the audience's own concerns, the communicator has to know what those concerns are. Thus a good advisor will often start by long and deep listening to the audience she hopes to serve. This is certainly the case for agricultural extension, where locally based personnel commit themselves to meeting the community's needs over the long haul.

ADVOCATING

In the ordinary situation that leads to *advocating* (Goodwin, 2012, 2013, 2014), the advocate sees that there is something wrong or missing in others' be-

liefs, attitudes, or decisions. She therefore undertakes to remedy that problem by persuading her audience to pay attention to something, think about it, change their beliefs or attitudes about it, and/or change their intentions toward it. In contrast to advising, which aims to help the audience make *their* own decision, in advocating the communicator aims to induce the audience to make the decision *she* knows is right (Pielke, 2007).

Here's the challenge: As before, audiences don't like being subjected to persuasion. When her audience detects that she is trying to influence them, they are likely to resist her attempts to limit their autonomy and restrict their freedom of choice. The fact that she thinks a decision is right doesn't bear much weight for others; they can legitimately distrust her motives in trying to bend them to her will. Any communicator who sets out to persuade is likely to encounter an audience concerned about being manipulated.

Communicators have two ways of meeting this challenge. The first is to try to hide advocacy under the cover of some less invasive undertaking. The advocate hopes that her advocacy may pass unnoticed, so audience reactance may not be triggered. One obvious problem with this approach is that it is often unethical: the communicator who tries to sneak "stealth advocacy" (Pielke, 2007) into her report (for example) will not be living up to her responsibilities as an advisor, since she will be arguing on the basis of *her* concerns, not those of her audience. Gaither and Sinclair (chapter 8, this volume) demonstrate similar ethical problems when corporate advocacy is hidden under cover of alleged reports on environmental topics. The sneaky approach is also simply unlikely to work. We have seen already that audiences are on the lookout for the covert attempts to persuade hidden under the cover of authority or advice. Especially in a culture like ours, saturated with attempts to sell products and persons, audiences are skilled in detecting and repelling attempts to meddle with their minds. If anything, audiences may be *over*-sensitive to persuasion, rejecting legitimate advice or appropriate reports because of suspicions of hidden manipulative intent. And if the audience does not call out the stealth advocacy, it is likely that advocates on the other side will. Over the long term, unethical covert advocacy is unlikely to persuade, but likely instead to get the advocate into trouble.

The prudent communicator will therefore pursue a non-sneaky approach, being open about her intent to persuade. But why should she expect her audience to be open to *being* persuaded? To understand how advocates can gain audiences, it's useful as usual to switch perspectives and consider why an audience might find advocacy worthwhile. As we have seen in the discussions of previous speech acts, audiences often know they need the benefit of others' knowledge and perspectives. It also happens that audiences realize they need

to benefit from others' *reasoning*. When facing a difficult judgment, there are often many things to think about. But the reasoning process is time-consuming and laborious; sources of information have to be identified and assessed, a large amount of information has to be collected and analyzed, and the results need to be organized to identify lines of reasoning pro and con (or on multiple sides)—all this before the considerations are finally weighed and a judgment reached. Worse, this arduous process often takes place in an environment that is already crowded with competing communications, saturated with misinformation, partial truths, and contradictory reasoning. It would be very convenient if somehow a chunk of the cognitive labor involved could be outsourced to others who are competent to do it and motivated to do it well. If other people would take responsibility for sorting through the mess and synthesizing the best reasons for and against a particular judgment, then the audience would only have to review their work-product and make the final judgment: a still-challenging, but much less time-consuming, task.

The advocate can thus earn an audience's attention by accepting the job of "outsourced" reasoning: by taking responsibility for making the best possible case for her position. If she fails to develop strong arguments, she can be criticized not just for being ineffective, but for the more serious offense of failing to live up to her ethical responsibilities. The advocate's undertaking of responsibility thus provides her audience good reason to listen to the advocate and grant her a limited trust: to trust her to defend her position as zealously as she can.

Early rhetorical manuals, back in Cicero's Rome, recognized that the first rule of advocacy is to know what you are talking about. Thus scientists and other experts start off well positioned to become outstanding advocates. The practice of science is also quite argumentative, which should prepare scientists for the tasks of analyzing evidence, synthesizing reasons, and presenting the whole case clearly to the audience. Perhaps the most challenging feature of advocacy for a scientist will be finding that she will not be accepted as an authoritative voice. Advocacy is outsourced reasoning, but it is also openly partisan—an advocate presents reasoning for *one* position. Prudent audiences will thus always "hire" multiple advocates, who together generate the strongest reasons both pro and con (or on all sides). Of the full alphabet of possible considerations, if one advocate presents arguments A, B, and C, and her opponent X, Y, and Z, the audience can be reasonably assured that arguments M, N, and O aren't worth considering. But this means that a scientist-advocate may find herself in an uncomfortable position. Her arguments, likely based in her best scientific judgment, *will* be contradicted by another advocate—possibly an advocate without her excellent credentials. As an ad-

vocate, she cannot block even specious counter-arguments by simply saying "that's wrong—I'm the expert, I know"; she is obliged to keep on arguing.

