ETICA: A YEARBOOK OF ETHICS & PUBLIC AFFAIRS
2025, VOL. 1, 41-52
https://doi.org/10.5281/zenodo.16992615

American University
of Armenia Press

Widespread Puzzling Beliefs*

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Abstract

The paper addresses the reasons for the current pervasive mistrust of science and expertise in the United States. It argues that in addition to the contributions of the internet and social media in facilitating the spread of misinformation, information silos, validation of kooky views, and so forth, the most significant contributing factor is the failure of the educational system in the U.S. to inculcate the basics of critical scientific thought and of its myriad extraordinary accomplishments.

Keywords: trust, expertise, science, education, critical thinking, evidence, rationality

Introduction

The PERITIA Horizon 2020 project and the conference on the Ethics of Trust at the American University of Armenia addressed the topic of a "crisis of trust in science and expertise." It seems that many people these days—rather than listening to what the best expert opinion is telling us about climate change, or COVID-19 vaccines, or election results—hold beliefs that are at variance with the best evidence. My examples of such puzzling beliefs are drawn from the U.S. context: 30% of the U.S. population believes that global warming is caused either by normal patterns or or that it does not exist at all; 25% are inclined to believe that the COVID-19 vaccines are unsafe for adults; and perhaps most shockingly, 1/3 of the country believes that the 2020 American presidential election was rigged, and that Biden won through "voter fraud" rather than "fair and square."

In each and every one of these cases, the evidence that these claims are false is abundant and readily available. So, how do so many people come to believe the opposite of what the evidence indicates? What or who is to blame?

Many theories have been proposed to explain how we ended up here. Some blame the internet and social media for the way they enable the fast spread of misinformation, and encourage encapsulation in information silos or echo chambers, so that the views you start out with keep getting reinforced without being subjected to counter-evidence. Some blame self-serving and mendacious politicians, who endanger the public good for their own benefit. Others point the finger at science itself, and the way in which the occasional scientific scandal may have eroded the public trust. Or they blame science for not communicating effectively. Or they blame it

for straying beyond its proper boundaries of expertise and making value recommendations. Still others look at the academy and especially at the "post-modernist" movement in the humanities and social sciences which has been raising doubts about the very possibility of objective knowledge or objective truth and so has promoted a kind of skepticism about the privilege we accord science.

I do not want to deny that some of these factors may be playing a role in explaining our current predicament. But what I want to argue is that, at the most fundamental level, the problem is far simpler and that the blame for our current problems actually lies with all of us and with the kind of society that we have built. We are to blame for the situation we are in. I will explain.

Puzzling Beliefs

Why is it *puzzling* that people have come to hold these beliefs? Because, *by and large*, people are rational: they *conform their beliefs to the evidence*. Yet, in these important cases, they seem to be deviating wildly from what the evidence supports. And this requires explanation.

In what sense are people by and large rational? First, a word about "rational." A *belief* that is "irrational" is not a belief that is merely false—indeed, it need not even be false at all, it might be true; rather, it is *a belief that is not supported by the evidence that you have for it*. If you buy a ticket for a lottery, and you have the firm belief that you will win the lottery, that belief will be *irrational*, even if it turns out to be true, and you do win the lottery. It is irrational because even though it turns out to be true, you had zero evidence that you were more likely to win the lottery than the next guy. So, a belief is irrational if it is not supported by the evidence available to you. And a *person* is irrational if he or she has a tendency to form beliefs in a way that is not proportional to the evidence that there is for them.

In this sense, then, if you look at ordinary, everyday behavior, it is remarkably rational: in going about your life, crossing the street, climbing the stairs, ordering food, driving your car, and so on, you are constantly being exposed to new evidence and rationally adjusting your beliefs accordingly.

Of course, we are far from perfect in this regard. None of us is perfectly rational. We all experience occasional lapses, especially when strong emotion is involved. But it is the norm. And departures from rationality get called out and need explanation.

So, when we come across a *large-scale deviation* from the available evidence, as we seem to get in these cases, it is puzzling. And when they concern *matters that are as important as these*, we really need to know what is going on. After all, we are here talking about matters as important as the future of the planet, the potential deaths of millions, and the viabil-

ity of democratic forms of government. So, the stakes could not be higher.

You might think that puzzling beliefs are nothing new. For example, even before the Trump era, nearly 50% of Americans believed in ghosts, 24% in reincarnation, etc. One difference, though, between my examples and these ones is that these are all examples of beliefs for which there is *no adequate evidence*, rather than examples of beliefs that have been *refuted* by the available evidence.

