Episteme (2024), **21**, 1434–1445
doi:10.1017/epi.2023.38

episteme

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Science Journalism and Epistemic Virtues in Science Communication: A Defense of Sincerity, Transparency, and Honesty

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(Received 14 November 2022; revised 28 March 2023; accepted 20 June 2023; first published online 31 July 2023)

Abstract

In recent works, Stephen John (2018, *Social Epistemology* **32**(2), 75–87; 2019, *Studies in History and Philosophy of Science Part A* **78**, 64–72) has deepened the social epistemological perspective on expert testimony by arguing that science communication often operates at the institutional level, and that at that level sincerity, transparency, and honesty are not necessarily epistemic virtues. In this paper I consider his arguments in the context of science journalism, a key constituent of the science communication ecosystem. I argue that this context reveals both the weakness of his arguments and a need for further analysis of how non-experts learn from experts.

Keywords: Science communication; media ethics; social epistemology; epistemology of journalism; science communication

1. Introduction

The conceptual framework of social epistemology is grounded in adjustments to traditional individualistic epistemology of testimony (Goldman 2001). These adjustments include responses to such social issues as the role of social identities (e.g., Fricker 2007) and how trust functions between differently situated individuals (Faulkner 2007; Figdor 2018). In recent work that focuses on the ethics of science communication, Stephen John (2018, 2019) deepens the social epistemological perspective on expert testimony in science communication in two ways. His general goal is to move away from expert testimony at the level of individual scientists to that scientific institutional structures. After developing a model of how non-experts come to learn from expert institutions, he argues that the individualistic epistemic virtues of sincerity, transparency, and honesty are not necessarily virtues at this institutional level.

In this paper I will consider John's (2018) arguments against these epistemic virtues from the perspective of science news journalism (science journalism for short).[1] Unlike

[1]Science news journalism is a subcategory of news journalism, and the only criterion I am using for news journalism is that it aims to report truth that can be verified by deadline – what Kovach and Rosenstiel (2001

scientists, science journalists' primary job is science communication, so an adequate account of the epistemic virtues relevant to science communication should apply to science journalism. I will argue that John's arguments against these virtues fail at least with respect to science journalists' practices and the norms guiding those practices. I do not try to argue against a modal claim that sincerity, transparency, and honesty are not *necessarily* virtues of science communication. Our topic is norms of a human social practice, not exceptionless laws of nature. This contingency does not license John's unqualified conclusion that these norms are "at best irrelevant and at worst dangerous" (op. cit.: 84). The logic of my argument is instead quite straightforward: if an account A of the norms governing a human practice P fails to capture the way P's primary practitioners reliably act, then A is not an adequate account of P's norms. In addition, examining these virtues in the context of science journalism helps us appreciate why they are virtues of science communication and how social epistemologists can help illuminate their function.

I will summarize John's arguments in Section 2 and respond to them in Sections 3 and 4. In Section 3, I focus on the move to the institutional level and his two-step model of non-expert learning, and defend the need for a key revision to the model. In Section 4, I consider how this revision helps show why sincerity, transparency, and honesty remain epistemic values in science communication.

2. Non-expert learning from scientific experts: John's two-step account

What norms should govern the ethically permissible scientific speech by which non-experts learn from experts? Using climate science and the IPCC (Intergovernmental Panel on Climate Change) as a case study of an appropriate "corporate body," John notes that speakers in science communication contexts are often institutions and that the speech of such institutions is often about consensus in a field, not about the world itself. How then do non-experts learn about the world from expert institutions?

In John's account, hearers make the inferential leap from an institution's report of consensus that p to believing that p in two steps[2]:

> The Sociological Premise: Institutional structures are such that the best explanation for the factual content of some claim (made by a scientist, or some group, or subject to some consensus) is that this claim meets scientific "epistemic standards" for proper acceptance.[3]

