ORIGINAL ARTICLE

Strategic communication as planned behavior for science and risk communication: A theory-based approach to studying communicator choice

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Abstract
This essay argues that we should treat science and risk communicators' choices about tactics, objectives, and goals as behaviors to advance both research and practice. Doing so allows for a discussion about how to use theories about behavior change and trust-building to help foster more strategic communication choices. The essay also seeks to anticipate and respond to potential arguments against using behavior change theories to encourage more strategic communication choices. We argue that it is possible to use behavior change tactics ethically if those tactics are aimed at increasing the likelihood that all participants in communication—including decisions makers like risk scientists—meaningfully engage with true, relevant information. Under the right conditions, such engagement is what should allow for the development of new knowledge, as well as a range of evidence-based evaluative beliefs, feelings, and frames. Being strategic when making choices about communication should also help with identifying situations in which justice, equity, diversity, or inclusion issues require additional attention. The essay concludes by noting that the difficulty of efficient and effective science and risk communication may require increased emphasis on getting experts such as scientists to collaborate with expert communication advisors. It may also be necessary to increase the capacity of science- and risk-focused communication practitioners.

KEYWORDS
integrated behavior model, integrative model of organizational trust, risk communication, science communication, strategic communication, trustworthiness

1 | INTRODUCTION

Many science and risk communicators inadequately use social science research that would enable evidence-based practice (Jensen & Gerber, 2020). Communication researchers' focus on theory building, rather than application, likely bears some responsibility for the weak uptake of social science. We strongly advocate for more applied communication research, but the current essay also argues that we can use social research to both better understand and shape scientists' communication choices. The essay specifically foregrounds two tentative insights underlying the authors' recent research

into scientists' views about communication and associated efforts to help scientists make strategic, evidence-based communication choices (e.g., Besley et al., 2018, 2020, 2019; Dudo et al., 2021). The essay then expands on these points to describe a theory-driven way to both study and promote strategic science and risk communication decision-making. Put differently, the question this essay seeks to address is as follows: What body of theory could communication strategists or researchers use if they wanted to try to understand and change science and risk communicators' choices? For example, imagine that a communication advisor wanted to get decision makers in a scientific organization to put more

priority on two communication objectives: demonstrating high integrity and self-efficacy. What theory could they use to make these choices more likely?

Our experience in the field and the apparent paucity of research focused on shaping scientists' communication choices is driving our effort to suggest a theory-based way to study and promote evidence-based communication practice. We hope others will both take up the challenge of studying science communicators' choices as well as use our insights to try to (ethically) shape communicators' behaviors. We focus on science and risk communication together because of our sense of the conceptual and academic overlap in the two subfields (Bennett et al., 2021), and we conceptualize ''scientists'' as broadly as possible to include a wide range of people involved in science-based decision-making. An assumption underlying this work is that scientists will often need expert advice from communication researchers and professionals to communicate effectively and we return to this assumption at the end of the essay.

This essay is part of a broader special issue on crisis and risk communication. In providing this essay, we recognize that scientists' communication choices are not the only factor that affect communication decisions, but we would also argue that such decision-making represents one potential place where improvements are possible. Other challenges to improving communication decision-making, including institutional and regulatory barriers, are not directly the subject of this essay.

2 | THE TWO TENTATIVE INSIGHTS

2.1 | First insight: Communication choices are behaviors and can be studied as behaviors

The *first insight* is the recognition that science and risk communication choices *can* be intentional behaviors. Borrowing from the strategic communication literature (Hon, 1998), communication choices include decisions about what long-term behavior-like goals and associated nearer term communication objectives to prioritize, as well as what tactics to use to try and achieve priority objectives (Table 1). We prefer the terms ''behavioral goals'' and "communication objectives" based on the strategy literature but recognize that other terms could be used to differentiate between cognitive and affect outcomes (i.e., communication objectives) and behavioral outcomes (i.e., goals). Many communication choices—and outcomes—are also likely unintentional but a key aspect of strategy is intentionality.

The fact that communication *choices* can be understood as *behaviors* may seem obvious to some, but the key consequence of this fact is that it suggests that anyone who wants to understand and/or improve communication choices (i.e., communication trainers, communication strategists, researchers who study communication) can treat communicators' choices about tactics, objectives, and goals as potential behavioral goals for their own communication efforts. Put differently, communication advisors' goals are often to change

the scientists' communication goals, objectives, and tactics. To our knowledge, few scholars or practitioners have built on this idea (for a review, see Bennett et al., 2019).

