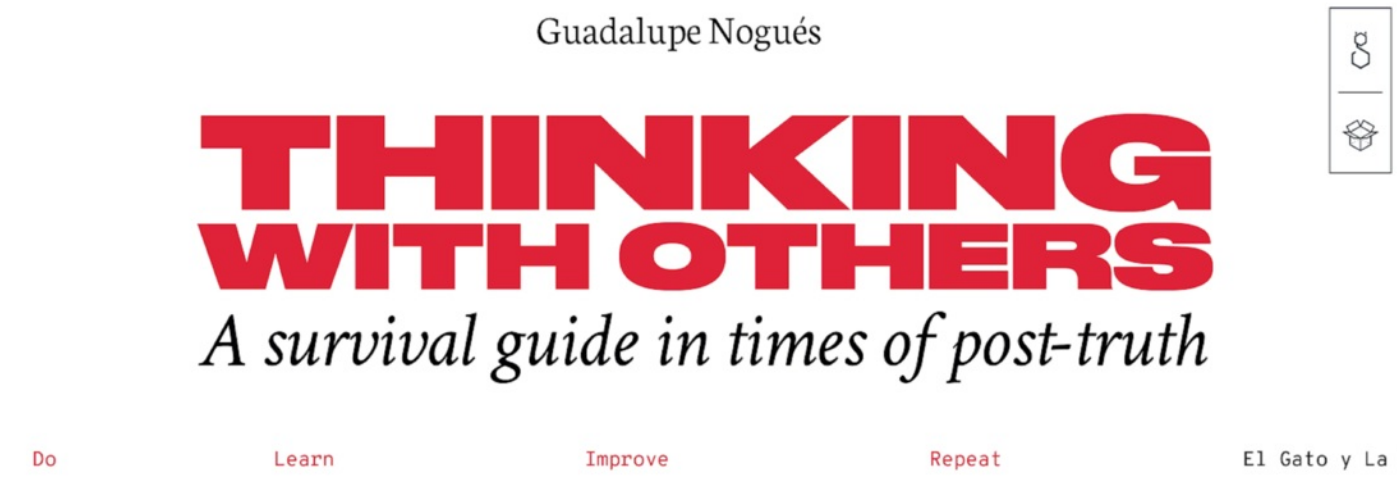

Thinking with Others. A survival Guide in times of post-Truth - Of Words and Things, Chapter 1

Authors:	Guadalupe Nogués
Submitted:	21. March 2020
Published:	27. March 2020
Volume:	7
Issue:	2
Affiliation:	El Gato y la Caja. Buenos Aires, Argentina
Languages:	English
Keywords:	"Pensar con otros", how do we know what we know?, journal project, sharing Knowledge
Categories:	DEMETRIOS Textbooks, Humanities, Social Sciences and Law
DOI:	10.17160/josha.7.2.646

Abstract:

Below is the introduction, preface and first chapter of the book Pensar con otros. Una guía de supervivencia en tiempos de posverdad (Thinking with others. A survival guide in times of post-truth), published in 2018. A book that aims to be a starting point to break down post-truth into its main components through concrete examples, as a way to better prepare ourselves to identify the structures that foster post-truth and thus achieve, together, survival and victory. Post-truth allows facts to become facts as long as they fit the desires of each group, of each tribe. Each of these groups develops its own narrative with a language that privileges the capacity to provoke emotions, and pushes those emotions to build landscapes only accessible to those who share the way of looking at them. This discontinuity in the landscape is a threat to the existence and development of meaningful human bonds, to our coexistence as a species on this planet and, thus, to our survival. For this reason, we will consider it an important and urgent public health problem, and this is our contribution to solve it together.

JOSHA
Journal of Science, Humanities and Arts
March 2020 Volume 7, Issue 2

THINKING WITH OTHERS. A survival guide in times of post-truth - Of words and things, Chapter 1

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Ilustrator: Morocho Estudio
Date of previos publicacion in EL Gato y La Caja: 10/02/2020
Link to the original article: Thinking with others

Below is the English version of the introduction, preface and first chapter of the book *Pensar con otros. Una guía de supervivencia en tiempos de posverdad* (Thinking with others. A survival guide in times of post-truth), published in 2018. The complete book can be found in Spanish at pensarcontros.com. The rest of the chapters of the book have not been translated into English yet.

JOSHA
Journal of Science, Humanities and Arts
March 2020 Volume 7, Issue 2

Of words and things

From the deepest ocean trench to the top of mount Everest, Earth's surface is one continuous plane that we can trace with our finger without ever lifting it from the map. Between the lowest depth and the highest summit there is only a difference in height, and we can move seamlessly from one to the other. However, just reading two different newspapers or listening to a conversation between intellectuals from two different disciplines today reveals a broken, discontinuous landscape in which the distance between A and B seems to be infinite, simply because it's impossible to get from A to B.