[2021]) aptly call the journalism of verification. Otherwise, for my purposes the category can be understood very broadly to include mainstream media (e.g., The New York Times' Science Times, Fox News in its news segments, Scientific American), podcasts (e.g., Radiolab, Indre Viskontas' Inquiring Minds), popular science writers (e.g., Robert Sapolsky, Malcolm Gladwell), bloggers (e.g., Neuroskeptic), freelance science writers, and occasional participants who don't do science writing for a living, along with social media (aggregator websites, Facebook "friends") that link to these direct sources. Note that it is compatible (imperative, actually) with reporting news to report it in ways that will attract eyeballs (or clicks). For example, The Daily Show can provide science news even though Trevor Noah also entertains his audiences: he obtains the news from standard media sources, reports it, and riffs on it. Discussion of epistemic norms governing testimony (the basic topic of John's paper and this one) presupposes this concern with verifiable truth. (Importantly, John is not denying the existence of truth, another complex topic that predates today's massive disinformation context.)

[2]He suitably qualifies these as not being premises in an explicit inductive inference. I accept the way he intends the premises to be understood.

[3]On p. 81 this is expressed as: In virtue of social institutions, people credentialed as scientists can reasonably be expected to assert claims (in their role as scientists) only when those claims meet proper epistemic standards. I'll take these equivalents, while noting that in science communication scientists are

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This premise says that the sociological structure of an epistemic community is working in such a way that the best explanation of what community members say is that the testimony is warranted or justified in the light of its epistemic norms. This premise recognizes that institutions can fail to meet their epistemic standards for non-epistemic reasons. For example, the replication crisis in psychology illustrates how widespread scientific research practices can promote individual professional (social) status while undermining the reliability of the field's publication record. The IBE (inference to the best explanation) in the premise affirms that the epistemic standards are not being compromised.

> The Epistemological Premise: If some claim meets scientific epistemic standards for proper acceptance, then I should accept that claim as well.

This premise says that I should accept what the institution (or member/spokesperson) says, given that I accept the epistemic standards of that institution. John uses the term "accept" to at least involve deference (op. cit.: 81), such that "accepting" means something like "willing to defer to another's testimony as sufficiently epistemically grounded to justify my belief."

John provides good reason why these premises should be kept separate. For example, climate deniers usually agree that scientific standards of acceptance for climate science claims are fine, but (in effect) argue that the sociological premise fails. For them, the best explanation of why a scientific institution says that P is ulterior political or economic motives. Conversely, John argues, we may accept that astrologers' claims satisfy the sociological premise, but in this case we reject the epistemological premise: in "modern societies," we do not accept the epistemic standards of astrology as grounds for our own belief. We classify astrology as a pseudo-science in part because its standards are not scientific, unlike those of climate science.

John then draws out the implications of his model for the epistemic virtues of sincerity, transparency (or openness), and honesty. He argues that these do not remain virtues in institutional science communication. I'll consider his arguments against each of these three virtues in science communication in turn, treating openness as equivalent to transparency.

2.1 Against sincerity

Sincerity is the norm of fitting one's public claims to one's private attitudes; an agent's public assertions should accurately reflect what she believes (op. cit.: 78). John argues that following the norm of sincerity is misguided and can be dangerous. The norm is misguided in that sometimes claims that are not believed are proper to assert. For example, when an institution is offering a jointly reached consensus opinion that meets scientific epistemic standards, individual scientists in the institution may not believe the consensus opinion, but it is proper to assert it anyway. An institutional spokesperson who is one of those dissenting scientists would be speaking insincerely but properly. In terms of being potentially dangerous, sometimes claims that are properly believed are improper to assert. A scientist may well believe something based on evidence that has not been peer reviewed, but it would be improper (and risky) to assert it. The upshot is that the folk just need to assume the claim meets institutional

speaking in the distinct role of science communicators – that is, they are making "public science" rather than "research science" assertions (Southwell *et al.* 2022). I will return to this difference in Section 3.

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epistemic norms (i.e., the sociological premise) in order to gain knowledge (or justified belief) from the experts. It's the "working well" part of the institutional structures that matters for proper speech, not the beliefs of the individuals in it, including those who act as mouthpieces for the institution.

