Science Communication and Trust

Edited by
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Contents

11

Science Communication and Radical Trust

Adalberto Fernandes

Introduction

This chapter will defend the following claim: Science communication may produce radical trust, characterised by a lack of scientific knowledge. The aim is to better understand what radical trust consists of and what its relationship to knowledge in science communication is. The second claim that will be argued is that this kind of radical trust may (1) result from a rational choice to voluntarily abstain from trying to understand complex science and simply accept what experts have to say; or (2) it can be the result of socioeconomic disadvantage that force people to trust science radically. This means that there are two kinds of radical trust in science, and science communication should be critically aware of what types of radical trust it is contributing to.

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This chapter tries to understand the conditions under which radical trust in science communication could be a good thing and to explore the dangers associated with practices of forced or obscure "trustification". Trust can be "extracted" from people in a process of "trustification – [it] works in a similar way to how consent is extracted from individuals when they click 'accept' on a cookie popup notification" (Benjamin, 2023, p. 1), usually without users knowing what they are putting their trust in. This trust is obligatory if we want to benefit from the results of science and to refuse to trust in this way would amount to cutting ourselves off from a world where being scientifically and technologically savvy is a necessity. Trustification erodes the complexity of placing trust in daunting scientific and technological details by "collapsing complex social relations into a single metric of trust/no trust, risk/benefit" (Benjamin, 2023, p. 143). This obfuscates that trust includes larger political and economic conditions: "We often cannot even tell who, what or where we are expected to place our trust in the power structures and sociotechnical assemblages that surround technology" (Benjamin, 2023, p. 10).

Radical Trust

In one specific radical sense, trust is inherently antithetical to knowledge. This relationship of opposition stems from the circular situation in which trust sometimes seems to be trapped. Radical trust happens when subjects *do not know*, presenting them with the risk of being misled, fooled, injured, and betrayed, *and do not also know* that these nefarious possibilities are on the table. The radical case of trust explored in this chapter is the one in which knowledge plays no part. It is the case of individuals' lack of knowledge about the fact they are trusting the moment they are trusting. This radical version of trust has been proposed by Derrida (1998, pp. 47–48), who considers that, in a world without radical trust, everything would be "programme or proof, predictability or providence, pure knowledge and pure know-how, which is to say annulment of the future". If everything could be known beforehand,

without the need to trust in the future that may come with its unexpectedness, the proper possibility of the future would disappear. Only when the future is uncertain can the future be called the future; otherwise, it would be an eternal present or a repetition of the past. To leave open the "futurity" of the future, it is necessary to trust that something unpredictable, not calculable, or known, can happen. Trust is, thus, one important condition for science. Any scientist who does not trust that an experiment can succeed in the future probably will not even try to do it or, indeed, dedicate their entire life to science. On the other hand, scientists who do not believe that an experiment can fail in the future, or that it can disprove a hypothesis, cannot trust that experiment to refute scientific claims. This trust is radical because it cannot be eliminated by any amount of knowledge. If it could, it would signify the end of the future, of novelty, and science.

Besides the place that radical trust has concerning the novelty and futurity of everything, including science, radical trust also has an ethical aspect in Derrida's eyes:

> No discourse or address of the other without the possibility of an elementary promise. Perjury and broken promises require the same possibility. No promise, therefore, without the promise of a confirmation of the yes. This yes will have implied and will always imply the trustworthiness and fidelity of a faith. (…) A chance that entails the greatest risk, even the menace of radical evil. (Derrida, 1998, pp. 47–48)