Arguably, the most comprehensive model for thinking about behavior change is the Integrated Behavioral Model because it incorporates three specific types of potential communication objectives that various theories have found drive intentional behavior (Fishbein, 2009; Montano & Kasprzyk, 2015). While this model is typically used to study and shape health and environmental behaviors (Armitage & Conner, 2001), it should equally work to study and shape the "choices" that communicators can make about their tactics, objectives, or goals. The Integrated Behavioral Model specifically points to (1) attitudes, (2) perceived norms, and (3) personal agency as key potential drivers of any given behavior. In doing so, it builds on the well-established Theory of Planned Behavior (Ajzen, 1991; Fishbein & Ajzen, 2010), as well as related theories such as the Health Belief Model (Carpenter, 2010). The Protective Action Decision Model (Lindell & Perry, 2012) and the Risk Information Seeking and Processing Model (Yang & Huang, 2019) similarly include many of the same underlying constructs, although often using different terminology.

Perhaps more importantly for shaping behaviors is the fact that the attitudes, norms, and agency are typically understood to exist as the sum of salient evaluative beliefs. The centrality of beliefs to behavior-change models is useful to communicators because beliefs typically have direct analogues with specific types of information that a communicator could seek to promulgate or learn. The abstract concept of an "attitude" as a potential communication objective becomes more concrete when understood and measured in terms of whether someone believes a goal behavior is likely to generate a set of positive or negative feelings for themselves, or produce utility (i.e., perceived risks or benefits perceptions). Such communication is easy to imagine in cases where the behavior is something like wearing a seatbelt. In such a case, a communicator might simply share the affective or cognitive benefits and risks associated with seatbelt wearing ("It'll make you feel safe and lower your risk of injury"). An equivalent example for a communication advisor would be to try to communicate to a scientist that devoting time to citizen discussion at a public meeting might be satisfying, enjoyable, and/or useful. The challenge of affecting such communicative beliefs thus becomes trying to find ways to enable an audience—scientists involved in communication, in the current context—to pay attention to behavior-specific risk or benefit information such that they "receive" and "store" the information for later cognitive retrieval (Petty et al., 1983). Such beliefs can also be termed "evaluative" inasmuch they often include an affective component (e.g., environmental and health risks are often seen as negatives).

Perceived norms are similarly grounded in evaluative beliefs, but the focus is on beliefs about whether key others already perform the goal behavior and whether the behavior is expected by key others. Changing perceived norms (i.e., norms about communication choices)

TABLE 1 Descriptions of communication tactics, communication objectives, and behavioral goals, including key differences

Communication tactics	Communication objectives	Behavioral goals
Communication tactics should be understood as the basic choices that communicators can make about: 1. Behaviors (e.g., room setup, scheduling, posture) 2. Message content 3. Style/tone (e.g., humor, narrative, aggressiveness) 4. Channel (e.g., face-to-face, online, billboard) 5. Source (i.e., who communicates)	Communication objectives can be understood as outcomes that can result directly from communication tactics and affect goal behaviors (i.e., they mediate the effect of tactics on goal behaviors).	Communication goals can be understood as behaviors, but these behaviors vary in their level of concreteness, specificity, and target. 1. Concrete: An audience does a desired behavior (i.e., votes, buys, donates, quits, etc.) 2. Somewhat abstract: An audience *considers/seeks* evidence relevant to a desired concrete behavior. 3. Abstract: An audience *accepts* a decision, outcome, or technology, thus making themselves potentially vulnerable to others' choices (i.e., behavioral trust)
These choices should be chosen to try to affect potential communication objectives.	Key objectives in communication research include: 1. Beliefs about the natural/physical world and causality (i.e., scientific knowledge/understanding) 2. Evaluative beliefs/perceptions about behaviors (i.e., risks/benefit [attitude], normative, and self-efficacy/agency beliefs) 3. Beliefs/perceptions about others trustworthiness (i.e., integrity, benevolence, and ability beliefs) 4. Specific emotions/feelings (e.g., disgust, anger, joy) 5. Specific psychological or sociological frames (e.g., issue is about gains, not losses) 6. Psychological processing (i.e., sustained attention)	Most substantial goals also typically require a range of intermediate behavioral goals. Also, scientists can be the audience for goals (e.g., scientists should consult with interested audiences with the goal of making better research decisions).