2.2 Against transparency

Transparency holds that scientific research should not be shrouded in secrecy; scientists should be open about what they do. The problem John raises for transparency arises from the fact that non-experts often hold what he calls a "false philosophy of science" – they hold naïve beliefs about the epistemic practices that yield the claims that meet scientific epistemic standards. For example, they may think dogmatism is bad without recognizing that dogmatism in science can be valuable. For example, a new theory often needs stubborn adherents before sufficient evidence can be gathered to support it. This naïve view of science impacts non-experts' attitudes of trust in science by the way it interacts with the warrantedness of belief. Belief can be warranted or not warranted, and it can be robust (hard to dislodge) or fragile. Because of the false philosophy of science, the public's trust in, and willingness to accept, scientific statements may be fragile. In the long term, transparency might make trust more robust by promoting a better philosophy of science, but in the short term it can backfire and undermine what fragile trust there is. The potential costs of transparency can be very high, such as when climate skeptics leverage the public's false philosophy of science to block acceptance of climate science consensus and prevent effective action to counter rising global temperatures. Thus, it is not clear that the potential long-term benefits must outweigh the short-term costs. While one might argue that opacity contributes to fragility, John replies that transparency shouldn't be a "basic" ethical demand.

2.3 Against honesty

Honesty holds that scientists should report their uncertainties, both first and second order. They should acknowledge their epistemic limitations and/or the limitations of the data on which their statements rest. For example, one should not report a precise estimate of future effects of climate change given uncertainty about a first-order estimate; one should report a hedged estimate. The problem, John notes, is that policymakers and the public want clarity, and honesty about uncertainty can lead to policy paralysis and public resistance to policy implementation. Admission of uncertainty may be taken as evidence of incompetence or as grounds for skepticism. While John concedes that honesty should be the default, institutions should aim instead for effectiveness: they should make assertions that would secure uptake of claims that are in the hearer's epistemic interest to believe. Hearers may be in an epistemic situation in which saying what is strictly true will be ineffective, while "dishonest" claims would be effective. In climate science in particular, spuriously precise claims would be effective without being honest. The dishonest claims would not mis-lead, but "well-lead": they would promote true belief as well as actions based on them.

3. John's institutional move and his two premises, in the science media context

In this section, I'll consider John's move to the institutional level and his subsequent model of non-expert learning from experts in science journalism, a major part of

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science communication. I'll argue that both features are inadequately characterized, and that the two-step account needs a key modification to be adequate.

The move to the institutional level is clearly appropriate for science journalism, which largely takes place within either general (e.g., *The New York Times' Science Times*, Fox News in its news segments) or science-specific news media institutions (e.g., *Scientific American*, Radiolab). The bulk of science consumed by the public – most of whom do not seek out science news and have neither access to nor the expertise to understand peer-reviewed papers – comes from such media institutions (Bubela *et al.* 2009: 517). Access may be direct or indirect through links to major media at news aggregator websites or passed on by individuals in one's social media networks. Such institutions, especially legacy media, often set the agenda for science news generally. So it is valid to locate the virtues related to science journalism as applying in the first instance to news media institutions that are wholly or largely comprised of non-experts (i.e., people without advanced scientific credentials). Science journalism offers statements subject to institutional-level epistemic norms, and the individuals who produce that information are trained to follow those norms (even if journalism does not have a credentialing system, as in science).

There are some important differences between science and media institutions in science communication. The first regarding what counts as scientific consensus. This difference stems directly from the distinct timescales of science and media: scientific consensus is achieved over long timescales, whereas in media scientific consensus is more fluid. For example, coverage of Covid-19 involved reporting scientific consensus, but this was consensus-to-date in a rapidly evolving scientific landscape that was not what is usually considered consensus in science. From the perspective of science, climate science is dynamic relative to quantum mechanics and static relative to Covid-19 science; from the perspective of media, climate science is static compared to Covid-19 science, but by 2022 it was not nearly as dynamic as it was in early 2020. In short, what counts as "scientific consensus" in science communication will depend in part on what institution is asserting it.