Beliefs that you hold on inadequate evidence are a certain kind of irrational belief; but beliefs for which you have ample disconfirming evidence are much worse and are much harder to explain. The puzzling cases I am talking about are all of the latter kind.

You might also think that people believing propositions that have been decisively refuted is nothing new, either. For example, there are, and always have been, kooky conspiracy theorists out there: people who believe, for instance, that there never was any moon landing, that the whole thing was faked.

That is true, but we are talking about a very small number of people. It is easy to live with the claim that there is a small number of "kooks" amongst us; it is much harder to live with the claim that a third of the population is kooky. In any case, calling someone "kooky" is saying: I don't know why he believes the crazy things he believes, but I don't really care. But, of course, we do care why so many people believe things that threaten the very existence of democracy.

I defined "puzzling beliefs" as beliefs that seem irrational because they seem to run counter to the available evidence.

The big question we face, then, is whether this appearance is true or illusory: when we figure out what is going on here, should we conclude that people only *seem* irrational or are they really being irrational in holding these beliefs?

This question is important both for science and for society. For science, it is important to figure out how belief, which is supposed to be responsive to the evidence, could deviate from it in such a large-scale way.

For society, it is important to figure out what is going on because we might know how to fix the problem if we are dealing with basically rational people who have been misled in various ways; if, instead, we are dealing with an outbreak of mass irrationality, we may not know what to do, since we do not really know of good ways of dealing with irrationality, let alone irrationality on a massive scale. So, the answer really matters.

Two Important Distinctions

Before we get to considering explanations, we need to make two basic distinctions.

First, between two types of questions:

A(ccess)-type questions: questions that ordinary folks can settle for themselves. They can get access to the relevant evidence *and* are in a position to evaluate that evidence for themselves.

E(xpert)-type questions: questions where ordinary folk either *lack access* to the relevant disconfirming evidence or are *not in a position to evaluate it* for themselves and so must rely on the expertise of others.

In ordinary life, we come across many questions that we can settle for ourselves. However, much of ordinary life is pervaded by questions that are E-type questions that we cannot settle without expert help. My car's broken down—what's wrong with it? I have a pain in my stomach—what's causing it? Or think of all the questions that you have to google, or look up on Wikipedia, etc.

The puzzling examples I cited above—the belief that climate change is unreal or that the COVID-19 vaccines are unsafe or even that the election was rigged—are all basically E-type cases (although I think the one about the election is closest to being an A-type case). In such cases, you either do not have access to the relevant evidence for yourself or, even if you did, would be unable to appreciate the justification for yourself; to believe the right thing on these topics, you need to rely on expert opinion.

So, the situation is that the experts have the evidence, and they make it available to you through journals, newspapers, government officials, and so on. Of course, if, for whatever reason, you do not *trust* the experts, you will end up ignoring this evidence and it will not have the appropriate effect on your beliefs. This lack of trust will explain why your beliefs are not conforming to the evidence.

The question of the rationality of these puzzling beliefs then becomes the question: Were you *rational* to withhold your trust from the experts? A second, important distinction has to do with whether the question at issue is a purely *factual* one or a *practical* one.

For example, the questions whether climate change is real, whether the COVID-19 vaccines are safe and effective, or whether Biden won the election fair and square, are factual questions: they concern whether something is true.

However, the question whether it is rational for you to *take* the COVID-19 vaccines is not just a factual matter, it is a question about whether you have a reason to *do* something, not a question about whether to believe something. And you could very well believe that the vaccines are largely effective and safe, while thinking that, on balance, it does not make sense for *you* to *take* them. This might be because of the special circumstances you find yourself in—you are young, etc.

E-type Cases

Let's turn then to looking at E-type cases—where you have to rely on expert opinion on a given topic. Here we need to ask: What is an expert? What is it to trust an expert? How do you identify who the experts are? When is it rational for you to trust them?

For present purposes, the notion of an expert on a given *factual* topic can be taken to be fairly unproblematic: it is someone who knows a lot more about the topic than ordinary folk do and who can pronounce on it with considerable reliability.

What about an expert on a *practical* question, e.g., whether it is good for you to take a given vaccine?

Here, it is *not* enough that someone knows a lot more about the relevant factual issues; the person must also know what is in *your* best interests; and that, in most cases, is a *much* higher bar to meet.

What is trust? And what is it to trust someone, more specifically to trust them as an expert on a given topic?

Ronald Reagan, when asked whether he trusted the Russians to abide by the terms of a nuclear arms control treaty, said: "Trust but verify!" This is cute, but slightly nonsensical. To trust someone involves relying on them without having to double-check that what they are telling you is true. That is the whole point of trust. In effect, Reagan was saying that he did not trust the Russians.