thus also involves finding ways to communicate information about how others behave or are expected to behave (Rimal, 2008). For example, a communication advisor whose behavioral goal is to get a team of scientists to practice their crisis response might want to communicate about the degree to which peer organizations are practicing their crisis response and/or the degree to which peers expect similar organizations to practice such responses.
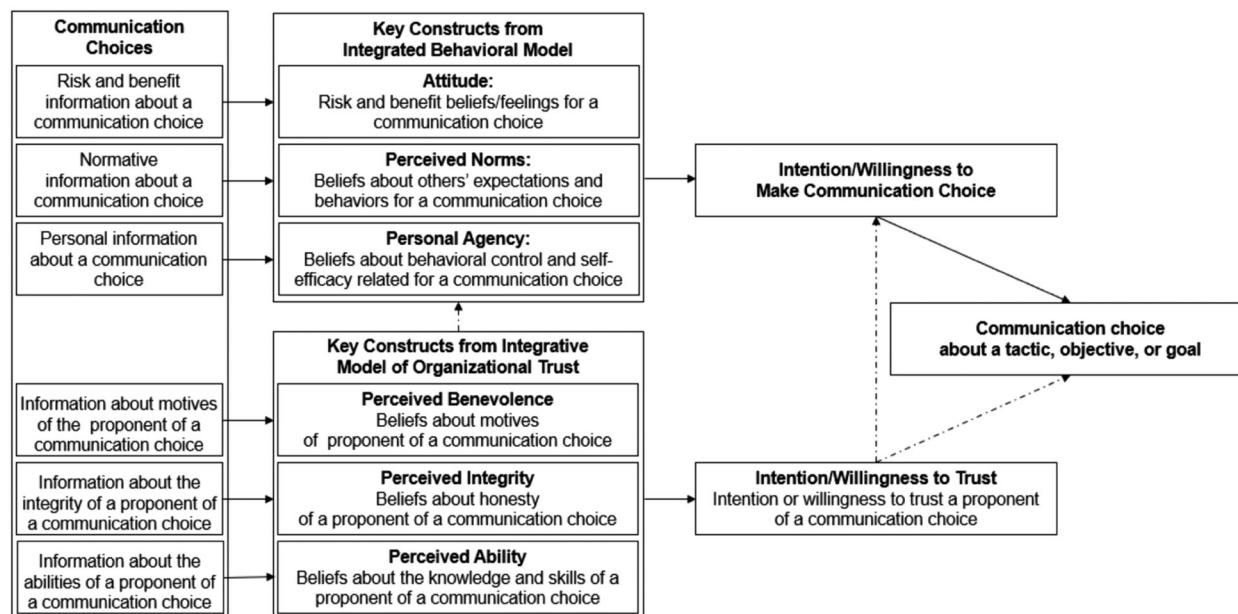
Affecting what the Integrated Behavioral Model terms "personal agency" would follow a similar path but involve communicating in ways that seek to shape beliefs about the degree to which a person has control over a behavior and/or whether someone has the skills (i.e., self-efficacy) needed to do the behavior. For example, a risk communicator who prioritized the objective of self-efficacy might want to communicate to their audience that they (the audience) can make personal choices that could limit a risk. Equivalently, a communication advisor might want to find ways to help scientists recognize that they (the scientist) have the ability to use a communication tactic, or achieve specific communication objectives or behavioral goals.

As noted, one early study based on the insight that communication choices are behaviors used the Theory of Planned Behavior to understand scientists' overall intention to communicate (Poliakoff & Webb, 2007). We and others then built on this work to further study both scientists' engagement willingness as well as scientists' choices about communication

tactics, communication objectives, and behavioral goals. In general, this research has suggested that scientists who see communication choices as beneficial, ethical, and possible are more likely to say they would be willing to prioritize that communication choice. In contrast, normative beliefs have not generally been strong predictors of communication choice willingness (e.g., Bennett et al., 2019; Besley et al., 2020, 2019). Such correlational work is only illustrative, however, and we return to future needs below. The top half of Figure 1 seeks to summarize the key relationship between information about potential communication choices, beliefs about those choices, and the decision to make such choices.