Bill Nye has recently transitioned from science education to open advocacy for the theory of evolution, with a book, numerous public statements, and a much-watched debate with a prominent creationist. He is conspicuously fulfilling the advocate's basic responsibility: arguing enthusiastically and at length, to anyone who will listen.

Nye's campaign also illustrates another feature of advocacy: that it is often an ongoing process, requiring extended engagement with the audience. Changing minds takes time. The opposing side rarely capitulates quickly. So an advocate, even a scientist-advocate, should be pleased when she finds that there is occasion for more arguments to be made.

Conclusion

We see a similar pattern for each of these four speech acts, summarized in table 1.1 above. Communication generally starts when a public needs a scientist and the knowledge, understanding, perspective, or reasoning that she is uniquely equipped to provide (column 1). But the very asymmetry that makes what she says potentially valuable also makes it reasonable for the audience to be cautious in simply accepting it (column 2). The scientist can counter these reasons for distrust with good reasons for trust by openly undertaking a specific responsibility to the audience—by establishing local ethical norms that will guide their relationship (column 3). In undertaking just those responsibilities, the scientist is performing a distinct speech act (column 4). To fulfill the responsibilities she has undertaken, the scientist produces discourse that often has typical, generic features (column 5).

Speech act theory thus shows promise in going beyond the conduit metaphor/deficit model in meeting the four goals itemized in the introduction to this chapter. It provides an account of science communication that respects audience members' agency, giving them active roles in the communication process. It opens the way for a more complex communication ethics, identifying a variety of responsibilities that communicators undertake to meet the demands of different situations. It shows that extended interactions—ongoing dialogue and engagement between scientists and citizens—are often necessary to fulfill these responsibilities. And finally, speech act theory is grounded in ordinary intuitions about how communication works. While the explicit theory is a product of some sophisticated philosophizing (see footnotes 1 and 3), the speech acts that are the objects of the theory are everyday practices. We already know (at least in basic ways) how to exercise authority,

report, advise, and advocate. We also already understand the responsibilities of each of these acts, or at least have a sense of the trouble we can get into as we undertake each one. Speech act theory does not replace our ordinary intuitions about communication; it merely articulates them more fully. This means that science communicators with no special expertise in communication theory already know enough to resist the blandishments of the conduit/deficit model. We just need to switch from asking "how" to asking "what." Whenever we catch ourselves wondering something like "how can I get this idea across—how can I put this complex topic into simpler words?" we can fend off such conduit model thinking and start by asking, "well, what am I trying to do here? Am I taking responsibility for being an advocate, or for giving advice?"

Of all the features of speech act theory, it is its ability to offer a more sophisticated ethics of science communication that makes it relevant to this volume. The deficit model assumes that science communication is ethical if it is effective: the communicator has fulfilled her responsibilities to her audience if she has delivered a well-packaged message. From a speech act perspective, science communication can be effective only if it is ethical: to earn her audience's trust, the communicator must undertake and then fulfill complex and situationally determined responsibilities to her audience. No ethical responsibilities—then no trust and no effective communication.

This aspect of situational determination also means that speech act theory shows promise of being flexibly adaptable to meet diverse communication needs. There is no single ethics of science communication; there are multiple responsibilities scientists can undertake and fulfill. The four acts presented here represent only a sample of approaches designed to deal with recurrent challenges of scientist/public communication. As different challenges arise, speech act theory provides a framework for identifying different ways to manage them. In fact, even these four speech acts can be combined in various ways: experts can issue *advisory reports*, for example, undertaking a dual set of responsibilities. It's worth noting, however, that not all combinations work as well. Some responsibilities are in tension with each other, and thus are difficult to undertake simultaneously. It may be challenging, for example, for a communicator both to insist on her authority and to function as an advocate; the former speech act admits of no reply, but the latter always contemplates the potential for counter-arguments.

I have been able to cover here only a few speech acts, with only a few practical pointers and examples about how they could be carried out; this essay is very far from a manual for scientists on "How to Do Science Communication Speech Acts." I have also focused exclusively on scientists' communication,

not mentioning the communicative activities of others who play vital roles in the circulation of scientific information: media, traditional and new, government officials, politicians, advocates, opinion leaders, and ordinary citizens of all stripes. Still, it is the involvement of *scientists* somewhere in the process that makes science communication what it is. Finally, I have not had room to give accounts of the ways institutions can support—or undermine—the conditions needed to make scientists' speech acts possible. The presence of certain funding mechanisms, for example—governmental or industry—can foster or block trust by making it easier or more difficult for a scientist-advisor to credibly undertake a responsibility to be guided only by her audience's concerns. But in some sense, the institutions in which scientists and their audiences find themselves embedded are just additional contextual factors that have to be managed by speech acts on particular occasions.