Another difference is in the nature of science news as opposed to peer-reviewed papers. Science journalists produce science news, an epistemic product that is "public science" as opposed to "research science" (Southwell *et al.* 2022): in science news, what is asserted is also intended to show why and how the information is meaningful to the public. While scientists need to learn how to produce public science (Bubela *et al.* 2009; Illes *et al.* 2010; Stilgoe *et al.* 2014; Van Horn and Poldrack 2009), public science just is what science media do. For example, Radiolab is a paradigm example of public science, while *Nature* is a paradigm example of research science. A Radiolab podcast may be designed around a scientific discovery originally published, after peer-review, in *Nature*. But the presentations of the same scientific facts (or a subset of them) differ because the intended audiences differ in expertise and levels of intrinsic interest. Science news, like news generally, must be presented in ways that will attract and be intelligible to non-expert audiences and, hopefully, will maintain their interest for more than the time it takes to read a headline.

Finally, another difference is the science media's role as an active intermediary. Science writers are both experts and non-experts. A science journalist who is not also a credentialed scientist will count as a non-expert hearer when gathering news, and an expert speaker when writing it. The traditional distinction in work on testimony must recognize that the same individuals and institutions wear both hats within one job.

These three differences are worth exploring from a social epistemological perspective, but I will set them aside as they do not raise fundamental issues for John's model. A fourth, however, matters a great deal. Science communication is a complex,

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competitive ecosystem in which various institutional actors compete for public belief. Scientific institutions like IPCC are just one actor in this ecosystem, which also includes universities, science media, for-profit corporations, and other professional organizations (such as the Union of Concerned Scientists). These groups have different institutional structures that constrain the content of their institutional speech and its relation to the institution's goals. It is difficult to draw a line between the epistemic and non-epistemic institutions – credentialed scientists work at or are part of all these different institutions, while some institutional purveyors of science news, such as Fox News and Facebook, are not paradigms of epistemic propriety in the best of circumstances. The key point, however, that in this institutional ecosystem acceptance of testimony is not individualistically determined, as John's premises hold. In the same way that social epistemology is contrasted with traditional individualistic epistemology, the concept of acceptance is social and not individualistic. Non-expert acceptance occurs within a competitive communications environment in which epistemic and non-epistemic institutions are vying for non-expert deference to their testimony. In other terms, the traditional "hearer" of testimony is a consumer: news consumers assess one institution's testimony in relation to that of at least some other potential institutional testifiers (directly or indirectly) and accept that of the institution they prioritize. What is accepted depends on this ranking. Even those who only get their news (science or otherwise) from one source are aware of other sources by way of ignoring or dismissing them.

For example, the IPCC does not have direct competitors among science institutions, but it has many of them in the science communication ecosystem, where it is one social entity among others. Many people pay attention to and prioritize one or another of these social competitors rather than the IPCC. Thus, some climate deniers are like astrology deniers in that they may accept the sociological premise for the IPCC but not defer to its scientific epistemic standards because they prioritize other epistemic standards; but others may prioritize other social institutions (epistemic or not) over the IPCC specifically even if they accept scientific standards for, say, meteorology.

John sets aside this complication when he writes (as noted above) that "in modern societies we typically assume that the epistemic standards characteristic of scientific research communities should govern our own beliefs" (op. cit.: 77). But this assumption is doing essential work: in modern societies with complex and competitive communication landscapes, non-experts will learn from the institution to which they defer most, both socially and epistemically. They prioritize that institution over its competitors. Because of its importance to testimonial acceptance, the assumption John is making should be explicit as a third premise:

> The Priority Premise: I should prioritize science institutions and scientific epistemic standards over other institutions and their epistemic standards.

Clearly if I do not prioritize scientific epistemic standards I will not accept that P even if P meets scientific epistemic standards. As noted, this is the climate denier who is like the astrology denier. But we also must pay attention to deference (acceptance) relative to the social environment. Epistemic institutions are a type of social institution, and are assessed as social institutions as well. Non-experts may prioritize one epistemic institution over another socially even when both equally satisfy the sociological premise, or they may prioritize a social institution that doesn't count as an epistemic institution (on some criterion or other), whether or not it has epistemic standards and meets them. The priority premise, mentioning both standards and institutions, is needed.