Suddenly, facts are recognized as facts only insofar as they fit the desires of each group, of each tribe. Every one of these groups develops its own language—one which, out of the many functions of language, prioritizes its ability to stir emotions, and then uses those emotions to build landscapes that are only accessible to those who share a viewpoint. Since there is only one world but many different eyes looking at it, we are gradually separated and polarized by tribal discourse. In *The Death of Tragedy* (1961), George Steiner said: *"Words carry us forward toward ideological confrontations from which there is no retreat. (...) Slogans, clichés, rhetorical abstractions, false antitheses come to possess the mind. (...) Political conduct is no longer spontaneous or responsive to reality. It freezes around a core of dead rhetoric. (...) Instead of becoming masters of language, we become its servants."*

And on the waste land around the chasm, on the territory that each tribe claims as its own, there grows an infectious seed: post-truth.

Each year, *Oxford Dictionaries* choose their "word of the year." In 2016, they chose *post-truth*, which was defined as "*relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief.*" The term also entered the dictionary of the Spanish Royal Academy in the late 2017, but with a slightly different definition: "*a deliberate*

distortion of reality that manipulates beliefs and emotions in order to influence public opinion and social attitudes."

The most frequent use of the word *post-truth* occurs in the field of politics. It has been extensively discussed in the context of the United Kingdom European Union membership referendum (or "Brexit"), and of United States presidential election that put Donald Trump in the White House. In both cases, the campaigns of the winning parties were supported by data that were later established to be false (such as the idea the United Kingdom would save money by leaving the European Union), or by rather vague statements (like "Make America Great Again"). There were exaggerations, misinformation and false promises, as if politicians had decided to bring to life this H. L. Mencken quote: "*There is always a well-known solution to every human problem—neat, plausible and wrong*." Both these elections created an environment of exacerbated polarization: what our side says is right and what the other side says is wrong, regardless of whether it's true or not.

We know lies are not new to politics. Thucydides discussed them as early as the 5th century BCE in his writings about the Peloponnesian War: "*To fit in with the change of events, words, too, had to change their usual meanings*." However, this was a new phenomenon: once it became clear that the Brexit and Trump campaigns had been full of false data, many voters did not feel cheated. It was as if truth, in its more extensive, or even in its most limited sense, were no longer relevant compared to how they had been made to feel. And politicians were not even pretending to be telling the truth anymore, considering their claims could be easily debunked by publicly available data.

Aside from politics, post-truth is also often discussed with respect to journalism and professional communications. Traditional media are being pushed aside by new media. Social networks have made it easier than ever to share news, both true and false. We can all publish new content, which quickly adds to and mixes with what is already available. The news of a terrorist attack or an earthquake can travel around

the world in minutes, but so can a rumor, a piece of fake news, or just gossip. On the one hand, the ability to create and consume content outside of traditional media gives us independence and freedom. On the other hand, it can sometimes be difficult to know what value to assign to each specific piece of information. Our division into tribes that inhabit their own "pseudo-realities" is strengthened by the ways in which we engage with the media and by our usage of social networks—both of which make it easier for us to group ourselves into isolated bubbles. Post-truth endangers, above all, our ability to create and maintain the kind of human bonds that can only occur when we share a common world.

There are some who believe that we should not be calling this phenomenon "post-truth", but simply "lies" or "falsehoods." While the Spanish Royal Academy definition seems to support the idea that post-truth always equals intentional deception, that does not seem to be the case. In post-truth, facts are hidden, shaped and manipulated, sometimes in a deliberate and systematic manner, but not always; thus, the broader Oxford Dictionaries definition seems more appropriate.

Apparent certainties arise in areas where there is still doubt, and doubt arises in areas where there are already certainties. Post-truth emerges as a result of that confusion, because it stands up as a cohesive and systematic narrative in which internal coherence trumps any anchoring to the real world. This is neither a mistake nor a lie: a person who makes a mistake can eventually notice it and mend it, and liars know that they are lying. Post-truth, however, is hard to identify and to step away from, because it makes everything look the same.

It is too early to tell whether we are living in "post-truth times," but we do know that this phenomenon also happens in areas outside of politics and journalism. These are areas for which we have data and know things, and yet there are people who simply ignore all of that knowledge and adopt a position that is not supported by facts. For example, we know that vaccines are very safe and highly effective at preventing disease, and we know that human beings are largely to blame for the climate crisis

that is threatening our very existence. Yet, there are people who believe that vaccines cause autism, and that anthropogenic climate change is a lie. These examples, in which unreasonable doubts are raised over issues for which we have well-established data, reveal a structure of post-truth that we also observe in politics and journalism.

POST-TRUTHS

Talking about post-truth forces us to talk about truth. And that is not so simple, since the word means different things in different contexts. The concept of truth is quite concrete in areas like mathematics, logic or metaphysics, in which truth is arrived at by a process of deduction. That is not the definition of *truth* that we will use throughout this book. Here, we will consider truth as the correspondence between what we say and what occurs in the world. We will take a practical approach. That is, we will assume that there is in fact a reality that exists independently from us and that can be accessed with varying degrees of difficulty. Our access to reality is imperfect, because it is performed with imperfect tools. Our experience is subjective: our senses mix with our expectations to tell us what is happening, and our interpretations of the meaning of facts are variable. We can sit and pout forever about our own limitations, or we can simply accept that this is the best we have at hand and consider our limitations as parts of the process through which we access reality. In this book, the term *truth* must be read in that sense: not as something that is absolute and entirely certain, but neither as something so vague and inaccessible that it can be equated to any piece of fiction. This delicate distinction is one of the key points we will discuss in the following chapters.