2.2 | Second insight: Communicators need to trust proponents of strategic communication

The *second insight*, and one that we do not believe has been studied in a substantive way, is that getting someone like a scientist to intentionally choose a communication tactic, communication objective, or behavioral goal is likely easier when that person trusts the proponent of the communication choice (bottom half of Figure 1, dotted lines between trustworthiness beliefs and behavioral beliefs, as well as between intention/willingness to trust and intention/willingness to choose a behavior). Trust in this context refers to a behavioral

FIGURE 1 Key constructs from the Integrated Behavioral Model and the Integrative Model of Organizational Trust in the context of potential drivers of choices about communication tactics, objectives, and goals. Dotted lines are not part of the theory and thus speculative. Contextual variables such as demographics, values, and partisanship are not shown because these are not typically affected by communication choices

willingness to make oneself vulnerable to someone else, as suggested by the Integrative Model of Organizational Trust (Hendriks et al., 2015; Mayer et al., 1995; Schoorman et al., 2007).

Similar to the Integrated Behavioral Model, this integrative trust model represents another attempt to incorporate ideas from across various theories, including related concepts such as reputation (Vanhamme & Grobben, 2008), relationships (Bruning & Galloway, 2003), and credibility (McCroskey & Young, 1981). The idea of trust as vulnerability applies here because science decision maker who choose to direct resources toward a recommended communication choice are making themselves vulnerable to potentially wasting resources, as well as generating unwanted effects. For example, a communication advisor who suggests that a scientist devote time to relationship building (i.e., trust building) is asking the scientist to put less into other activities, including research.

While we do not know of specific tests of the Integrative Model of Organizational Trust in relation to variables from the Integrated Behavioral Model, it seems plausible to hypothesize that trust would also correlate with the likelihood that someone will be motivated to consider information about a communication behavior and integrate related new beliefs into their thinking (Petty et al., 1983). For example, a highly trusted communication advisor who encourages a scientist to devote more time to discussion may have more success getting the scientist to consider this choice than a less-trusted advisor. Similarly, trust may have a direct relationship with behaviors. For example, a scientist who trusts a communication advisor might tend to accept their advisors' guidance on the amount of time to devote to discussion

without putting additional cognitive resources into trying to update their beliefs about the benefits, normative acceptability, or difficulty of the proposed scheduling choice. Asking someone to take your advice, in this regard, involves asking someone to be vulnerable to you. Within the public relations literature, these ideas are prominent in "excellence theory" in the form of the hypothesis that organizations will have more positive experiences with strategic communicators when the head of public relations is a trusted part of the organization's dominant management coalition (i.e., working out of the "corporate suite") and not just an outside, more subordinate advisor (Grunig & Grunig, 2008).

Further, and also similar to the Integrated Behavioral Model, the Integrative Model of Organizational Trust suggests that willingness to trust is grounded in three types of beliefs that a communicator could choose to prioritize as communication objectives. These trustworthiness beliefs include benevolence beliefs, integrity beliefs, and ability beliefs, although other researchers often use different terms (e.g., Earle et al., 2007; Fiske & Dupree, 2014; McCroskey & Young, 1981). A benevolence belief involves perceptions about whether a trustee's motives (e.g., a communication advisor) are aimed at helping and not hurting the potential trustor (e.g., a scientist asked to take advice). An integrity belief, in contrast, involves perceptions about the trustee's honesty and morals, including fairness. Ability beliefs involve perceptions about the trustee's competence and capacity to reliably perform relevant activities (Hendriks et al., 2015; Mayer & Davis, 1999).

One study specifically in the area of science and risk communication further argued that it may also make sense to draw on the procedural justice as fairness literature

(Lind et al., 1990; McComas & Besley, 2011) and attend to whether a trustor believes a trustee is willing to listen to other voices when making decisions (Besley, Lee, et al., 2021). Another type of belief that might fit into the trustworthiness space, but is not part of the Integrative Model (or included in Figure 1), is belief about whether someone shares an aspect of one's social identity, especially one's core values (Kahan et al., 2011; Siegrist et al., 2000; Tajfel, 1982). It is easy to imagine, for example, that a communication advisor might communicate to try to ensure that a scientist recognizes that the expert advisor shares some aspect of a scientist's identity-relevant values. Neither of these potential communication objectives are depicted in Figure 1.