Radical trust is not reducible to knowledge, including that knowledge of not knowing, because trust is a radical and gratuitous "yes" to what may come in the future (the other, a new meaning, a scientific discovery, etc.). But this yes is not simply an "intentional" decision of affirming trust. Merely to exist, to be a witness of what happens, to listen to someone and to talk to others, is to "unconsciously" trust that those things are possible. We do not simply talk to achieve trust, trust is already working before we engage in communication as its precondition, otherwise, there would be no motive to listen and to talk. We trust that we will be understood by others and will understand them, even before understanding occurs. Without this basic radical trust, scepticism would take

over everything. But even to be a sceptic is to believe that scepticism itself is possible. It is to trust that nothing can be trusted, given that a sceptic cannot *know* anything for sure. For Derrida, this radical trust of the "yes" is prior to the possibility of being betrayed or misled. To be misled is a secondary moment that can only stem from the first affirmation of surrendering oneself to that risk. It is not because individuals are intrinsically vulnerable that they need trust to survive, nor do they trust because they know for sure that they will be betrayed (that kind of suspicious *knowledge* would not amount to trust). They trust because their vulnerability cannot be fully known at the moment when they trust, given that knowing that one is at risk is already knowledge that reduces the amount of trust needed to live. That is why we are not immune to failure. It is because it is not possible to know fully that we are trusting the moment we are actually trusting that we are vulnerable to accidents, betrayals, or errors.

The ethical reading of this gratuitous "yes", an affirmative trust that is unrecognisable to itself, points to an openness to the other, even if that also exposes individuals to the dangers that may come by being open. Without this openness, nothing would be possible. Life would be filled by continuous hate, suspicion, and crippling anti-sociability. Anti-sociability would not be even possible without the minimal and imperceptible trust that would expose a person to the risks of sociability. An anti-social subject was social at some point before tasting the shortcomings of sociability. It also means that if trust is not breached, it may not even be possible to know that trust was, in fact, at work. Trust is, thus, closely linked to failure, to treason, but that does not mean that evil and error are looming everywhere. It just means that, for error and evil to happen, trust must first be placed in something or someone. To say that, without evilness and errors, trust would not be known is not the same as claiming that trust does not exist beforehand. To know and to exist are two different things, so trust reigns every time things run smoothly and subjects do not know that to be the case.

What can be summarised from this description of radical trust is that trust has a paradoxical relation to knowledge. Once people know how to trust, once they know that they are trusting, or know that they must trust because they do not know something, they are not trusting radically.

They are, at best, "semi-trusting". Full trust is, according to Derrida, unknowable and cannot be instrumentalised or requested on demand, which calls into question any research and practice of science communication that has as its goal *knowing* how to attain radical trust in science. Such a project would negate itself. If trusting were absolutely within the realm of knowledge, there would be no need for trust. Trusting is a fragile thing when it encounters knowledge, and it seems to be a condition for passing from ignorance to a state of knowledge and back again: Individuals cease to trust once they know, until their knowledge proves to require revision—which in turn reveals that they were trusting all along, given that they did not have knowledge in the first place, only trust. This radical version of trust suggests that we do not know when we are trusting because knowledge is antithetical to trust. To know how to acquire trust is a self-contradictory exercise because it entails knowing something that requires trust in the first place. If there is no trust in the possibility of people obtaining knowledge about trust, trust is not possible. If individuals know that they are trusting, they are no longer *fully* trusting. They are knowing, instead of trusting *completely* or radically. That just means that trust cannot be fully known, and to know how to trust completely is, paradoxically, to not know how to trust radically, because the strongest form of trust appears when there is no full knowledge, a situation which forces one to trust. This is more obvious when people do not even know that they are trusting, something that can only occur a posteriori but not at the moment when trust is being performed. And maybe it could never be known if trust were never breached.

This definition of trust is a challenge for science communication. It is not the version of trust that is at play in the discussions of trust and mistrust in science, given that trust is always associated with some sort of knowledge (e.g., about oneself or scientific institutions), so science communication works with impure or non-radical forms of trust. If science communication is in the business of *knowing* various strategies for obtaining trust and giving people *knowledge* that may make them trust science, it always results in an act of partial trust, not in its fullest and radical version. However, this chapter will try to argue that even this radical definition of trust can be deemed useful to understanding contemporary science communication because it shows the

tension between knowledge and trust in a more intense mode. It shows the fragility of trust and how, in this very fragility, trust reveals its utmost strength because it is auto-performative or tautological. *For trust to exist, we have to simply trust*: "if we are very conscious of the fact that we trust one another, or keep talking about it, one will have some reason to wonder if there is really trust between us at all" (Lagerspetz, 1998, p. 29). As expressed by Baier (1986, p. 260), "Trust is akin to a delicate plant […] that might not withstand scrutiny of its foundations, even if those foundations were entirely robust before the scrutiny".

