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# Final Paper

The coronavirus continues its rampage in the United States managing to change all of our lives in an instant. In the midst of this chaos, it seems as though we found ourselves stuck inside another epidemic - the epistemological epidemic. To paint a picture, this epidemic consists of individuals denying the existence of the coronavirus, refusing to wear masks, taking safety precautions and so on. More recently, many people have been vocal about not taking the vaccine. The sheer refusal of science-deniers to believe in science may inevitably result in numbers of casualties beyond our imagination.

I believe these anti-vaxxers and science-deniers are not entirely to blame. By walking alongside the path of a non-scientist's quest to obtain scientific knowledge, we will be able to clearly see the struggles in which they encounter. Through the philosophy of Thomas Kuhn and Bruno Latour, I believe we can actually partly blame the nature of knowledge and science.

To start off, it is important to address Kuhn's theory of paradigms. To Kuhn, paradigms are what differentiates science from non-science and where normal science occurs. Scientists devote themselves to a particular paradigm and work within that paradigm to create theories, observe, and experiment. In other words, scientists are puzzle-solving. Furthermore, Kuhn makes the argument that knowledge obtained within one paradigm cannot be transferred into another paradigm. Every paradigm is completely self-contained and once a scientist leaves, or un-devotes, themselves from a paradigm, they are also subject to giving up the knowledge they

obtained. The most profound claim that Kuhn makes is the fact that a paradigm actually shapes the world of the scientist and impacts the way they think.

While on the topic paradigms, a new question arises concerning the non-scientist's position within (or not within) paradigms. Since knowledge cannot be transferred out of paradigms, we can assume that the non-scientist must be within the paradigm for any transfer of knowledge to occur. In other words, in order for a non-scientist to obtain the knowledge presented within a specific paradigm, they must devote themselves to that paradigm and that one only. Once they devote themselves to that paradigm, they are able to gain knowledge through the scientific literature.

Bruno Latour actively pursues the position that science should be thought of in the literary sense. He spent much of his time observing scientists in the laboratory. Latour understands science as the process of fact-making which is then presented through scientific literature. Understanding science in the literary sense is so important because it is the only product of the scientific process that other scientists and non-scientists will be able to access. Scientific literature aims to persuade the reader to believe the claim that is presented within them.

To recap, we discussed that the non-scientist must devote themself to a paradigm in order to obtain the knowledge generated within that paradigm. Once devoted, the non-scientist is able to obtain knowledge through way of scientific literature. Next, we will discuss the methods in scientific literature uses to persuade its readers.

Similar to other forms of literature, the writers (scientists) employ multiple rhetorical strategies to ratify the purpose of its creation. One rhetorical strategy that scientists use in scientific literature is incorporating more black boxes in their writing. Black boxing is a pivotal

concept for Latour. It is the way in which a scientific theory becomes a fact – when other scientific theories use it as a base. Every scientist would hope that their theory, one day, becomes a black box. One of the ways that Latour illustrates a black box is through the way we understand the idea of DNA. DNA is understood as a double helix and must be taken into account in this way when conducting biological experiments. The more black boxes that a scientist employs in a scientific paper, the stronger its persuasive prowess becomes.

Adding onto the concept of black boxes, Latour recognizes the idea of uncovering them as well. He claims that any black box can be uncovered to show the process by which it was created. Latour uncovers the DNA double helix black box by showing us the process by which James Watson constructed the fact. Before Watson, the double helix was never considered a fact.

Establishing the concept of black boxing, we can continue our journey alongside the non-scientist. The non-scientist, after devoting themself to the paradigm and obtaining scientific literature, is now able to read the literature in hopes to gain scientific knowledge. If the scientist's rhetorical strategies are successful, then the non-scientist takes the information presented in the scientific literature as fact.

Now the question arises pertaining to the instance in which the non-scientist is not persuaded by the scientist. In this case, the non-scientist takes on the role of the dissenter. The dissenter is now responsible for presenting statements that refute the scientific literature. Latour would call these statements negative modalities which would indicate that the idea in the scientific literature is unsettled. As straight forward as this sounds, the scientist did not make dissent easy for the non-scientist.