So, there is a real world outside that seems to follow its own rules, and in which things happen. The things that happen are the facts of reality. There are no “alternative facts.”

Having clarified this, let us go back to post-truth. The process of highlighting emotional aspects and causing known information to be ignored in favor of positions

that contradict it is not always driven by intention. Sometimes—and this may be one of the key problems here—what we find is a certain indifference towards the distinction between what is true and what is false. From this indifference or ignorance, we get *casual post-truth*. Many factors are at play here, including our beliefs and emotions, our inability to tell true experts from false ones, and certain errors in reasoning. We split up into increasingly isolated tribes, around common ideas that are often far from real, or true. In addition to this, the media amplifies the most extreme voices because that makes them more reliable in the eyes of an audience that expects to be told exactly what they want to be told.

When the mechanisms that create casual post-truth are co-opted and exploited by groups with the intention of writing a "post-truthful" narrative, we get *intentional post-truth*, which is what the Spanish Royal Academy seems to be referring to. But this can only be achieved by dominating and directing the process that leads to casual post-truth. We need to recognize our individual and collective responsibilities in the emergence of casual or involuntary post-truth, which, very often, leads to intentional or voluntary post-truth.

We are both victims and perpetrators. This approach assigns us greater responsibility, but also gives us greater power. It is not enough for us to identify intentional post-truth, such as spotting fake news or fact-checking politicians. We also need to look within, and challenge the ways in which we think and act, so as not to unwillingly make the problem worse.

THE REASON FOR THIS BOOK

Post-truth is both the product and the cause of an endless rift. We inhabit parallel narratives within overlapping worlds in which physics breaks down and allows us to walk through each other without ever being deflected from the predetermined trajectories of what we have decided is real. This fracture, this discontinuity in the landscape, threatens the emergence and development of human bonds, which in turn

threatens our coexistence on this planet and, therefore, our survival. That is why post-truth is, after all, a public health issue.

This book attempts to be a starting point for unravelling the issue of post-truth into its main components so that we can all survive and thrive together. The focus will be on mechanisms and processes, illustrated through concrete examples, so that we can be better prepared to identify the structures that favor the emergence of post-truth when new issues arise.

The book is also a part of a wider effort to make us more committed to truth, to be better empowered citizens, and to strengthen the ties that bind us.

None of this means that we should all hold one homogeneous position on every topic. Not in the least. But we should be able to lay strong, shared foundations, to agree on what is and is not true, and to use that as a cornerstone to build better societies, and to better protect democracy.

One of the problems with post-truth is that it is presented as an alternative to truth, as if truth were something that we possess and not what it actually is: an unknown target on the horizon towards which we move, and for which we need a compass. If we become lost, we can build a compass. But if we cannot agree on where North is, there is no compass we can possibly build. We will be doomed to forever wander the winding paths of ignorance. Or worse: we will be doomed to walk behind someone who has made up their own North and can shift it at will.

We all share this same planet, this same reality. We also share concerns, problems and hopes. But there also are, and will always be, major differences between us. In order to discuss our different perspectives, we need to agree on the facts that we are observing. Without that fundamental agreement, there is no possible exchange of ideas or arguments, no way to have shared experiences, and we run the risk of becoming impervious to others.

Sharing a common reality is the first step towards agreeing or disagreeing on possible courses of action. It will bring us together in discussion. That is why the fight against post-truth is a fight for preserving the possibility of human bonds.

We can strive to understand post-truth in order to detect it, address it and survive (both ourselves and our species). The road is certainly long and complex, but it is also rich and transforming. Walking down that road will not only teach us a lot about the world (and about ourselves), but will also allow us to take back the power of becoming agents for change, and of claiming the opportunity to both freely look at the world as it is, and use the best tools to imagine and build the world we want.

This book is an attempt to understand the issue of post-truth, to show why it is important and urgent, and to provide some tools to approach it.

HOW WE KNOW WHAT WE KNOW

We have already mentioned that we can identify two types of post-truth: *casual* or *involuntary*, which stems from our behavior, and *intentional* or *voluntary*, which is created by people or interest groups who have somehow learned how to hack into the mechanisms of casual post-truth for their own benefit.

As a first step down the road towards identifying and fighting post-truth, we need to understand how we can differentiate *what is known* from what is not. That is, we need to be able to answer this question: “How do we know what we know?”

This is the time to lay a strong foundation: we are going to discuss how to identify and weigh the evidence around factual issues, which will allow us to speak more clearly of the existence of *truth* in a practical sense. We will also discuss how to evaluate consensus and take uncertainty into account.