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This added complexity reveals how testimonial deference is as much a social attitude as an epistemic one. Social deference is a broader attitude because it does not only operate in the epistemic sphere. It is arguably the ground on which epistemic deference rests: as work in epistemic injustice (e.g., Fricker 2007) shows, we're unlikely to epistemically defer to someone who belongs to a social category to which we do not defer.[4] In these terms, John takes for granted that social deference to scientific institutions, and not just epistemic deference to scientific epistemic standards, is the default. That science institutions and their epistemic standards have enjoyed both social priority and epistemic priority (in "modern societies") is a contingent matter, to which I return below. Of course, epistemic and social deference may still often go together even if the relation is contingent. They may be most clearly separable when speaker and hearer are social equals, such as when one credentialed scientist is talking to another. But even here, prestige hierarchies in academia show how social deference constrains whose scientific testimony is more likely to be accepted, even when the same epistemic standards are met by both scientists. Only the already socially privileged can take the priority of their epistemic standards for granted. Most worrisome, of course, are cases of social deference to an institution whether or not its testimony has met its, or any, epistemic standards.

Perhaps a clause with these conditions might be added into the epistemological premise, rather than adding a separate priority premise. However the modification is made, the point remains that the inference fails without it. Science news consumers' acceptance of institutional testimony is determined by assessing and prioritizing institutions in relation to at least some of their competitors on both social and epistemic grounds. For clarity, I will call this three-step (or modified two-step) model the modified model in what follows.

The question of social deference is critical in this context. I will argue below that the virtues of sincerity, transparency, and honesty are especially important for epistemic institutions that do not enjoy default priority status in the social ecosystem in which they operate. It is no accident that these virtues have come to the fore recently in scientists' testimony: their behavior is an adjustment to science's relative loss of social deference today compared to its social status mid-twentieth century.

4. Responding to John's arguments: in defense of sincerity, transparency, and honesty

Are sincerity, transparency, and honesty virtues in science communication? In this section, I'll consider John's arguments against these virtues in the special, but central, case of science journalism, using the modified model instead of his original model. The bulk of my discussion, however, is reserved for the latter two virtues.

4.1 In defense of sincerity

John aptly reminds us of the case of the creationist biology teacher (taken from Lackey 2012) and uses it to show that sincerity is not necessarily a virtue.[5] The creationist biology teacher asserts widely accepted claims about evolution in her classroom even

[4]Fricker (2012) also applies the framework of epistemic injustice to institutions (see also Anderson 2012). Individuals can also act epistemically unjustly toward institutions, but I will not pursue this issue here.

[5]Lackey uses it to show that the teacher's lack of belief (and so lack of knowledge, assuming knowledge requires belief) does not prevent her students from acquiring testimonial knowledge about evolution. Like

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though she does not believe them. As John notes, her claims are proper insofar as she is speaking while in her role as teacher of the theory of evolution. They are proper because they meet the relevant scientific standards, even though her speech is insincere.

This case can be usefully elaborated using the modified model in a way that shows how it does not in fact undermine sincerity. In this case, the teacher rejects the priority premise for science, but also recognizes her religious institution is not socially dominant over scientific institutions – she lives in "modern society" – and so in her pedagogical role she acts as a mouthpiece *for the socially dominant institution(s)*. In other words, the charge of insincerity shifts from her speech to the insincerity of her playing a pedagogical role when it requires her to contradict her rejection of the priority premise for science. In journalism, the same type of case is found in contexts of propaganda, when news outlets report what the socially dominant institution (the authoritarian government) tells them to report. The government may even provide evidence for what they must report, but whether such evidence is provided or not they must report it. In this case the journalist rejects the priority premise for the dominant political institutions and so acts as a mouthpiece for it. Neither case shows that sincerity is not a virtue in testimony. They show that when we do not defer to a dominant social institution, many of us will be insincere in the roles we play rather than pay the price of not playing them. The biology teacher and the journalist could both lose their jobs, at a minimum. The internal conflicts they may undergo when they opt to play the roles show that this choice is not lightly made. But once the decision to play the role has been made, teaching the students (or passing on the propaganda) becomes a matter of doing that testimonial job well. In sum, sincerity remains a virtue for proper speech in contexts where one can express one's beliefs without fear of reprisal. When it comes to news, a society with a free press is such a context.