But there is a version of Reagan's thought that is correct; it has been well brought out by Dan Sperber, Gloria Origgi, and their colleagues. As they have pointed out, there is a distinction between trust and "blind trust." While we have no choice but to trust experts, that does not mean that we do not, or should not, exercise a certain kind of *epistemic vigilance* about what we are being told—we check on whether what we are being told is internally coherent, or coherent with what we already think we know. We check on whether the source in question still qualifies as an expert or whether she has somehow fallen out of touch with the most recent developments. Or, whether the source is straying from what they are truly expert on. And so on. So, being trusting is consistent with being vigilant in these ways. A good knower would trust but remain vigilant. So, Reagan should have said not "Trust but verify!" but rather: "Trust but be vigilant!"

Let's turn to the next question: how do we rationally identify who the relevant experts are on a given topic?

I was once in a debate with Daniel Kahneman, the Nobel Laureate in economics, who recounted the following story. He was invited to lunch by people he did not know, who said they wanted to talk about climate change. It turns out they were climate change deniers. Kahneman said that he then thought to himself: "Well, I treat the folks in the National

Academy of Sciences as experts on this, and the consensus among them is that climate change is real; whereas these guys treat these other people as experts and those people deny it. Who am I to say which of us is right?"

At the time, I found myself surprised—even outraged—at this remark by the Nobel Laureate: don't we have much more reason to treat the members of the National Academy of Sciences (NAS) as experts rather than arbitrary internet "experts?" The people in NAS have a string of extraordinary scientific accomplishments behind them—they put people on the moon, virtually eradicated polio, came up with the science underlying computers and the internet, etc. What string of accomplishments do the arbitrary internet experts have to their names?

Well, maybe that is a bit unfair as a description. Climate change deniers can always count on there being at least a few well-credentialed scientists who have rebelled against the consensus. And these days, with the internet, it is much easier for the denialists to find out that such prominent rebels exist. The fact that such scientists exist, along with certain other factors, like distrust in government, can offer some rational support for the denialist view. But it does not make the appearance of gross irrationality go away, because to side with a few fringe figures over the overwhelming consensus of climate and other scientists, still seems very irrational.

So, how could Kahneman say what he said? How could he think that his lunch companions were *epistemically blameless* in picking the fringe "experts" rather than going with his choice, which is the consensus of the members of the prestigious NAS?

Kahneman did not explain. But I now see that we can offer the following argument on his behalf. To put the matter succinctly: *for many people, the question which experts to trust is itself an E-type question*. In other words, for many people, the question which experts to trust on a given topic is itself a question that you cannot answer for yourself but need expert help to do so.

There are at least two dimensions to the question about how to identify experts:

(a) What criteria should people use to figure out who counts as an expert on a given topic?

(b) How do ordinary folk rationally tell who satisfies those criteria?

As examples of (a) we could mention: Why should we prefer experts who have degrees from top institutions and membership in national academies to those who are not credentialed in this way? Why should we prefer people with a track record of impressive accomplishments over those who do not have such a record? Why should we prefer the views of the consensus of the members of a national academy to fringe outliers?

As examples of (b), we could mention: How do I tell what the "top"

institutions are? How do I tell who has got an impressive track record and who does not?

To some of us, the answers to these questions may seem obvious, questions that we can more or less answer for ourselves—these are A-type questions. To others, the answers may appear far less obvious and may not be answerable without expert help—these are E-type questions.

To whom will the answers to these questions appear obvious? As one might expect, they will appear most obvious to those among us who have received a good education—one that includes an appropriately deep study of what it is to inquire into the truth about the world in a rational manner. Such an education taught me not only about the *institutions* and the *content* of science; it also taught me *how to think critically and scientifically*.

If you have received a decent education, you learn about the phenomena that science seeks to understand; you learn how complex those phenomena are, how difficult it is to make predictions about those phenomena that are accurate, and how remarkably accurate many scientific theories have been. You would learn just how remarkable it is to have been able to land a probe on an asteroid coming in from the furthest reaches of the solar system traveling at 25 kilometers per second, or what an achievement it was to discover the structure of DNA and now to be able to edit it. The list is endless and mind-boggling.

You also learn about the peer review process, how tough it is to get something accepted by a top journal; how incentivized scientists are to criticize the views of other scientists, to check them; and so forth.

A proper appreciation of the magnitude of scientific achievement, of the genius that underlay those achievements, would naturally lead you to have a great respect for science as a knowledge-producing institution. While learning all of this, though, and inevitably, you would also learn how to think scientifically and critically yourself. It is not possible to teach someone a decent amount about what proper critical rational thinking is without also teaching them how to think critically and rationally.