The principles of ethical communication are not standards imposed from outside by institutions or other frameworks; these are not tablets of commandments passed down from on high. Instead, I have proposed a way of thinking about ethical responsibilities that shows them to be practically necessary to get communication to work before audiences who reasonably decline to be passive recipients of information. Communication based on a conduit/deficit model approach doesn't work because it doesn't confront the problem of legitimate distrust. As Wynne (2006) has commented,

> It is a contradiction in terms to instrumentalize a relationship which is supposed to be based on trust. It is simply not possible to expect the other in a relationship to trust oneself, if one's assumed objective is to manage and control the other's response. The only thing which one can expect to control, and to take responsibility for, is *one's own trustworthiness.* (pp. 219–220; emphasis in original)

By contrast, speech act theory provides the scientist a repertoire of mechanisms for making conspicuous what is generally the case: that she is worthy of trust. It asks her, though, to spend some time before preparing her effective communication to pause and think *what* she is doing.

References

Austin, J. L. (1962). *How to do things with words.* Oxford, UK: Clarendon Press.

Brossard, D., & Lewenstein, B. V. (2010). A critical appraisal of models of public understanding of science. In L. Kahlor & P. A. Stout (Eds.), *Communicating science: New agendas in communication* (pp. 11–39). New York, NY: Routledge.

Davies, S. R. (2008). Constructing communication: Talking to scientists about talking to the public. *Science Communication, 29*, 413–434.

Dieckmann, N. F., Gregory, R., Peters, E., & Hartman, R. (2016). Seeing what you want to see: How imprecise uncertainty ranges enhance motivated reasoning. *Risk Analysis*. doi:10.1111/risa.12639

Dillard, J. P., & Shen, L. (2005). On the nature of reactance and its role in persuasive health communication. *Communication Monographs, 72*(2), 144–168. doi:10.1080/03637750500111815

Ensminger, J. (2001). Reputations, trust, and the principal agent problem. In K. S. Cook (Ed.), *Trust in society* (pp. 185–201). New York, NY: Russell Sage Foundation.

Fischhoff, B. (2012). Communicating uncertainty: Fulfilling the duty to inform. *Issues in Science and Technology, 28*(4). Retrieved from http://issues.org/28–4/fischhoff/

Fischhoff, B., & Davis, A. L. (2014). Communicating scientific uncertainty. *Proceedings of the National Academy of Sciences, 111*(Suppl. 4), 13664–13671. doi:10.1073/pnas.1317504111

Gaither, B. M., & Sinclair, J. (2018). The ethics and boundaries of industry environmental campaigns. In S. Priest, J. Goodwin, & M. F. Dahlstrom (Eds.), *Ethics and practice in science communication* (pp. 155–174). Chicago, IL: University of Chicago Press.

Goodwin, J. (1998). Forms of authority and the real *ad verecundiam*. *Argumentation, 12*, 267–280.

Goodwin, J. (2001). Cicero's authority. *Philosophy & Rhetoric, 34*, 38–60.

Goodwin, J. (2010). Trust in experts as a principal-agent problem. In C. Reed & C. W. Tindale (Eds.), *Dialectics, dialogue and argumentation: An examination of Douglas Walton's theories of reasoning and argument* (pp. 133–143). London: College.

Goodwin, J. (2011). Accounting for the appeal to the authority of experts. *Argumentation, 25*, 285–296.

Goodwin, J. (2012). What is "responsible advocacy" in science? Good advice. In J. Goodwin (Ed.), *Between scientists & citizens: Proceedings of a conference at Iowa State University, 1–2 June, 2012* (pp. 151–161). Ames, IA: GPSSA.

Goodwin, J. (2013). Norms of advocacy. In D. Mohammed & M. Lewiński (Eds.), *Virtues of argumentation* (pp. 1–18). Windsor, Ontario, Canada: OSSA.

Goodwin, J. (2014). Conceptions of speech acts in the theory and practice of argumentation: A case study of a debate about advocating. *Studies in Logic, Grammar & Rhetoric, 36*, 79–98. doi:10.2478/slgr-2014–0003

Goodwin, J. (2015). Comment exercer une autorité experte? Un scientifique confronté aux Sceptiques [How to exercise expert authority: A case study of a scientist facing *The Sceptics*]. *Argumentation et Analyse du Discourse, 15*. Retrieved from https://aad.revues.org/2035

Goodwin, J., & Dahlstrom, M. F. (2013). Communication strategies for earning trust in climate change debates. *Wiley Interdisciplinary Reviews: Climate Change, 5*(1), 151–160. doi:10.1002/wcc.262

Green, M. S. (2014). Speech acts. In E. N. Zalta (Ed.), *The Stanford encyclopedia of philosophy*. Retrieved from https://plato.stanford.edu/entries/speech-acts/

Grice, H. P. (1957). Meaning. *Philosophical Review, 66*, 377–388.

