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On the Argument from Double Spaces: A Reply to Moti Mizrahi

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Abstract

Van Fraassen infers the truth of the contextual theory from his observation that it has passed a crucial test. Mizrahi infers the comparative truth of our best theories from his observation that they are more successful than their competitors. Their inferences require, according to the argument from double spaces, the prior belief that it is more likely that their target theories were pulled out from the T-space than from the O-space. The T-space is the logical space of unconceived theories whose appearances agree with their realities; the O-space is the logical space of unconceived theories whose appearances may agree or disagree with their realities.

1. Introduction

My (2020) argument from double spaces mirrors Bas van Fraassen's (1989) argument from a bad lot in multiple respects. If the argument from a bad lot spells trouble for scientific realism, then the argument from double spaces also spells trouble for van Fraassen's (1980) contextual theory, Moti Mizrahi's (2020) relative realism, and a host of other philosophical positions including scientific realism. This article aims to elaborate and sharpen the argument from double spaces in light of Mizrahi's (2021) response to it.

2. Various Ways of Grouping Scientific Theories

We can divide scientific theories into two groups in various ways, depending on what our interests are. In this section, I introduce the following three ways:

> We can divide scientific theories into a group of successful theories and a group of unsuccessful ones. Successful theories are those that have passed tests. For example, the Ptolemaic and Copernican theories were successful, given that they made true predictions about the motions of celestial bodies. Unsuccessful theories are those that have failed tests. The theory of cold fusion was unsuccessful, given that it did not make any true predictions. It was not only unsuccessful but also false, and it was never accepted by the scientific community.
>
> We can divide scientific theories into a group of true theories and a group of false ones. True theories are those that correspond to the world, while false theories are those that do not. Obsolete theories, such as the effluvial theory and the vibratory theory, were false. How about current theories? It is under dispute between scientific realists and antirealists whether they are true. Scientific realists classify them as true, while scientific antirealists do not. Some scientific antirealists, those who endorse the pessimistic induction, classify them as false.

> We can divide scientific theories into a group of theories that were selected from good lots and a group of theories that were selected from bad lots. In this context, a good lot is defined as a set of competing theories which includes the true one, and a bad lot is defined as a set of competing theories which does not include the true one. The best of a good lot is true, while the best of a bad lot is false. Scientific realists believe that our best theories were selected from good lots, scientific antirealists are skeptical that they were selected from good lots, and scientific pessimists believe that they were selected from bad lots.

Van Fraassen's argument from a bad lot comes down to the request that scientific realists show that our best theories are more likely to have been selected from good lots than from bad lots. He says, "For me to take it that the best of set *X* will be more likely to be true than not, requires a prior belief that the truth is already more likely to be found in *X*, than not" (van Fraassen 1989, 143). This request is a demanding one, given that a true theory may exist not in the collection of imagined rivals but rather in the collection of unimagined rivals. To meet the demand, scientific realists would have to adduce evidence for the belief that our best theories are better than their unconceived rivals.

3. Double Spaces

In this section, I attempt to divide scientific theories into two groups in a way not mentioned in Section 2 above, making use of two technical concepts: the T-space and the O-space. I argue that scientific theories can be divided into a group of theories which were chosen from the T-space and a group of theories which were chosen from the O-space. Let me first go through a few examples of scientific theories.

The phlogiston theory and the continental drift theory have something interesting in common, although the former was false and the latter was true. We once believed that the phlogiston theory was true, but we now believe that it was false. We once believed that the continental drift theory was false, but we now believe that it was true. The similarity between them is that we once had false beliefs about them. Specifically, we once had the false belief about the phlogiston theory that it was true, and we once had the false belief about the continental drift theory that it was false.

How about the oxygen theory? Ever since it was constructed, we believed that it was true, and we still believe that it is true. Suppose that it is true, and that our belief about it will not change. The oxygen theory and the continental drift theory, although both are true, can be classified as belonging to two different groups of scientific theories, because we have only had a true belief about the oxygen theory, but we once had a false belief about the continental drift theory. Compare now the oxygen theory with the theory of cold fusion. One is true, and the other is false. However, they can be classified as belonging to the same group of scientific theories, because we have never had false beliefs about them and have only true beliefs about them. This observation motivates the distinction between a group of theories about which we only have true beliefs and a group of theories about which we may have true or false beliefs.

This distinction can be captured by two technical terms: "the T-space" and "the O-space." The T-space is the logical space of unconceived theories whose appearances agree with their realities.[1] The reality of a theory pulled out from the T-space is *transparent* to us. Consequently, if it appears to be true, it is really true; if it appears to be false, it is really false. If it appears to be comparatively true, it is really comparatively true; if it appears to be comparatively false, it is really comparatively false. In sum, our belief about it is always true; it only gives rise to a true belief about itself in our minds.