2.2.1 | Cognitive processing as an underlying objective

An additional type of communication objective not substantially discussed here but that underlies our emphasis on beliefs is the psychological idea of cognitive processing type (i.e., dual process models) (Kahlor et al., 2003). Any focus on intentional, long-term behavior change in communicators or other audiences likely means prioritizing communication aimed at fostering systematic cognitive processing (i.e., system 2, central route processing) as it is this type of engaged, sustained attention that is typically associated with belief formation (Chaiken, 1980; Petty et al., 1983). Conversely, ethical and practical arguments mean it does not make sense to encourage scientists to communicate in ways that only take advantage of heuristic processes (i.e., peripheral or system 1 processing), including people's biases (e.g., accessibility heuristics) and emotions (e.g., affect heuristics). This ethical discussion is revisited further below. Tactics such as dialogue, narrative formats, and clear language are all thus helpful inasmuch as they can increase the likelihood that participants in communication—including scientists—have the ability and motivation to meaningfully engage with communicative efforts such that they are more likely to update their beliefs.

2.2.2 | Choosing what tactics, objectives, and goals to advise scientists to prioritize

It may also be noteworthy that the concepts and theories we suggest that communication experts use to advise science communicators are the same concepts we suggest that people like scientists use to build strategies to communicate with priority audiences. This can cause confusion. However, if beliefs about risks and benefits, norms, behavioral control, and trustworthiness are key to driving people like scientists' behaviors, it is logical that these same types of beliefs underlie everyone's behaviors. The difference is that the behaviors that communication advisors want scientists to consider are choices about *communication* goals, objectives, and tactics. In contrast, scientists' communication goals are often about

getting stakeholders like policymakers to consider scientific evidence, getting other people in their society to support scientific endeavors, or trying to help people make better personal decisions (Besley et al., 2020). Their objectives and tactics, in turn, should flow from these goals.

An understanding of the components of these two integrative models can also point users toward related theories given that the underlying constructs appear—under various names—in most behavior change and trust theories. For example, science and risk communicators can almost always benefit from devoting resources to trust building because almost all long-term communication goals can benefit from trust in expert advisors. The public relations industry partly exists to ensure that organizations build long-term relationships of trust with stakeholders to ensure that these organizations' activities meet organizational goals (Bruning & Ledingham, 1999). Similarly, when a specific behavior is desired, strategic science and risk communicators should almost always seek to understand through qualitative and quantitative research what their priority stakeholders believe about risks and benefits, social norms, and their ability to enact the desired behavior. Deep knowledge about what people believe, as well as whether these beliefs are associated with the desired behavior, can then provide a starting point for communication planning, as well as evaluation (Atkin & Freimuth, 2013). As discussed below, ethical communicators also use others' perceptions reflexively to make decisions about whether they need to change their own behavior. For example, if a community believes your organization is behaving disrespectfully, it is worth considering whether you could behave more respectfully.

In addition to an infinite number of tactics and goals, there are a range of factors such as demographics, psychological traits, and values that are not typically amenable to change through communication. It is easy to get lost in the range of these types of variables but, from a communication perspective, such factors might better be understood as either predictors or moderators of evaluative beliefs, feelings, or frames (Hayes, 2013). They cannot be communication objectives because they are not readily amenable to change. For example, peoples' core values are generally understood to develop early in life as a result of formative experiences, and there is substantial evidence that these values then affect how information about risk is interpreted and used over time (e.g., Kahan, 2017; Kahan et al., 2009, 2015, 2012).

3 | ETHICAL CONSIDERATIONS

There may be people in the scientific community who think that being a strategic communicator is inherently unethical. We would argue the opposite. Indeed, it seems negligent for risk managers to avoid thinking carefully about communication, especially since a failure to communicate intentionally can still result in communication effects. Put differently, anyone responsible for helping science and risk communicators make better communicator choices should feel morally

obligated to think strategically about how to make smart communication choices more likely.

For science and risk communication advisors, one way to advance ethicality is to ensure that communicators prioritize communication activities where at least one goal is considering changes to their own behaviors. They should thus also prioritize objectives involving potential changes to their own beliefs, feelings, and frames. For example, communication advisors should seek to encourage risk scientists to go into public meetings with a desire to learn what others are thinking so that they can decide if they—the scientist—need to adjust their research or communication goals. That said, discussions around "public engagement" often include a vague call for "mutual learning" without specifying what should be learned or the timeline over which that learning needs to occur. A long-term, strategic approach might argue that "learning" could include attempts to foster justified (i.e., likely to be true) evaluative beliefs about other people (e.g., trustworthiness-related beliefs and normative beliefs) and potentially desirable behaviors (e.g., technology uptake, protective acts). Further, there is no reason to expect that different parties involved in communication will learn the same things or that every individual communication activity needs to involve equal belief change by all parties. The challenge of differentiated learning seems especially relevant to risk communicators interacting with people outside of risk decision-making processes, but anyone seeking to help shape risk communicators' communication choices also needs to recognize that most expert advice needs to be tentative and regularly adapted to context and new evidence.