Within journalism in a free society, sincerity is a norm to assert what satisfies institutional epistemic standards – for example, that the news report is properly sourced. We justifiably criticize assertions at media outlets such as InfoWars when the sincerity norm is violated for personal financial gain. And it is standard reporting practice to corroborate what one source says – to get additional, independent sources of evidence. Certainly, there are things the reporter believes or is inclined to believe that she can't assert because it isn't properly sourced or corroborated (and maybe can't be); she will not assert anything rather than assert something she does not believe. But it would be individually perverse and professionally unacceptable for a reporter, qua reporter, to follow the norms of reporting and then assert what she comes to *not* believe.[6]

4.2 In defense of transparency

As John notes, transparency does show the mess that goes on behind the scenes in an expert system – to use the same sausage metaphor, seeing how the sausage is made can

John, I set aside issues of knowledge here. I also assume one can assert what one does not believe without lying.

[6]As well, it is a standard reporting convention that reporters attribute claims to the sources directly – e.g., "The IPCC said X," not "X." If she was at the IPCC press conference and recorded the IPCC spokesperson's words, presumably she believes that the IPCC said X, and sincerely reports that. If teachers followed the same convention, then Lackey's Creationist biology teacher would also tell her students sincerely, "According to evolutionary biologists, X." However, this convention exists to inform news consumers the source of the information, not to indicate that the information is not verified or believed. (In this case there is usually a disclaimer, e.g., "this could not be independently verified.")

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put people off from eating it. But just as acceptance is relational, our responses to transparency also depend on the available alternatives. If sausage is not replaceable – i.e., the alternatives are starvation or malnutrition – we'll eat it anyway even if its production disgusts us. It follows that John may be mistaken in his diagnosis of the fragility of some people's acceptance of scientific testimony as being due to a false philosophy of science, on which his argument against transparency depends. Instead, the fragility is plausibly due to the fact that science is no longer unquestionably the socially and epistemically dominant game in town. With the advent of the internet, cable TV, and social media, scientific institutions are just one competitor among many vying for priority in the science communication ecosystem. People now have many easily available alternatives and can (and do) prioritize their testimony instead.

In this context, being transparent can be seen as a way to earn that social deference back. That is, transparency is a social epistemic virtue in which we aim for epistemic deference to an institution's epistemic standards by promoting social deference to that institution.[7] It is a way of treating the public with respect even if it is the non-expert party. It can enhance social trust, which is a precondition of acceptance given the priority premise. It becomes especially relevant to science when the meaningfulness element of public science is negative: for example, for many people, the meaning of climate science is not good. Another example is the open science movement in psychology (e.g., Nosek *et al.* 2015), where part of the response to the replicability crisis has been for researchers to be more transparent about their research methods. Default social deference, which scientists have long enjoyed, can make transparency seem unnecessary, but that's because they have had what being transparent helps achieve. Transparency can help repair the damage to a science's default epistemic priority by shoring up its social status as a trustworthy institution.[8]

Science journalism, and journalism generally, is a clear example of the virtue of transparency as a means to priority in a competitive science communication ecosystem. Journalism and journalists have never enjoyed the social deference accorded to science and scientists. Transparency is very much part of journalism, such as in sourcing (being transparent to news consumers about where information is from) and standard investigative practices (e.g., using legal means to force other institutions to provide otherwise hidden information). It is no accident that major media outlets have become more transparent than ever as competition for priority has increased. For example, *The New York Times*, a newspaper of record, has incorporated many features online that exhibit allegiance to the virtue of transparency. Just as with science, it is still authoritative, but its authority is no longer unquestioned. These steps include explaining why a source is not being identified; providing a link in a climate science story to an explainer of how the information was gathered; providing a box that directs readers to a site answering questions on how the Times works; adding a sidebar in its Ukraine–Russia on how the reports are verified; and, perhaps most telling

[7]Another sense of transparency that is purely or directly epistemically helpful is transparency as clarity, rather than transparency as openness. Being open is a way of not being paternalistic. Only the latter is at issue here.

[8]The BBC's broadcast of the Royal Family on TV in 1969 is similar: the transparency of the film, showing them engaged in ordinary activities, raised concerns that it would destroy their mystique, but it ended up restoring public support for the monarchy. The monarchy isn't an epistemic institution, but the social role of transparency is the same: being more open in order to generate "solidarity," which in epistemic situations can increase acceptance.