In order for this section not to become polluted with post-truth, we will wade into the waters gently. The examples and stories in the first section are not too controversial,

and have been selected to illustrate the core points of how we know what we know. In the second section, we will address the main mechanisms that cause involuntary post-truth and, in the third, we will discuss some examples of voluntary post-truth in action. Finally, in the fourth section, we will take everything we have discussed into account in order to move forward and consider how to survive post-truth.

THE AGE OF POST-TRUTH

How does science work?

WE CAN KNOW

Linus Pauling was one of the most prominent scientists in the 20th century. His discoveries on the nature of chemical bonds won him the Nobel Prize in Chemistry in 1954. After witnessing the horrors caused by nuclear bombs in Hiroshima and Nagasaki, he became a political activist and received a Nobel Peace Prize in 1962.

Thus, when, in the late 1960s, Pauling began to champion the idea that common colds could be prevented or shortened by taking vitamin C, many people listened to him. For many of us, the sound of an orange effervescent tablet dissolving in a glass of water is part of our childhood. It is not that our parents were insane: the idea that taking one or two grams of vitamin C a day could protect you from colds seemed reasonable—Pauling, a man of remarkable intelligence and dedication, who had received awards from the research community, said it did. He had to be right, right?

Sometimes, I will tell stories. Not because the stories in themselves prove anything. They don't, because, as an author, I choose the stories that illustrate what I want to tell and because, in any case, they are nothing but anecdotes, which are far from being proof of anything. But stories are often interesting in themselves—they provide context

and introduce us to people and times. Stories have also been with us for a long time. They are a part of what makes us human.

Pauling founded an institute to research the benefits of vitamin C. And although it may not seem obvious, this is a problem: when scientists design experiments, they do it *to find out whether* something matches what they believe or not, not *to confirm that* something does. Pauling was already convinced that vitamin C worked, even before he did any experiments, and there's the rub: there is a great difference between believing that something *may* be true, and being convinced that something *is* true *before* having any concrete evidence that it is.

Pauling had started taking three grams of vitamin C daily, he was convinced that he was getting fewer colds, and he believed that this was due to the vitamin C megadoses that he was consuming (doses above one or two grams per day are considered extremely large). Taking that belief, plus some research he had read on the subject, he wrote a book in 1970 that became a best seller and established in society the idea that vitamin C was effective against the common cold. As a consequence, pharmacies started selling vitamin C supplements. A few years later, millions and millions of people were following Pauling's advice to take two or three grams of vitamin C per day.

But Pauling was not right. The opinions of scientists, though some may not like to hear it, have no more value than those of any other person. Opinions on factual issues are only valid when they are evidence-based. In order to obtain evidence, we need a scientific investigation that complies with certain rules in order to provide reliable results. When that happens, opinions not only cease to be mere opinions, but it is no longer important who the source is (or even whether that source is a scientist or not). Science is a *how*, not a *what*, and particularly not a *who*.

Pauling's first experiments showed results that seemed to support the effectiveness of the vitamin. The first concerns appeared around 1980 and were based mainly on the fact that Pauling's experimental methods were not entirely correct, and that his

interpretations of the results were biased. A *how*, we said; not a *what*, and particularly not a *who*.

What could Pauling have done to confirm whether his suspicions were true in a less biased way? To begin with, he could have compared a group of people taking the vitamin to another group taking something that looked the same but did not have the vitamin (what is known as a *placebo*). In addition, since what was being tested was the number of colds—an illness which can show very variable symptoms among people—it would have been necessary for these groups to be comprised of lots of individuals (so as to reduce the weight of the peculiarities of each person on the final results), and for the study to extend over a long period of time. If Pauling had wanted to have even more data, he should have repeated the experiment several times, and have got more or less the same result each time, in order to be able to assert that, indeed, vitamin C worked against colds.

But he did not do any of this, or he did it halfway. Some of the methodological problems of Pauling's experiments were that there were no control groups of subjects receiving placebos, that the test groups were too small, and that the results were not properly interpreted.

Curious about the results, other institutes began to research the topic. The new studies were better designed, and more careful about methodology. And that is where the differences started to appear: their results pointed towards the fact that people who took vitamin C and people who received a placebo got colds at the same rate. At most, the groups treated with the vitamin showed less severe colds, but that was it. Pauling did not accept these results, and he never changed his stance. The medical and scientific community, which considered the quality and quantity of the available evidence, never endorsed him.

So, on the one hand, we have the opinion of a genius, Linus Pauling. But on the other, we have a body of high-quality experimental evidence. It is clear that what we *know*

is that there seems to be no justification to consume vitamin C in high doses. The amount of vitamin C that we need to be healthy can be obtained from a balanced diet.

Yet, these supplements continue to be sold in pharmacies, and many continue to buy them. Why? Let us try to understand.