A second element of ethicality is to recognize that helping scientists change what other people believe is not inherently problematic if scientists (a) are focused on creating opportunities where people can make up their own minds, and (b) are providing the best available evidence in a way that appropriately acknowledges uncertainty. All beliefs, in this regard, involve a degree of uncertainty and nothing in our advice suggests lying or taking advantage of human's inherent tendency to rely on peoples' cognitive biases. To the contrary, a primary benefit of high-quality public participation as engagement is to highlight the value of communication that enables participants to have access to a range of information (including decision makers' real behavior) and both increased opportunity and ability to think systematically about what they hear. In doing so, they might be understood to be making up their own minds (Heath, 2018). One rationale underlying why we think it is reasonable for science communicators to share trustworthiness information, for example, is that we personally want ostensible experts to provide us information about why we should see such persons as skilled, caring, and honest. We assume others do too; and this seems like a safe assumption given the prevalence of tools such as online rating systems of restaurants, shops, and professional services. Again, this point likely has special importance for communication with nonspecialists, but anyone providing advice to communicators also needs to reflect on the importance

of sharing information that enables communicators to form the full range of beliefs related to any given communication choice, as needed (Figure 1).

A third ethical issue that combines the previous two points is that all communicators need to ensure that they are behaving in ways that make them worthy of trust before communicating. Such guidance should be part of any advice given to science and risk communicators. This point is also relevant to the idea that we communicate through behaviors, not just messages. These communicative behaviors might involve simple acts like whether we dress in a way that communicates respect or arrange a room in a way that takes your audience into account. They can also include more resource-intensive choices such how much effort we put into communication activities, including whether risk managers do things like budget time and money to enable real relationship building and leave time and opportunities for real changes to initial plans. Under-resourcing strategic communication planning, implementation, and evaluation are communication choices with ethical and practical consequences. Again, as with the other ethical points, this matters to all science and risk communicators, including communication advisors asking scientists to consider specific tactics, objectives, and behavioral goals. One responsibility of subject-matter experts is thus to push back on communication advice that is not grounded in reality.

The final ethical point that deserves special consideration is whether helping science and risk communicators be more strategic has the potential to exacerbate existing injustices or inequities; or fails to actively advance diversity and inclusion. Having access to resources could make being strategic easier by allowing the hiring of consultants, the testing of potential choices, and evaluation. Indeed, even gaining meaningful access to scientific information is problematic for underserved communities. Conversely, smart strategy can also allow under-resourced individuals to efficiently use scarce resources. Perhaps more importantly, however, is that being explicit about goals—including the audience for the goals—should make it more likely that people and organizations can identify situations where communication choices may be inappropriate or lacking. For example, communication experts should ensure their organizations have strategies to enable recruitment of colleagues who reflect the communities affected by the organization.

4 | CONCLUSION

This essay argued that anyone who wants to advance evidence-based science and risk communication should focus their efforts on understanding and changing potential communicators' evaluative beliefs about communication tactics, objectives, and goals that they want communicators to consider. To our knowledge, there is little theory focused on changing communicator behavior to make it more strategic and evidence based. The essay thus specifically emphasized communicating information relevant to the evaluative

beliefs highlighted by the Integrated Behavioral Model (e.g., risk/benefit beliefs, normative beliefs, and agency beliefs), and the Integrative Model of Organizational Trust (e.g., benevolence, integrity, and ability beliefs, as well as voice and identity beliefs). We also highlighted four ethical concerns that someone might raise in response to the strategic perspective we suggest. We ultimately, however, argued that a failure to strategize raises equally challenging ethical questions.

Our only substantial hesitation in arguing for treating scientists' communication choices about tactics, objectives, and goals as behaviors is that we have limited direct evidence to support the idea that communication advisors can shape communication choices. One reason for writing this essay is to encourage the development of such research. Nevertheless, there is already considerable cross-sectional survey evidence that shows scientists' beliefs about various tactics (Besley, Newman, et al., 2021; Besley et al., 2019) and objectives (Besley et al., 2018; Dudo & Besley, 2016) are associated with a willingness to prioritize relevant tactics and objectives. However, we still need longitudinal research aimed at showing that we can change these beliefs and associated behaviors.