So, at the end of a decent education, you not only end up with a trust in—indeed reverence for—the institutions of science; you end up with a trust that you can see to be rational by the very critical faculties that you acquired when you learned what it is to think critically and scientifically. So, for you, the question about why it is rational to trust science was, as it were, satisfactorily answered a long time ago—answered through the use of your own critical faculties.

In effect, what I am suggesting is that, with proper schooling, the question of which experts to trust becomes an A-type question—one that you can settle for yourself. You can see for yourself how extraordinarily impressive the scientific method has been in understanding the world around you. The kind of critical faculty that is thereby cultivated is also

what enables you to exert the "epistemic vigilance" that Sperber et al. (2010) describe—allowing your trust in expertise to not be blind.

Now, you might think it is an objection to what I have been saying that the question of which experts to trust can occasionally arise in a meaningful way even for a highly educated person. It is absolutely true that this question can arise meaningfully, even for those with substantial education; however, this is not an objection to my claim; it actually supports it.

Take, for example, the question whether cryptocurrencies are the future of money, or whether they are just a Ponzi scheme with which to defraud unsuspecting folks. Because a currency like bitcoin is such a new concept, resting on previously unheard-of technologies like the blockchain, and so forth, most of us will need to rely on experts to figure out what to think. But who should we listen to? Who counts as an expert?

You might think the answer is easy. Who are the experts on money? Surely, the chairman of JP Morgan Chase—the largest bank in the U.S.—Jamie Dimon, would qualify; and he says cryptocurrency is all nonsense. But is Jamie Dimon really the right person to listen to? We know from history that sometimes an idea can be so new and transformative that even the best of the old guard cannot recognize its value: history provides many examples of such blindness. So, maybe instead we should listen to the inventors of the various cryptocurrencies? However, those folks are interested parties with a heavy investment in persuading you that crypto is the future of money; so, their views, while worth hearing out, cannot be taken as reliable yet. So, we do not know who to turn to.

As we can see, then, a choice of expert can be a real conundrum, even for highly educated people. But it is a conundrum precisely about questions about which *there is no established scientific consensus*. Because questions about cryptocurrencies contain so many new features, critical scientific reflection has not yet been able to fully process what it would be correct to believe about them. Far from showing, then, that education makes no difference to the question of who to trust, it only reinforces the privileged place that critical scientific thought has for us.

What I have been arguing then, is that if you have received a proper education, one that includes not only learning about the great achievements of scientific thought but inculcating a certain amount of that skill in you, the question of who to trust on most well-defined topics becomes relatively easy. And indeed, that is how it seems, doesn't it? Here we are, a bunch of highly-educated academics, scratching our heads about how people could allow themselves to be misled by fraudulent experts. Of course, the matter seems easy to us; but how does it look from the vantage point of someone who has not received our kind of education?

Suppose all you have to go on is a very basic education, from a generally bad public school system, such as the one in the U.S., most of which

you will have forgotten by the time you are 30. Here you are in early adulthood having to make up your mind about whether to take a new vaccine, or whether to believe in something as elusive as global climate change, or even whether to believe that the election was not rigged.

In such a case, it is easy to see how you might not know the answers to our questions about how to go identifying the right experts. Why should you prefer the views of the consensus of the members of a national academy to fringe outliers? And what is a national academy anyway? And how do they arrive at consensus? Is that forced on them perhaps by outside forces, like the government or money? And who has the most impressive track record? And what does that mean anyway? For someone with little knowledge about the achievements of science and with too little capacity for critical thought, these can all seem like very difficult questions to answer in a rational way.

If, through no fault of your own, you grow up not knowing the answers to such questions, you can easily find yourself in a quandary with respect to them from which you cannot extricate yourself through purely rational means. To rationally resolve an E-type question, you need to know which folks to count as experts.

However, which folks to count as experts is itself an E-type question for you, and so itself requires reliance on experts. This threatens what we call a regress of justification.

If you are in this predicament, it may very well be a rationally irresoluble matter for you which experts to trust. Once such a rationally unbridgeable gap opens up, it can only be filled with rationally arbitrary factors, such as charismatic persuasion, propaganda, political solidarity, disinformation, information silos, and the like.

In the educational system as we currently have (at least in the U.S.), many individuals experience a rationally blameless uncertainty about how to go about identifying the relevant experts, and when to trust them. For them, it is totally understandable that their opinions may be manipulated by factors and actors in a way for which they cannot be wholly blamed.