EVIDENCE, WE NEED EVIDENCE

Information reaches us through many different channels. We talk with our neighbors, with our friends and with our family. We read newspapers; we watch television. We take part in social networks. We listen to experts, to our doctors, to our cultural referents, to celebrities. We also have our personal experience: our life lessons. We receive all that as a barrage of opinions and ideas about the world that we don't always have time to evaluate carefully. Because, of course, *information* does not equal *truth*: there is high-quality and low-quality information; there is true, likely, doubtful and false information, in a descending ladder that brings us closer and closer to post-truth, if we are not careful.

Not everything in life is information exchange, of course. Human beings are very complex. We think through a combination of several components that mix and intertwine: reason, emotion, values, traditions, intuitions... We are individual beings; we are all different, but with much in common. We value the beauty of the world. There is beauty in art, in mathematics and in nature, and each one of us appreciates it in a particular and unique way. Thinking in terms of evidence may sound very cold and analytical, as if it could erase the subtleties that make us who we are. But I don't believe that. Quite the opposite: I see it as proof of the world that we have in common and unites us, and of our heroic ability to have moved from being ordinary animals to being animals who wonder what the world is like, and who wonder what it is like to wonder what the world is like. I find that beautiful.

We also take into account our personal experiences. If we regularly take vitamin C supplements and *it seems to us* that we are catching fewer colds than other people, we may think vitamin C is protecting us. If family or friends tell us they are also doing it, we may take that into account as well. And if a famous athlete or celebrity says it too, we may find it even more compelling. After all, celebrities often have access to "the best of the best" and, if they choose something, it must surely be great, right?

The problem with positions that stem from personal experiences (our own or other people's) is that there is no guarantee that they are not completely wrong. All the cases mentioned above pose the same problems. How do we know if we are *really* getting sick less often than other people? Do we have the *correct* statistics of how often people get sick, or is it just a vague impression we have? And even if it were true that we got sick less often, how could we know if that was due to the vitamin C supplement we took? Couldn't the cause be something else, like how many hours we sleep, how exposed we are to the viruses that cause colds, or what we eat? When we start to dissect what might be happening, we realize that, other than the feeling that something we do works, we do not really have clear evidence that it does, unless we research it.

Now, let us go one step up on this fictional ladder. It is no longer a friend or another person telling us that they have caught fewer colds since they started taking vitamin C. Now, we read in a newspaper that a survey of 1000 people was carried out, and that 82% of them believe that vitamin C can prevent colds. How about that? Is this more believable to us? We could think that 820 people are a lot of people, and that that has more weight than what our friend or neighbor has told us. But it does not. You cannot vote on reality. Democracy cannot be used to find out whether a fact is true or not. A survey is a useful method to find out what people's *opinions* are on a topic. In this case, it tells us what people think about vitamin C. But an aggregate of opinions that are not based on evidence is just that: an aggregate of opinions. This may sound controversial, but it is a key point: a survey is not a valid method for

learning about the facts of the natural world. Those 820 people may be just as wrong about whether vitamin C effectively prevents colds as our friend or our neighbor.

So then, what? These people (a friend, a celebrity, or the participants in a survey) are not experts in the subject, but what they say can have an impact on us. Opinions, anecdotes and personal stories are data that we keep in mind. And they might be useful. But they might also not be. That information alone is not enough to tell us if they are.

It is amazing how many times a day we exchange this type of information. When you start paying attention, you can see that it is everywhere: we give advice on anything, from where to buy the best produce to which doctor or electrician to call. I try to pay attention when this happens. In many cases, it doesn't seem to be an important thing to do. For example, when a conversation is about personal tastes, feelings or ideas, opinions and experiences are key. But when the conversation refers to the reality of the world, and something more vital is at play, like people's health or safety, I make a conscious effort to try to detect whether or not the information that I am giving or receiving is supported by reliable evidence. I don't always manage to do it, of course, but being aware of it helps.

Let us go up one more step: What if the person recommending that we take vitamin C to prevent colds is a doctor, or an expert in an area that is relevant to the issue? This is something important, so much so that it bears to be repeated: what is important is not *who* says something, but *on what they are basing what they are saying*. Is it based on their personal experience? Do they feel they get fewer colds since they started taking vitamin C? If so, then it is the same situation as we discussed before, and we are facing another Pauling (without the Nobel prizes). We are back in the realm of unfounded opinions and anecdotal cases.

But what if, instead, their idea was supported by some kind of evidence, some stronger proof? The first thing would be to ask what that evidence could be. What could we look for as reliable data? If scientific research has shown that vitamin C

protects against colds, and has done so through careful studies that have, for example, compared how often a group of people who do not take the supplements get sick versus a group that does, then we already have more reliable information. If what our doctor says is based on that type of information, then it is more reliable than if they saw a celebrity recommending vitamin C in a magazine, or if they are basing their advice on their own personal anecdotal experience, like our made-up friend, or the 820 people in the survey.

That's right: a doctor's opinion, just like Pauling's opinion, is worth the same as anybody's when it comes to scientific questions: *nothing, unless it is backed by evidence*. It is not a matter of intelligence or college degrees. Few people have been smarter or better trained than Pauling, yet few have been more wrong on this issue.