The underlying behavior change (Montano & Kasprzyk, 2015) and trust theory are well established (PytlikZillig et al., 2016; Schoorman et al., 2007), and we are thus confident the advice we provide here could serve as a starting point for further research into intentionally shifting scientists' communication behavior. Building up such evidence might require, for example, training programs specifically designed to make sure that scientists see the value and desirability of specific choices while also ensuring that they feel capable of enacting the choice. Beyond our survey work, we are thus helping to use the underlying ideas to study whether two specific science communication training programs can increase prioritization of (a) the goal of relationship building (i.e., trust building) by shaping beliefs about this goal, and (b) whether the tactic of improv-based training affects beliefs about the value of "perceived listening" as a potential communication objective. Nevertheless, whether these efforts work as hypothesized, there is every reason to believe that we should be able to affect scientists' communication choices. Past research on communication training has mainly focused on outcomes such as whether a communicator communicates in a way that people enjoy (Rodgers et al., 2018; Rubega et al., 2021) rather than, for example, whether they prioritize objectives such as being perceived as caring, or whether they prioritize tactics that make it more likely that they will be perceived as caring.

A related challenge is that we cannot reasonably expect most scientists to become communication experts who are able to make evidence-based strategic communication choices. We believe that it is possible to get any communicator to make more intentional decisions, but we should not expect every communicator to develop evidence-based strategy. This challenge is reflected in this essay's frequent reference to expert communication advisors.

Further, given the difficulty of communicating effectively and efficiently, a more productive approach to improving communication efforts might be to better train scientists to work alongside communication professionals. These two types of experts can then work collaboratively to identify priority behavioral goals and then design, implement, and evaluate the strategies needed to achieve those goals. At a certain point, we already expect people like businesspersons or politicians to lean on a support system in areas such as communication by hiring the strategists and technical experts needed to communicate effectively. For experts like scientists, this might mean that more training needs to emphasize making intentional communication choices while working with communication experts and developing the ability to collaborate with other scientists and organizations to achieve goals. This might further mean, for example, communication focused on sharing the benefits, acceptability, and ability for people to work together as well as building trusting relationships between subject-matter experts and communication experts (i.e., advisors). It may also mean that we move away from stand-alone training of science and risk communication skills toward training focused on the use of specific communication tactics as dictated by a strategy. While some basic level of communication proficiency may be needed by many scientists, it makes little sense to teach a scientist how to write an opinion piece for a newspaper if the decided-upon strategy requires that scientist to play the role of host at a public meeting.

Increasing collaboration around communication might also mean that the scientific community will need to put more emphasis on training communication advisors in strategic thinking related to science and risk. A recurring but largely undocumented theme in science and risk communication practice is people moving into the field—either from scientific fields or journalism—without strategic communication training. Journalists, for example, who become professional communicators are unlikely to have been trained in strategy. This leads to both the "rediscovering the wheel," and ineffective or inefficient efforts based on the premise that filling knowledge deficits will lead to positive outcomes (Fischhoff, 1995; Simis et al., 2016). As noted, a fundamental premise of public relations "excellence," in this regard, is the differentiation between expert strategists and technicians and the value of having an experienced strategist working within the "dominant coalition" of organizations' leadership structures (Grunig & Grunig, 2008). This movement of people from scientific research to communication likely has benefits but may also create the need for concerted efforts to communicate the value of putting time and energy into developing the capacity to communicate strategically. Such efforts could include a deep understanding of the full range of potential science and risk communication tactics, objectives, and behavioral goals, and how these are connected.

The science and risk communication community cannot expect to succeed at communication for free. Being strategic should increase efficiency over the longer term, but communicating well requires resources that could go to other activities, including additional research. No one can do everything but, again, a rational for being strategic is to identify priorities

so that available resources can be found and directed toward those priorities. This may also mean saying "no" to activities that some people enjoy or that have outlived their purpose. Getting decision makers within scientific organizations to adequately resource communication thus represents another type of communication choice around which communication advisors may need to develop communication efforts. As suggested above, our expectation is that these discussions about funding will further bolster the importance of being intentional about choices about communication tactics, communication objectives, and behavioral goals.

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