Does Science Communication Promote Radical Trust?

Science communication has become a necessary feature of a healthy democracy, given the role that science has in the life of the citizens, and the amount of political decisions that are based on scientific expertise. Thus, to communicate science is to communicate something necessary to govern oneself and others. This means that a radical trust should have no place in science communication, given that such communication is to ensure that individuals *know* something about science and can make informed decisions in a democracy dependent on scientific knowledge. However, perhaps radical trust may be inevitable in a world that depends on increasingly complex science that cannot be understood by all individuals. Concretely, by making people depend on experts, by appealing to trust in something that most people cannot, completely or even partially, know, science communicators ask people to suspend their self-rationality when evaluating their trust in science. For a democracy to benefit from science, which entails having extended public support for complex science that cannot be fully understood by laypeople, science communicators cannot help people to think for themselves if it is to obtain trust in science. This seems to be thus a case of radical trust, that is, of trust without scientific knowledge. Notice that this kind of radical trust occurs when science is highly complex, the kind of complexity that not even one scientist alone can master and fully comprehend, given its interdisciplinary nature.

This claim seems to contradict the proper reason behind the existence of science communication as a social function that responds to an increasingly complex science-society relationship, which is to make less prominent the knowledge and power gaps that stem from the lack of public engagement and dialogue with an omnipresent science in the way in which democracy is governed. Radical trust is not the main objective of science communication, and certainly not one with which most science communicators and researchers would identify. The reason is that one aim of science communication that makes it politically relevant is its contribution to achieving a certain degree of epistemic balance or knowledge distribution between experts and laypeople, allowing decisions to be as informed as possible and not just based on gratuitous trust. It is, thus, *not* claimed that science communicators *should* actively promote radical trust. Simply trusting without knowledge makes people more vulnerable to epistemic harm. What is claimed here is that, in some situations, science communication is *forced* to produce radical trust, even if it is not a desirable outcome.

Science communication "suspends" the appeals to the rationality of individuals by showing that it is better, in some complex matters, to not think for themselves but let the scientific experts do the thinking for them instead:

> the rational layman will recognize that, in matters about which there is good reason to believe that there is expert opinion, he ought (methodologically) not to make up his own mind. His stance on these matters will – if he is rational – usually be rational deference to the epistemic authority of the expert. (Hardwig, 1985, p. 343)

In this quote, a paradoxical trust is produced by reasoning about suspending reasoning, when the "rational" subject has "good reasons" "not to make up his mind", to be reasonable by not using reason, or to limit the uses of reason to achieve a "rational deference", that is, a reason to obey what cannot be fully understandable.

Given the impossibility of being an expert in more than two or three disciplines, something that occurs only in highly rare cases and is certainly much rarer for most people across the world, given unequal

access to education, "we can use a number of fallible proxies for expertise, like social accreditation, or cognitive capacities, but we cannot detect expertise directly" (Martini, 2020, p. 121). This means that expert testimony must be trusted because in some cases it is not possible to understand the expert's reasons and thus to how they were obtained. It is this difference in knowledge access that makes someone an expert. What justifies trusting in an expert? It seems that people justify their trust in experts through non-scientific factors. Goldman (1999, p. 372) suggests that novices may trust indirect evaluations of expertise: (1) the evaluation of the quality of the argumentation presented; (2) the evaluation of the credentials of other experts with established expertise in related scientific fields who can be called upon to assess the authoritativeness of the original expert. While the second option only increases the burden of trusting another supposedly credited expert to scrutinise the good credentials of the first expert, the first option of analysing the argumentative quality of the expert's argumentation, albeit through a layperson's rational judgement, is still not the same as directly knowing what the expert knows. What Goldman (2002, p. 147) means when he refers to the argumentative quality as an indirect marker of expertise can be understood by his division between "esoteric" and "exoteric" statements. Esoteric statements pertain to the realm of expertise and are typically inaccessible to novices, while exoteric statements pertain to what lies outside the domain of expertise and may thus be accessible to novices. For instance, an appeal to common sense or using shared metaphors can be understood as exoteric ways to approximate to esoteric statements. Usually, the layperson is only able to evaluate the exoteric sentences provided by the expert, and it is based on these that the expert constructs a form of argumentative justification which is "indirect" as opposed to "direct" (Goldman, 2002, pp. 147–148). The layperson's ability to acquire direct justification from expert arguments is limited in situations where various matters are esoteric (e.g., some argumentative premises are based on technical skills in using and interpreting scientific instruments). Also, to rationally adhere to well-argued exoteric arguments is not always a warranty for trusting experts: "Skilled debaters and well-coached witnesses can appear better-informed because