Something about this can make it difficult to stay alert. When people make these types of recommendations to us, they often do it because they care and are thinking about our well-being. If we probe for evidence of what they are telling us, it translates into distrust and, by extension, into a rejection of the care that a person has shown for us. Something that I try to do in these cases (and this is me making a recommendation based on my personal experience that I would love to see studied in a controlled experiment to check whether or not it works) is to keep things separate: I hold on to the good (the display of love—"Thank you!"), while at the same time I ask myself if what they are saying to me is right or wrong. I separate the person from what that person is saying, and I hold on to their gesture.

But this is not just a matter of people being mistaken: there are also those who use a sort of "junior" version of post-truth to exploit ambiguity, or even our lack of information on how to choose what information to trust. The advertising industry (9 out of 10 advertising professionals, according to a survey by the University of Whoknowswhere) use this confusion in their favor all the time, showing dentists, dietitians or doctors recommending certain products, without it being clear whether

or not those products are really effective, or whether they have used a methodologically valid process to support their claims.

So, what do we need from a claim to better trust it? We need it to be supported by high-quality evidence. For example, if we read a scientific paper directly, or an expert tells us about it, or we read it (properly described) in the media, we can trust it more than if this information did not exist and we only had, at best, personal opinions or experiences. There are no rules that we can apply blindly, but we can incorporate some "guidelines." The most important thing is for us to start viewing confidence in a claim, not as a black-and-white issue, but as a spectrum. It is not about being certain, but about being a little more or less certain as new evidence appears.

This is another small thing that I find beautiful, as well as useful. There is no absolute certainty regarding claims about the real world, but some information is more reliable than other. While uncertainty may make some uncomfortable, I see it as something that is beautiful and flexible, in which I am not forced to fully take one side, but where I am invited to proportion my support of something to my level of confidence, to base that confidence on the evidence I have, and to change my support when evidence changes significantly.

When we tried to assess whether vitamin C prevents colds or not, we saw that, in order to know, we need to take into account the type and quality of the scientific evidence available. It was not enough for our parents to have given us supplements as kids, nor to have the opinion of Linus Pauling, even if he was a double Nobel Prize winner who was loved and admired by his peers. Pauling was an extremely intelligent and capable man who was, on this particular issue, completely wrong. Because, despite having won two Nobel Prizes, he was also a human being, with the same ability to make mistakes that all human beings have. It is precisely because we can be—and often are—wrong that we need a method to understand what is evidence and what is just unsupported opinion.

HOW TO COME CLOSER TO THE TRUTH

We accept, then, that there is an “out there,” a real world. But we also know that we should not rely heavily on our personal experience or our intuitions, because they are often wrong. In order to get answers, we need a way to address the questions by looking for concrete and reliable evidence. The good thing is that this already exists: the tools of science allow us to examine our beliefs from as far *outside of ourselves* as is possible.

When we think of science, perhaps we picture high-school classes in which we were asked to memorize data or mechanically perform procedures without really understanding them, like rote learning the defining features of arthropods, balancing chemical equations or writing down Newton’s laws. The word *science* may also evoke a type of article in the media, such as when a new satellite is sent out to space or a potential cure for a disease is discovered. But that is the least fun and interesting part of it; the best thing about science is that it is much more than results. Science is fundamentally a *methodology*, a series of mental tools. It is a *process*, an action, a verb.

If all of our scientific knowledge was lost tomorrow, we could probably recover it in a couple of generations. If the methodology of science was irreversibly lost, our knowledge would stop where it is, and we would be doomed to a future of not understanding the world. It is the difference between having a piece of bread to eat and knowing how to bake bread.

Of course, science is not enough to “save us from post-truth.” When we discuss the specific mechanisms that generate post-truth in later sections, we will see that it is not enough for information to exist, and for us to know it and understand it. We need firm foundations before entering the analysis of post-truth. Those foundations

involve understanding that the methods that science uses to answer questions help us determine what is true and what is not.

Unless otherwise stated, when we talk about sciences we will be referring only to those that share the *methodology* of making observations or experiments to find out how certain real-world phenomena occur. We will focus on the *way* in which the questions are answered and not so much on the *topic* that those questions address. This usage of the word includes natural sciences, which study natural phenomena, but we will also include with it the study of other problems that do not seem to be so clearly part of science in terms of topics, but are in terms of the methodology they use, such as when we want to find out whether a new drug is effective or not. We will not discuss the non-empirical branches of mathematics, or technology, for example. As for social sciences, there are areas in which this methodological approach applies, such as econometrics or experimental psychology, and others in which it does not so much. When discussing how to approach truth, the topic is irrelevant. What we need is to first understand science as a method, as a way of approaching knowledge, and not as content from a particular discipline. As Karl Popper said, “But this does not affect my point that the classification into disciplines is comparatively unimportant, and that we are students not of disciplines but of problems”

In this book, we will call the knowledge that can be obtained through this method, regardless of the topic, *scientific knowledge*. This set of tools allows us to find out whether an idea we have about the world reasonably matches reality or not. Science, the methodology for answering questions by searching for evidence, is all around us.