The rhetorical strategies employed by the scientist are not only useful for persuasion but also to make the non-scientist's pursuit of dissent more difficult. If scientific literature used black

boxes, the non-scientist - as the dissenter - would now need to present statements that refute both the scientific literature and the black boxes. Let's refer back to the DNA example. A piece of scientific literature on biology uses the double helix black box. If the dissenter were to refute this specific scientific literature, they would also need to refute the black box as well. As a piece of scientific literature employs more black boxes, the dissenter would, in turn, have a more difficult time to refute the scientific literature.

Continuing on with our non-scientist to obtain scientific knowledge, it looks as though they have reached an impasse. The non-scientist can either accept the claim made in the scientific literature or become the dissenter. The obvious choice is for the non-scientist to take the path of least resistance and accept the claim. Refuting the claim will take the non-scientist on an arduous journey to not only uncover, but refute, black boxes upon black boxes. However, this is a lot to ask from the non-scientist trying to refute the claim in the scientific literature.

What if the non-scientist is neither persuaded, nor do they want to pursue refutation and become the dissenter? I believe there is another path that the non-scientist is able to take. When refuting scientific literature, the dissenter unknowingly takes part in the universal teaching method which is advocated by philosopher, Jean-Joseph Jacotot. In other words, the dissenter is responsible for finding (possibly curating) their own claims, freely, without guidance of a "teacher."

The universal teaching method approach towards education is effective on everyone since it is based on the claim that all people are equally capable of learning. However, the universal teaching method requires that the student (dissenter) have the will to learn. Without the will of the student, the universal teaching method fails at its core. For the dissenter to refute the

scientific literature, they must have the will to refute the scientific literature whole-heartedly. I believe this is not the case for most non-scientists when face-to-face with scientific literature.

When the non-scientist neither becomes the persuaded nor the dissenter, they become the denier. One reason the non-scientist might subscribe to be the denier is the use or over-use of black boxes. While employing black boxes are a great rhetorical strategy for the scientist to solidify the persuasive prowess of their scientific literature, it is a deterrent to the will-less non-scientist. If a claim does not lie parallel with the non-scientist's beliefs, the path of least resistance is away from the scientific literature – denial. However, denying scientific literature and its claims come at a greater, epistemic cost.

The scientific facts are what a paradigm is built upon – the sole existence of a paradigm is at the fate of these facts. To deny these facts, the non-scientist is inherently un-dedicating themselves from the paradigm in which those facts exists. Now, the non-scientist is back to the beginning of their journey to obtain scientific knowledge. However, if all scientific knowledge comes at the price of either being persuaded or dissenting, how is the non-scientist ever going to gain scientific knowledge that is contrary to their beliefs?

In short, the non-scientist will never gain scientific knowledge that does not conform to their beliefs. Not only will the non-scientist be a denier of whatever claim was made in the scientific literature, they will be a denier of that paradigm as a whole. If the non-scientist fails to be persuaded and to dissent, they are exiled from that paradigm just like any individual who undedicated themself from the paradigm. For the scientist, they dedicate themself to another paradigm and take part in normal science there. Where does the non-scientist go?

If the non-scientist refuses to gain the will to learn, they are stuck at the gates of any scientific paradigm – unable to enter. This path of the non-scientist is unexplained by both Kuhn

and Latour. Perhaps, they assume it to be the forbidden path that should be chosen by no one. I think there are two possibilities for the non-scientist. First, they may enter another paradigm that they may think is science, namely, pseudo-science. Second, they may enter another paradigm knowing whole-heartedly that it is not science. To Kuhn, these paradigms do not obey the rules of scientific paradigms – normal science does not occur here. However, once the non-scientist enters one of these alternative paradigms, they are shaped by that paradigm and it impacts the way they think.

I think of anti-vaxxers and science-deniers to be in these alternative paradigms. Within these paradigms, they are no longer subject to uncovering black boxes and dissenting. Then, they are shaped by the alternative paradigm to think in ways that are contrary to that of the scientific paradigms. In the scientific paradigm, fact-making is a process of theorizing, observation, and experimentation. In the alternative paradigm, facts are no longer constituted by these laws.

While Kuhn never explicitly discusses the non-scientist's position of obtaining scientific knowledge, Latour places a lot of trust in the non-scientist. Ultimately, the belief of the scientific literature lies in the hand of the reader (non-scientist); however, without the will to learn, the non-scientist is deterred by black boxes and the scientific literature's rhetorical strategies. Scientific knowledge is not easily obtainable for the average person. Consequently, non-scientists then turn towards other non-scientific sources of knowledge.