of their stylistic polish, which is not a true indicator of superior expertise. This makes the proper use of indirect argumentative justification a very delicate matter", and that is why it is a "non-conclusive" signal of expertise for the layperson (Goldman, 2002, p. 148). In summary, the layperson places trust in exoteric statements and indirect argumentative skills concerning an esoteric topic that remains inaccessible to them as a non-expert.

This epistemic dependency of trusting in the esoteric aspects of science, especially when laypeople cannot understand all its inner workings, is not necessarily irrational but may imply a strange rationality to not try to use reason autonomously. Were they to do so, individuals may become engaged in futile and dangerous acts of "epistemic superheroism" (Buzzell & Rini, 2023, p. 912). People who consider themselves epistemic superheroes

> feel a need to draw on their inner power and solve the epistemic problem through sheer force of cognitive will. They hunt for data in obscure journals (despite having no background in medicine) and recalculate the statistics offered by public authorities (despite not understanding sampling correction techniques). (Buzzell & Rini, 2023, p. 910)

In this sense, attempts to persuade people to question science, as those made by science denialists or by corporate or political interests, do not make people dogmatic, but they follow the best Enlightenment tradition of urging people to think for themselves (Buzzell & Rini, 2023, p. 907). They appeal to an important "epistemic virtue: You should be fair, consider the evidence, think for yourself" (Bishop & Trout, 2021, p. 1). It is this boosting of self-trust to think for oneself that correlates with mistrust in science when science is not intelligible to the non-expert. To accuse science of being non-understandable, complex, and esoteric constitutes, for epistemic superheroes, an increase in their critical thinking and trust in their reasoning powers. To remedy this confusion between linking mistrust of science that is too complex to be understood with critical thinking or cognitive autonomy from the experts, "the first rule of avoiding the con is to admit you're vulnerable: Know you can be conned" (Bishop & Trout, 2021, p. 2). People who commit

acts of epistemic superheroism believe that they are epistemically infallible, that they can understand all the important scientific facts on their own, and that they do not need to trust experts when matters are too complex to be understood by laypeople. Assuming that we can be wrong in our reasoning, that it has limitations, and that there are experts who know better, is the outcome of having to trust when we realise that it is not possible for us as individuals to know everything. If an individual cannot trust oneself to understand everything and need to trust others in things we cannot comprehend, radical trust seems to lurk in science communication: "admit that you can be conned because you have to trust people. […] The general lesson is that people who fall for cons are just like you" (Bishop & Trout, 2021, p. 2). If an individual believes it is always the others who are wrong, because the others cannot think for themselves and trust experts on scientific issues they cannot verify as laypeople, that individual probably attributes too much self-trust in his abilities to self-reason about complex issues that are only understandable to an expert. The solution for this self-deceiving attitude is, paradoxically, to fight the mind's desire to achieve epistemic autonomy and defer to science, because, in certain complex matters, there is no other choice. For instance, if "the evidence for global warming were easy to sift, we wouldn't need a deference rule. We could figure out the right answers on our own" (Bishop & Trout, 2021, p. 10).