What we need in order to approach truth is to understand how reliable knowledge is created. Largely, though not exclusively, this knowledge comes from scientific activity, understood as a *particular methodology that generates evidence and interprets it with a greater or lesser degree of reliability.*

JOSHA
Journal of Science, Humanities and Arts
March 2020 Volume 7, Issue 2

THE MASTER KEY TO ALL SOLUTIONS

Regarding vitamin C, we have come to a solution, to an answer, to something that we can say we know: scientific evidence, which is plentiful and very reliable, does not support the idea that vitamin C is effective against colds. That is the truth on this issue, and if someone continues to argue that vitamin C works, it is just their unsupported opinion and not much else.

As already mentioned, we are not talking about absolute truth but about something that, being supported by lots of evidence, has an extremely high degree of certainty. And this posits an interesting challenge: if my confidence in a particular claim is more of a spectrum than categorical certainty but, at some point, I need to categorically decide whether I believe in it or not, what do I do? I like to think in these terms: while there is no absolute certainty, I can operate in the world with little, enough or a lot of confidence in a claim, while keeping in mind that these truths may become more or less reliable over time, according to new evidence. To do that, I need to rely on the best evidence available. The evidence we have makes it clear to me that taking vitamin C supplements to fight colds does not work. At the same time, I am more than willing to change my mind if new, high-quality evidence indicates otherwise. For some, this life of relative uncertainty can be a source of anxiety. I find it much more distressing to walk through life feeling certain of things I don't really know.

But, after so much work from so many people, we only have one *solution*, and no other. We do not know whether other vitamins work as promised, or if vitamin C is very good for other conditions, or anything at all. We are always, in a way, trying to catch up with issues, and we still don't know if there is something we can do to navigate this world that is full of information which is sometimes correct and consistent, but at other times irrelevant, incomplete, or just contradictory.

The question of *knowing* or *knowledge* is just as slippery as the question of truth. Philosophy has many definitions of what it means to *know*. Our position here is the

same that we use to define truth: it is something that is practical, provisional, gradual, and always subject to review in the light of the evidence. Within this framework, if we want to know, we need to be able to find those few reliable—that is, evidence-backed—claims that seem to be lost in that sea of knowledge. We must not only find them, but accept them, if we want to avoid post-truth. But how do we do it?

James Randi is one of the most famous magicians and escape artists of the 20th century. He is not the kind of magician you find in books, like Harry Potter, or in films, like Dr. Strange.

I know there are no real-life magicians. What does the truth have to do with fully enjoying fictional characters? The only problem could be in forgetting the distinction.

Randi has no superpowers and, more importantly, he does not claim to have them. Inspired by the work of Harry Houdini, Randi decided to become a stage illusionist. For half a century, his appearances in theaters and on television made him very popular. What he knows—and he knows it very well—is how to trick us into believing that he performs magic “for real”.

When we see a magic trick, we know that the person performing it does not really have supernatural powers. We know we are being deceived, but, if they are a good magician, we do not know how. And that is what we enjoy in a show: the wonder of seeing the seemingly impossible happen. That is the unspoken agreement between the magician and their audience: we suspend disbelief for a while and allow ourselves to be amazed, while we keep in mind that this is a show, and the magician is a performer. Yet, there are those who break this agreement and claim to have paranormal powers; this has occurred in every possible way and in all historical contexts.

Uri Geller is an illusionist who, in the 1970s, claimed to have true psychic powers. In his frequent public appearances, he would claim he could bend spoons with his mind or know what someone else was thinking. But what is the fun in doing tricks if, at the

same time, you are convincing people that what you are doing is not attained through skill, but by using special powers? For Randi, and for most professional magicians, the fascinating part is to have their audience try, unsuccessfully, to figure out how they managed to escape from a small box in chains and handcuffs, or where those coins, handkerchiefs or pigeons are coming from. That is the art and the pleasure of magic: for the audience to know that what they are seeing is not true and, at the same time, for them to *believe* (for a while) that it is. As soon as magicians try to convince their audiences that their powers are *real*, that they can actually make objects appear and disappear, or that they can actually guess thoughts, they become frauds. James Randi, in parallel with his career as an illusionist, began to devote himself to exposing Uri Geller and other so-called "psychics" by repeating their tricks on television and explaining them to the audience. He also exposed the tricks of some pastors who claimed to be talking directly to God, and who convinced the faithful to stop treatments for cancer and other illnesses, and to try to heal themselves through prayer and through donating money (curiously enough) to those same pastors.

Randi managed to prevent many of those people from continuing to profit from their fraudulent actions. Unmasking those who live at the expense of people's vulnerabilities posits a problem, however: whoever exposes the "prophets," "psychics," or people with other "paranormal powers" is always one step behind them, trying to catch up. In the same way, people who use very thorough arguments to debunk medical treatments that do not work, explaining point by point why they do not work, or those who try to demonstrate why certain claims about any topic are wrong, are always one step behind. Alberto Brandolini formulated the "Bullshit asymmetry principle," which states: "The amount of energy needed to refute bullshit is an order of magnitude bigger than to produce it." Saying nonsense or lying is quick and easy. Gathering compelling evidence to refute it is harder and takes longer. It is a race that is lost before it even starts, but it still needs to be run.

