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Short Essay Question#1

What are logical positivism, realism, and anti-realism?

Logical positivism relies on the basis that the only philosophical problems worth speculation are those which can be solved by some type of logical analysis. This position branches from a more general definition of positivism which asserts that every rational claim can be proved scientifically, logically, or mathematically. Where logical positivism falls into the realist or antirealist camp depends on which definitions are applied to the terms realist and antirealist. A general definition of philosophical realism would be summarized as the acceptance that non-observable phenomena exist (observable in this context refers to the human senses, i.e. dark matter is unobservable as there is no way to detect it with human senses alone). Antirealism is the contrasting position to this argument; van Fraassen describes antirealism as a position in which "the aim of science can be well served without giving such a literally true story and acceptance of a theory may properly involve something less than belief that is true" (Arguments Concerning Scientific Realism).

The most prominent constraint on logical positivism is that it only concerns itself with problems that can be solved using logical analysis. Any problem that cannot be solved with logic can be discarded from philosophical discourse and considered meaningless. This naturally leads to the question, which problems can be solved with logical analysis and which cannot? This leads one into the realist vs antirealism debate. As described in the preceding paragraph, antirealists believe that, if something exists, then it must be observable in some way. This way of thinking can be expanded to reach a general conclusion about a hypothetical phenomenon. For example, if it is known that a phenomenon exists, then it must be observable; if it is observable, then there must be empirical data about the phenomenon which can be collected (temperature, size, location, etc); if there is empirical data, then that data can be logically analyzed and formed into a conclusion.

Now, one must define what it means to logically analyze something. Continuing from the example above, we have an unspecified phenomenon that we know exists, which (according to antirealists) means we can gather empirical data relating to the phenomenon. How can we logically analyze this data? To logically analyze anything means to use repeated, consistent reasoning to conclude the relationship of the facts and what is being observed. Thus, to logically analyze a phenomenon, one must have some set of observations about the phenomenon, implying that it is observable.

As described above, to logically analyze a phenomenon requires that there be some data or facts about what is being observed. This is not always the case with realism. To reiterate, the basis behind realism is the acceptance that non-observable phenomena exist. If one accepts both realism and logical positivism, it is possible for there to be a conflict of belief. For example, a person may hold the belief that dark matter exists. This belief would be accepted by a realist because although it is unobservable with any of the 5 senses, the concept of dark matter is well-motivated by other observations such as galaxy clusters, galactic rotation curves, and cosmic microwave background. These observations are best explained by a phenomenon which has similar properties to dark matter. So, although no observable evidence for dark matter exists, we can point to the existence of other phenomena to conclude that dark matter probably exists.

A realist would accept the idea that dark matter exists, but what about the logical positivists? To reiterate, a logical positivist generally believes that every rationally justifiable assertion can be scientifically verified or is capable of logical proof or analysis. So, continuing with the dark matter example, a logical positivist would claim that dark matter is not a rational or justifiable assertion. The reason for this is due to the inability to logically analyze the

phenomenon. To logically analyze a phenomenon, one must have facts gathered about this phenomenon through observations. But in our example, dark matter cannot be observed, therefore, it cannot be analyzed, which means it is not a rational belief for a person to hold. Thus, there becomes a conflict of interest between logical positivists and realists regarding the phenomenon of dark matter.

### Semantic Issues

From these definitions I have provided above, it becomes clear that logical positivists are more likely to align with the antirealist camp, however, there are some caveats, primarily in the definitions themselves. One factor which separates logical positivists and realists is what it means to be observable. In the preceding paragraphs, I defined observable as the ability for a phenomenon to be detected with the 5 senses. A person can hold the belief that for a phenomenon to be observable, it is not required that the phenomenon be detectable with the 5 senses directly. This person may assert that dark matter is observable because one can see the consequences/manifestations of dark matter in other phenomena which are detectable with the 5 senses (galaxy clusters, galactic rotation curves, cosmic microwave background, etc). Thus, dark matter is indirectly observable (while still observable) and meets the requirements to be logically analyzed and considered a rationally justifiable assertion by logical positivists.

### Underdetermination of theories and logical positivism

The underdetermination of theories by evidence often precedes doubt regarding those theories and thus to antirealism about the nature of the world described by the theories. The argument is as follows: all theories have infinitely many rival theories, each with empirical evidence. If multiple theories have equivalent amounts of empirical data, they are all equally possible

As stated above, this theory is one that is associated with antirealists who believe that observational entities are insufficient in determining the validity of a scientific theory. One of the ways that antirealists defend the underdetermination argument is by the assertion that while a theory may be false, the consequences of it are true. Also, a theory may be true during an observational period, but another empirically equivalent theory is true during a different period. Because this theory is generally associated with antirealists, it can be concluded that it would also be accepted by those in the logical positivist camp, as these two schools of thought generally have some overlap for reasons described in the preceding paragraphs.

While the underdetermination argument seems to point in the direction of logical positivists and antirealists, some attempt to expose flaws in the argument, thus giving more weight to the realists. When criticizing this theory, the first pretense, that all theories have infinitely many empirically equivalent theories, is often criticized. The most common criticism of this pretense is that scientists only pursue a few theories at a time and thus cannot be aware of all the possible rival theories. While some consider this to be a valid critique of the underdetermination argument, I find this flawed. While it is true that scientists only pursue a few theories at a time, there is a good reason for this. If scientists were to study every single possible hypothesis they would need an eternity. Countless possibilities are technically

possible, no matter the amount of currently available empirical data. Therefore, the discounting of certain scientific theories, on whatever basis it may be, is a necessity.

Another critique of the underdetermination argument is the assertion that the pursuit of a theory can be influenced by non-epistemic virtues. Examples of non-epistemic virtues include dogmatism and superstition. Again, I find this flawed. For example, if a religious scientist pursues a theory for the existence of God and they find empirical evidence in favor of God existing, the evidence they discovered is still valid despite the motivation stemming from a non-epistemic virtue. That is to say, a theory is not less likely to be false simply because the pursuit was motivated by non-epistemic virtues. By the same token, a theory is not any more likely to be true because the pursuit was motivated by epistemic virtues (creativity, curiosity, objectivity, etc).