This deference to experts, this abandonment of laypeople's power of reason to understand the scientific evidence, methods, and instruments and place trust in someone who seems to have better exoteric arguments, but whose esoteric arguments non-experts do not have the means to evaluate, seems to violate individuals' epistemic autonomy that should in principle be needed when it comes to evaluating rationally whether to trust an expert or not. However, as Medvecky (2020, p. 88) argues, such deference is both unavoidable and desirable, given that people do not have unlimited epistemic resources; in fact, being epistemically independent could lead to significant epistemic deficiencies. Trusting science does not always stem from knowing more science; instead, it is to trust that individuals' reasoning alone is not trustworthy, that they should trust science even if it is not possible for them to find esoteric reasons to trust it. Trust in science seems to be close to the radical definition of trust

because science communication asks people to strip away some of their fundamental resources for thinking for themselves. It asks people to trust that their rationality is limited, which is, paradoxically, necessary if they are to trust others. Therefore, science communication is not simply in the business of making people think for themselves, because this is not always possible in a world where some fields of science have become extremely complex and where information is too abundant to be manageable and understood by individuals alone. That means radical trust sneaks back in when it must be conceded that science communication cannot work

> just by downloading responsibility to the individual agent. Notices and warnings are ineffective if we can't heed them all, and education and encouragement to act with epistemic virtue demand time and attention we can't always offer. We can do little to reduce the extent to which we rely on others for our knowledge. (Buzzell & Rini, 2023, p. 924)

Not all science communication leads to situations of radical trust. What these arguments show is that, sometimes, when science is too complex to be properly understood by non-experts, there is no other option for laypeople but to simply trust. In some cases of highly complex science, there are severely limited options for translating expert knowledge into common knowledge. Were this not the case, the role of the expert in society would cease to make any sense. It is because there is an expert that translation is necessary for non-experts, and it is because it is hard to become an expert that getting a direct translation is not always possible. The inevitability of trust without knowledge, a radical trust, appears when the layperson does not have the means to use reason to evaluate expertise because it is too complex to be understood by a single agent. In those complex cases, science communication may be described as an endeavour that *indicates* to the laypeople who are the trustworthy scientists and scientific institutions that can deal with a certain matter. Accepting this indication is based on trust, given that people cannot do a full background check on experts and institutions and assess whether they are suitable for the complex matter at hand. Obviously, this sort of naked trust can lead people to accept rationally that they must trust in science through the exoteric communicational means available to them.

However, where even exoteric means are not enough—because they are still very hard to understand, or are too far from translating the complex esoteric scientific knowledge—people end up trusting science without knowing that they are radically trusting in it. That is, people trust that they know science, but they are only trusting in the indirect exoteric clues of expertise that may be far removed from the direct esoteric knowledge. They do not only trust that they are in the presence of a scientist capable of dealing with complex matters, but they also trust that the translation from esoteric to exoteric knowledge is faithful, although the criteria for that faithfulness cannot be accessed by them because this would require them to be experts in the first place. With highly complex science, the proper esoteric scientific knowledge is at no point apprehended by laypeople. Thus, if laypeople are made to believe that they trust science because they know it, they are radically trusting in something that can only be fully known by an expert. Again, this argument applies to complex science, one that even an expert cannot understand without the help of scientists from other fields.

It can be claimed that science communication, in cases of complex science, is no different from other non-scientific matters where it is not possible either to obtain direct knowledge, a situation which forces individuals to trust radically. However, the fact that this is no different should be a concern for the field of science communication because this is characterised by dealing with *scientific knowledge*, it is not just a question of indicating which authoritative experts or institutions should be trusted. Science communication should be critical of claims that suggest that science communication *always* makes people trust in science by making them more knowledgeable, since trust cannot be produced simply by more scientific knowledge per se but only through an admission of the limits of reasoning that makes one trust what cannot be understood. A critique is more necessary when those kinds of claims may promote acts of epistemic superheroism (e.g.: "always think for yourself") that can lead to science denial when individuals try to strip away any need to trust in science that cannot be understood. In sum, science communication also promotes radical trust, but that is not necessarily bad. It merely shows how trust in science cannot always be promoted through a greater input

of scientific knowledge, and that the need to trust in the unknown is an inevitable part of a healthy expert-layperson relationship.