Grice, H. P. (1969). Utterer's meaning and intention. *Philosophical Review, 78*, 147–177.

Iheozor-Ejiofor, Z., Worthington, H., Walsh, T., O'Malley, L., Clarkson, J., Macey, R., . . . Glenny, A. (2015). Water fluoridation for the prevention of dental caries. *Cochrane Database of Systematic Reviews* (6). doi:10.1002/14651858.CD010856.pub2

IPCC. (2013). Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press, 1535 pp.

Kauffeld, F. J. (1998). Presumptions and the distribution of argumentative burdens in acts of proposing and accusing. *Argumentation, 12*(2), 245–266.

Kauffeld, F. J. (1999). Arguments on the dialectical tier as structured by proposing and advising. In C. W. Tindale, H. V. Hansen, & E. Sveda (Eds.), *Argumentation at the century's turn: Proceedings of the Third OSSA Conference.* St. Catharines, Ontario, Canada: OSSA.

Kauffeld, F. J. (2001a). Argumentation, discourse, and the rationality underlying Grice's analysis of utterance-meaning. In E. T. Nemeth (Ed.), *Cognition in language use: Selected papers from the 7th International Pragmatics Conference* (pp. 149–163). Antwerp, Belgium: International Pragmatics Association.

Kauffeld, F. J. (2001b). Speech acts, utterances as. In T. O. Sloane (Ed.), *Encyclopedia of rhetoric.* Oxford, UK: Oxford University Press.

Kauffeld, F. J. (2002). Grice without the cooperative principle. In H. V. Hansen, C. W. Tindale, J. A. Blair, R. H. Johnson, & R. C. Pinto (Eds.), *Argumentation and its applications.* Windsor, Ontario, Canada: Ontario Society for the Study of Argumentation.

Kauffeld, F. J. (2003). The ordinary practice of presuming and presumption, with special attention to veracity and the burden of proof. In F. H. v. Eemeren, J. A. Blair, C. A. Willard, & F. Snoeck Henkemans (Eds.), *Anyone with a view: Theoretical contributions to the study of argumentation* (pp. 133–146). Dordrecht, the Netherlands: Kluwer.

Kauffeld, F. J. (2009). What are we learning about the arguers' probative obligations. In S. Jacobs (Ed.), *Concerning argument* (pp. 1–31). Washington, DC: National Communication Association.

Kauffeld, F. J. (2012). A pragmatic paradox inherent in expert reports addressed to lay citizens. In J. Goodwin (Ed.), *Between scientists & citizens: Proceedings of a conference at Iowa State University, June 1–2, 2012* (pp. 229–240). Ames, IA: GPSSA.

McKaughan, D. J., & Elliott, K. C. (2018). Just the facts or expert opinion? The backtracking approach to socially responsible science communication. In S. Priest, J. Goodwin, & M. F. Dahlstrom (Eds.), *Ethics and practice in science communication* (pp. 197–213). Chicago, IL: University of Chicago Press.

Pielke, R. A. (2007). *The honest broker: Making sense of science in policy and politics.* Cambridge, UK: Cambridge University Press.

Reddy, M. J. (1979). The conduit metaphor: A case of frame conflict in our language about language. In A. Ortony (Ed.), *Metaphor and thought* (pp. 164–201). Cambridge, UK: Cambridge University Press.

Shannon, C. E., & Weaver, W. (1949). *A mathematical model of communication.* Urbana: University of Illinois Press.

Stampe, D. (1967). *On the acoustic behavior of rational animals.* Photocopy. University of Wisconsin–Madison. Madison, WI.

Verschueren, J. (1985). *What people say they do with words: Prolegomena to an empirical-conceptual approach to linguistic action.* Norwood, NJ: Ablex.

Winter, S., Krämer, N. C., Rösner, L., & Neubaum, G. (2015). Don't keep it (too) simple. *Journal of Language and Social Psychology, 34*(3), 251–272. doi:10.1177/0261927X14555872

Wynne, B. (1989). Sheepfarming after Chernobyl: A case study in communicating scientific information. *Environment, 31*(2), 10–15, 33–39.

Wynne, B. (2006). Public engagement as a means of restoring public trust in science: Hitting the notes, but missing the music? *Public Health Genomics, 9*(3), 211–220.