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in the current competitive media landscape, tips on how to identify and avoid misinformation.[9] These explainers treat the public with respect, not with paternalism. The Times also avoids the hypocrisy of demanding transparency qua non-expert when gathering news, while remaining opaque qua expert when providing news. Transparency may not lead to acceptance, but acceptance is also a function of the features of individual news consumers, and this is something all science communicators face.

4.3 In defense of honesty

It is long known that science reporting on uncertainty can be a double-edged sword: many people end up confused about what they should believe and do and may simply end up rejecting the lot (e.g., Dunwoody 1999). This tendency has been a boon to companies, which may inject uncertainty into a debate about their products or activities in order to paralyze public policy action (Oreskes and Conway 2011). But to the extent that being effective is a matter of using the right framing, it is neither new to science communication nor an alternative to honesty.

It is well known that different framings of the same facts can be better or worse at informing the public, and that different publics need to be informed in different ways. This is of course compatible with being honest about one's uncertainty. A news story that is as certain as its sources are, and is framed effectively, is just good journalism. Being less precise or "true enough" (Elgin 2017) is not being dishonest about uncertainty: science communication is public science and so answers to different standards of truth than research science.

However, the clearest argument for honesty can be derived from John himself. John (2018, 2019) argues for an alternative norm against "wishful speaking," or communicating not well established claims for non-epistemic ends. Wishful speaking aims to promote a non-epistemic end while sacrificing epistemic ends; it "disrespects audiences by treating their beliefs as mere means that can be manipulated to further non-epistemic ends" (2018: 85). But effective yet dishonest speech is equally disrespectful of the non-expert in science communication. The only difference from wishful speaking seems to be that non-expert beliefs are treated as mere means to achieve epistemic ends. In his argument against honesty, John provides an artificial case of a shepherd who cries dishonestly but effectively that "a pack of wolves" is attacking the sheep, rather than the truthful "one wolf." This dishonest speech does not just get the townsfolk to believe the true proposition "the sheep are in danger," as John points out; that true belief in turn prompts effective action to save the sheep. But the paternalism is patent in this dishonest but effective communication. If wishful speaking is wrong, then dishonest but effective communication is equally wrong and for the same reason. The fact that one has a non-epistemic end and the other an epistemic one is irrelevant (and even the epistemic end really aims for a non-epistemic one). Effective public science will be true to the degree possible in the science communication context.

[9]On climate change: "The science of climate change is more solid and widely agreed upon than you might think. But the scope of the topic, as well as rampant disinformation, can make it hard to separate fact from fiction. Here, we've done our best to present you with not only the most accurate scientific information, but also an explanation of how we know it." On general reporting: "Do you have questions about how The New York Times works? Visit nytimes.com/behindthejournalism." On the Russian–Ukraine war: "Read more about our reporting efforts." On misinformation: "Here are warning signs to look for before you retweet information about the war." Bubela *et al.* (op. cit.: 516) also suggest open public discussion of the blurring public–private divide in science to enhance trust.

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5. Conclusion

John's discussion is a welcome impetus to closer social–epistemological reflection on the epistemology of expert testimony. He rightly emphasizes the institutionalized epistemic structures in which many knowledge producers operate. This essay critically examines his discussion from the perspective of science journalism, a primary player in the institutionalized science communication ecosystem. I have argued that John's model must be fundamentally modified to account for non-expert acceptance within this competitive arena. I have highlighted the situated nature of science communication institutions and the competition between these institutions for prioritizing their testimony over that of others. Acceptance in this context is not individualistic. It depends on how non-experts prioritize the competitor institutions. In short, John's institutional move is not social enough to account for non-expert learning from experts. I also conclude that sincerity, transparency, and honesty are values in this social context, and that their value comes to the fore only when we recognize the social competition for non-expert acceptance.

Acknowledgements. I would like to acknowledge helpful comments from an anonymous reviewer for this journal.

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https://doi.org/10.1017/epi.2023.38 Published online by Cambridge University Press

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Cite this article: Figdor C (2024). Science Journalism and Epistemic Virtues in Science Communication: A Defense of Sincerity, Transparency, and Honesty. *Episteme* **21**, 1434–1445. https://doi.org/10.1017/epi.2023.38