Political Economy of Trust of Science Communication

Arboledas-Lérida (2023) argues that science communication does not solve a problem by mediating trust in science, but is, in fact, the very symptom of inequalities in the access to scientific knowledge that it contributes to by not questioning why this knowledge imbalance exists in the first place:

> communicating science beyond the narrow circle of scientists is unavoidable for capitalistic societies. Even more so, they need to allot more social total labour time to SC [Science Communication], since the polarisation of the intelligence of production proves to be increasingly dysfunctional in the face of the on-going scientification of social production [...]. Therefore, there is no virtue in the fact that more science is transmitted to the 'public'. (Arboledas-Lérida, 2023, p. 700)

People need science communication because they have been deprived of the means to understand science by themselves; that understanding is accessible mainly to people with resources, for instance, to pursue careers in science. The fact some people do not understand science works in favour of capitalism, which needs an inexpensive workforce to build the world and not just scientists to think about it. Manual labour does not require the same monetary and educational investment in the workforce by businesses as skilled workers do. However, according to Arboledas-Lérida (2023), given the increasing role that science has in innovating capitalist lucrative production, workers too need to know more about science. Considering that they were stripped of the means to understand science autonomously, workers are now the main audiences of science communication. Simplified versions of science are necessary for them to adapt to the evolving technoscientific work environment. They are

not receiving scientific knowledge to be emancipated from their precarious work conditions, but merely to make them work better, faster, and cheaper by being attuned to the complexities of technoscientific capitalism. In sum, science communication is justified because there is an unequal distribution of capital that forces some disadvantaged people to be the receivers of mediated forms of science only, rather than being able to understand science itself, and for them to adapt to the fact that science is increasingly present in work life. This situation renders science communication a partner of capitalism by maintaining epistemic inequalities that stem from economic injustices. In Arboledas-Lérida's words, science communication

> would be superfluous were people carrying productive attributes that allowed them to assimilate scientific knowledge in an unmediated form [...]. But the restricted capabilities that capital equips workers with render impossible and even meaningless to them any non-mediated appropriation of objective knowledge. (Arboledas-Lérida, 2023, p. 705)

It means that, according to Arboledas-Lérida (2023), laypeople trust the expert not because the science itself is too complex for them to understand, but because there are economic powers that create the gap between experts and scientists, and so an asymmetrical dependency is promoted by science communication. Science communication should, if Arboledas-Lérida's (2023) argument is taken into its extreme consequences, be terminated because it is simply a way of maintaining unequal epistemic relationships, where some experts know the science and others receive simplified versions—a distinction that stems from unequal economic conditions. Following the consequences of Arboledas-Lérida's (2023) argument, if science communication does not take the steps to make itself unnecessary by making people independent of experts and mediated knowledge, science communication is maintaining unequal power relationships, instead of working towards the autonomy and emancipation of people.

However, there are two important objections to Arboledas-Lérida's (2023) argument. (1) If radical trust is a pervasive force, if it is not possible to achieve a state where trust has no role because people could

know science without the need to trust the mediation of science communication, it is hard to see a moment where science communication, even in an egalitarian society, would not be needed. We must remain open to trusting in what comes, in the future, in what cannot be fully known, including new scientific developments. (2) To know science, as opposed to receiving mediated forms of it, should not be something that every person has to strive for. Different trajectories in life, such as being an athlete, an artist, or a philosopher, should not be replaced by a complete dedication to knowing science just because receiving mediated forms makes people dependent on experts. *The fact that some people need to trust in the incomprehensible knowledge of others is also what gives them the possibility of knowing something that others do not know*. Even so, Arboledas-Lérida (2023) points to a crucial need to question the reasons for the existence of science communication and, especially, its economic reasons (Gregory, 2016), which systematically make some people the producers of science and science communication and others, who are usually economically more vulnerable, its receivers. It can be said that science communication may produce *a bad kind* of radical trust when people are forced to trust because of unequal power relations, and not just because their capacity to think autonomously can lead to acts of denial in the form of epistemic superheroism.