This creates a tension: on the one hand, it is essential to have proper research to obtain reliable evidence, but, on the other hand, as a society, we need to be able to make decisions in the short term, and sometimes we cannot wait that long.

How do we combat these frauds more effectively? How could we stay one step ahead? In the words of Randi himself, who very soon realized that he was unable to expose all of these charlatans, "To explain the tricks to you would give you one solution, but it wouldn't give you all of the solutions."

The same thing happens not just about fraud, but about knowledge in general. Every new piece of factual knowledge is obtained in a particular, meticulous and demanding manner, and it is essential that it be so. But how can we, who want to use that knowledge to make better decisions, find it and identify it? Are there any shortcuts, or are we doomed to assess each claim individually to see if they are reliable or not?

We need a "master key to all solutions" and we need it urgently, so as not to sink into the sea of irrelevant or inconsistent information while trying to identify that which is valuable and more reliable. It is not enough to try to catch up to the claims that appear in the media or on social networks, having to find out whether or not it is true that coffee causes cancer, that immigrants or refugees are criminals, that vaccines work, that the horoscope can tell us our future, or that placing a tax on sugary drinks helps prevent diabetes. How could we, instead, come to a more general solution, a set of rules that can be applied to new situations?

We can try to fact-check everything, but it is a slow and difficult process that requires dedication and a certain level of expertise. It is something that we expect journalists and news agencies to do before they publish their stories, and, as a society, we should demand it. We can also be proactively demanding of ourselves before believing a piece of information or repeating it as true. On the positive side, there are reliable information sources that follow guidelines for proper fact-checking, and there are also lists of unreliable Internet sites that have spread fake news. But fact-checking is not enough of a solution for the general public. It is valuable that it exists, of course,

but it is not enough. And lists of unreliable sites quickly stop being useful, because anyone who wants to spread falsehoods can create a new site in no time. Moreover, what prevents them from compiling lists of reliable Internet sites, and claiming that they are not reliable?

We do not want to be given fish: we want to learn to fish and thus be more independent. Fact-checking will not fully protect us from the fake news that proliferates and is easily spread over social networks. It may be able to catch some, but not all, and not quickly enough, and never to the full extent to which fake news is spread.

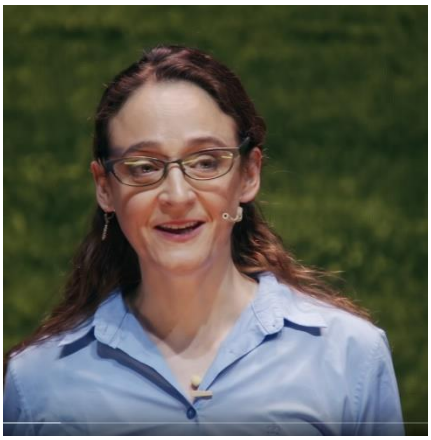
Professional research is essential, because it allows us to find and interpret the evidence with which we can evaluate claims. Professional journalism is also essential, because it communicates on issues correctly after verifying their truthfulness. But even then, we need another tool: at some point, each one of us must become an active agent, a reliable information selector. The *methodology* of science, as a way of answering questions from many areas of knowledge, can be useful. It is not the only element we need, but it is important for building the strong foundations on which truth can stand. Further ahead, once we have developed a more complete and more complex picture, we will see that, although we need to better understand the methods of science, this is not enough to combat post-truth.

In order to find the master key to all solutions that Randi was talking about and not get lost in this stormy sea of confusing or fraudulent information, we need a different outlook, one that allows us to better understand how we know what we know, and to what extent we know it. That is what will help us distinguish what is true from what is false, truth from lies—which is the first step in fighting the post-truth epidemic.

Throughout this first section on *how we know what we know*, we will venture into the world of evidence: what it is, how reliable it is, how much our imagination and our prejudices influence it, and what it means to have consensus or not.

Translated by Paula Serrano

About the author:



Guadalupe Nogués, PhD in Molecular Biology. Teacher and communicator. Now building bridges between science, communication, policy and education. We all contribute to post-truth and it's together that we can overcome it. // Bióloga molecular retirada de la mesada. Involucrada ahora en la ciencia, la comunicación, la educación y cómo entretejerlas. La posverdad la hacemos entre todos y la deshacemos juntos.

- The original article can be found at https://elgatoylacaja.com.ar/pensar-con-otros/prologo/las-palabras-y-las-cosas
- The full book, for free, is avaliable at https://elgatoylacaja.com.ar/pensar-con-otros/indice/
- For further information, please visit the TEDx Talk “How to talk to others who think differently” by Guadalupe Nogués at https://www.youtube.com/watch?v=ESwDIXXyh_Y&feature=youtu.be