What is the solution? As I say, once you have arrived at the point where the question who to trust as an expert is an E-type question for you, you have no rational way out. At that point, you are at the mercy of various irrational factors and actors.

So, the only solution for a democratic society that does not want this to happen is not to allow so many of its citizens to arrive at such a stage. And the only way for a society to prevent that from happening is to ensure that its citizens are educated in the only real respect that counts: a full appreciation of the powers and achievements of critical scientific thought.

Objections

I can offer two objections to the argument I have been making.

First, even many highly educated people—whom one might expect to have no difficulty identifying scientific experts—are climate change deniers, vaccine resistant, or believers in the "Big Lie" about the election (consider, for instance, some of the politicians in the Republican Party or figures like Robert Kennedy Jr.). So, how can we claim that a proper education is the solution?

Second, I have noted that those of us who have been taught both about science and about how to think scientifically have no difficulty figuring out that it is rational to trust science. But how did we arrive at this happy state? Was it not simply by having it drilled into us that scientific critical thought is the right way to fix beliefs? If so, why isn't what we have here just a sophisticated form of *brainwashing*? If all that is going on is that

I have been brainwashed one way (and we call that "rational") how can I rationally insist that others adopt my perspective?

I will take these in turn.

What about all those educated Republicans, then? Well, I do not know how many of those people really believe what they say they believe. Much of it may be just expedient political posturing.

At least as far as both the Big Lie and vaccine hesitancy are concerned, the studies show that lack of education is the best predictor for whether you will fall for these falsehoods. The situation with climate denial is a little more complicated, but then again, that is the topic most remote from everyday experience and concerns.

That said, I should emphasize that I do not for a moment think that a decent education would make *all* of our problems go away.

There will continue to be such a thing as *motivated irrationality*—where you allow your desires for something to be true to cause yourself to ignore or suppress the evidence against it. That does not necessarily go away with education. There will continue to be the influence of propaganda, which we know from history can be effective even with educated folks. (There are quite a few educated Turks who to this day deny the Armenian Genocide).

You can even encounter problems from being too intellectually sophisticated and falling for sexy but ultimately nonsensical views, as we have seen with the rise of "post-modernist" thought in the academy. According to such views, there is no such thing as objective truth or knowledge; rather, all truth is "socially constructed" at a particular time and place and reflects the contingent values of those who create it.

My favorite example of the proponent of such a view is the famous French philosopher and sociologist of science, Bruno Latour. When French

scientists working on the mummy of Ramses II concluded that Ramses had probably died of tuberculosis, Latour (2000), sticking to his guns, wrote a famous paper in which he questioned their findings. "How could an Ancient Egyptian pharaoh," he asked, "die of a bacillus that was not discovered until 1892 in Berlin? That would be as anachronistic as saying he died of machine gun fire." So, as we can see, even smart people can end up saying very silly things.

One of the things that underlies such social constructionist, relativist ideas is precisely the thought that lies behind our second objection. What makes critical scientific thinking the best way to approach an inquiry into the truth? As the ancient philosophers realized, you can quickly run out of answers to such questions.

Why is perception a good source of evidence about the world? It seems that we would need to use perception to try to answer this question. Why is logical thinking the right way to think? It seems that any answer will itself employ some logic.

However, if such *circular* justifications are allowed, then maybe other methods can have such circular justifications as well. Maybe if you read tea leaves, the tea leaves would tell you that reading tea leaves is the right way to figure out the world.

Philosophers are paid to think about such issues; but you would have to be mad to think that the outcome of those reflections may be that tea leaf reading *is* just as good a way of inquiring as science is.

No sane person is in doubt about the probative value of the scientific method, even if it would take a lot of philosophy to explain why that is the right attitude.

The ordinary person who is in a quandary about which experts to trust is not doubting that there is a fact of the matter about what to believe; or that there are better or worse ways of doing so.

That person has simply been let down by our educational system, such that questions which seem obvious to us appear difficult to them—leaving them vulnerable to manipulation by irrational factors and actors. That is why, I said at the beginning that it is we who are ultimately to blame for the current state of affairs, because it is we who allowed our governments to neglect the education of their citizens to the extent to which they have.

Acknowledgement: This publication is made possible by a European Commission Horizon Europe ERA Chair Grant. The opinions expressed are those of the authors and may not be shared by the European Commission.

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*A revised peer reviewed later version of this paper was published as Boghossian, P. Puzzling Beliefs: Why Do Many Americans Mistrust Science. Soc 61, 343–349 (2024). https://doi.org/10.1007/s12115-024-00996-4. All citations of this piece should reference this later version. © The Author(s), under exclusive license to Springer Science+Business Media, LLC, part of Springer Nature 2024