Laypeople are "likely to think of experts not simply as people with more academic qualifications, but people in a significantly different class, and potentially with significantly different interests", especially when "access to upper-tier income brackets, as well as the communities that house higher earners and the schools that educate their children, is determined by access to elite-college education" (Bennett, 2022, p. 559) and vice-versa. In the same vein, because

> the biophysical sciences are primarily populated by the socially dominant groups, and science communication promotes science as the good knowledge, this reinforces the view that the dominant social group is also the epistemically dominant group; those in the socially dominant group know better while those in other groups become epistemically inferior (Medvecky & Leach, 2019, p. 109)

To trust science that is too complex to be understood would thus be to accept uncritically all the reasons why some people have to trust scientists without understanding the science, while others have access to and may know the science. In this vein, and adapting an argument from Fuller and Collier (2003, p. 312), any science communication that does not make explicit the economic and political dimensions of science and its diffusion across the social fabric will not contribute to the "emancipation" of laypeople. Science communicators should thus inquire into who bears the cost of knowledge production and mediation, who benefits more from them, and what the economic imbalances between experts, laypeople, industry, and the state are. Making salient the economic dimension of the production and communication of science allows such matters to be open to negotiation between experts and laypeople in a field of dispute that is not just—using Goldman's (2002, p. 147) distinction—esoteric, but one that is exoteric, in the sense that people have a relevant knowledge about their economic difficulties. The science communicator can play a role in articulating how those difficulties correlate positively and negatively with the pursuit of science, and how investments in science and its communication either contribute to and/or fight against economic vulnerability. Scientists and science communicators may have better socioeconomic conditions than those who do not know science and therefore need to trust experts. This should be critically approached in order to understand and oppose the unjust effects of epistemic dependency. Trustworthy science communication will need an *open discussion of the political economy of science and science communication*, where the political and economic powers that make science and science communication possible are openly discussed with laypeople.

Conclusion

The radical form of trust, a trust without knowledge, seems to surface in contemporary science communication, especially in two situations. The first one is the deference to experts, which suggests that we should be wary of our self-reasoning capacities and embrace epistemic humility

when faced with complex scientific issues. This is especially important in the case when the open and inquisitive mind may, paradoxically, be counter-productive because placing too much trust in one's reasoning skills can increase the possibility of being wrong, which goes hand in hand with an inability to accept that some things are just too complex to be properly understood. In this case, people live in a world permeated by so much scientific and technological opacity (e.g., the inner workings of a laptop or the engineering of a car) that they do not even see that they are, in fact, trusting science, let alone know in what or whom their trust is being placed. This is a case of radical trust that no science communication could make fully explicit without casting doubt on everything that cannot be known by everyone in a highly esoteric technoscientific society.

The second situation is the deleterious political effects of deferring to experts, highlighted by the fact that the epistemic humility that makes people radically trust in experts of scientific matters too esoteric to be understood has as its basis power imbalances. The fact that capitalism needs a cognitive division of labour, where some less-skilled workers receive only mediated scientific knowledge to keep up with the upgrades of highly technoscientific work environments, while others produce and disseminate science that contributes to those upgrades, should make science communication critically ask what the objectives are of obtaining trust from laypeople. People may be forced to trust radically, i.e., to trust what they cannot know, simply because the resources to question that need to trust were not provided to them. Laypeople may trust because they do not know that their need to trust potentially contributes to the maintenance of unequal power relationships.

The problem is that the virtues of epistemic humility and the inequalities that make some people humbler than others may go hand-in-hand. To distinguish good radical trust from bad radical trust is a hard task. There may be cases in which it would be difficult to know whether laypeople are deferring to an expert because the matter at hand is too complex, or because the important, *and also complex*, issues about the power imbalances between experts, industry, government, the military, and laypeople have not been made explicit, voluntarily or involuntarily, or cannot themselves be easily understood. That scientists and

science communicators may have better socioeconomic conditions than those who do not know science and need to trust experts is, nevertheless, something that should be handled critically. Trustworthy science communication will need a *science communication that focuses on the political economy of science and science communication*.

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