By contrast, the O-space is the logical space of unconceived theories whose appearances may agree or disagree with their realities. The reality of a theory selected from the O-space is *opaque* to us. Suppose, for example, that it is successful and thus it appears to be true. It does not follow that it is true; it may be true, or it may be false. Suppose that it is more successful than its competitors and thus it appears to be comparatively true. It does not follow that it is comparatively true; it may be comparatively true, or it may be comparatively false. Our belief about it is sometimes true and at other times false; in other words, it sometimes gives rise to a true belief about itself and at other times a false belief about itself in our minds.

Let me apply these two concepts—the T-space and the O-space—to the examples of scientific theories above. The oxygen theory and the theory of cold fusion were chosen from the T-space. The oxygen theory appears to be true, and it is really true. The theory of cold fusion appeared to be false, and it is really false. The common feature of these two theories is that they only give rise to true beliefs about themselves. By contrast, the phlogiston theory and the continental drift theory were selected from the O-space. The phlogiston theory appeared to be true, but it was false. The continental drift theory appeared to be false, but it was true. The common feature of these two theories is that they once gave rise to false beliefs about themselves.

The realities of some theories, whether they are true or false, are transparent to us. Their appearances coincide with their realities. They only give rise to true beliefs about themselves in our minds. They were all selected from the T-space. By contrast, the realities of other theories, whether they are true or false, are opaque to us. Their appearances may or may not coincide with their realities. They sometimes give rise to true beliefs and at other times false beliefs about themselves in our minds. They were all selected from the O-space.

The T-space is not the space of true theories, and the O-space is not the space of false theories. Some inhabitants of the T-space are false, while other inhabitants are true. Similarly, some inhabitants of the O-space are true, while other inhabitants are false. Questions arise. Why is it that some inhabitants of the T-space are false? Why are some theories selected from the T-space false? In addition, why is it that some inhabitants of the

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[1] See Park (2020, 63) for a detailed discussion on the distinction between the appearance of a theory and its reality.

O-space are true? Why are some theories selected from the O-space false? My answer to these questions is that the appearance of a theory may diverge from its reality.

We can divide scientific theories into a group of theories pulled out from the T-space and a group of theories pulled out from the O-space. To do so is not to divide them into a group of true theories and a group of false ones. It is rather to divide them into a group of theories whose appearances agree with their realities and a group of theories whose appearances may agree or disagree with their realities. As a consequence, to ask whether a theory is pulled out from the T-space or O-space is not to ask whether it is true or false but rather to ask whether we can infer its reality from its appearance. If it is from the T-space, we can infer its reality from its appearance. By contrast, if it is from the O-space, it is not clear whether we can.

The definitions of the T-space and the O-space just introduced are different from the old definitions of the T-space and the F-space in my (2020) previous article. I previously defined the T-space and the F-space as follows:

> The T-space is inhabited by the unconceived scientific theories that are commonly fated to lead us to *true* beliefs about themselves (Park 2020, 63).
>
> By contrast, the F-space is inhabited by the unconceived scientific theories that are commonly fated to lead us to *false* beliefs about themselves (Park 2020, 63).

These old definitions fail to fully capture what I had in mind in the previous article. I hereby replace them with the new definitions. The new definitions fully capture what I had in mind in the previous article. Moreover, everything I said in my previous article regarding the argument from double spaces and its applications against several philosophical positions makes better sense with the new definitions than with the old definitions.

Mizrahi (2021) defends relative realism against the argument from double spaces after interpretating the T-space and the F-space in my previous article as "the space of true theories" and "the space of false theories," respectively (Mizrahi 2021, 4). This interpretation is due to my imprecise definitions of the T-space and the F-space quoted above. I should have stated explicitly that some inhabitants of the T-space are false, and that some inhabitants of the F-space are true. In addition, I should have provided a few examples to flesh out the concepts of the T-space and the F-space.

4. The Argument from Double Spaces

Philosophers infer the reality of a theory from its appearance, i.e., they observe a theory and then infer that it has a certain semantic property. These semantic properties include truth and comparative truth. Their inferences are challenged by the argument from double spaces according to which to take it that a theory has a certain semantic property requires the prior belief that it is more likely that it was pulled out from the T-space than from the O-space.

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Let me apply this argument to van Fraassen's contextual theory and Mizrahi's relative realism.

Van Fraassen (1980, 130–131) infers the truth of the contextual theory from his observation that it has passed a crucial test (Park 2019, 91). Let us grant that the contextual theory has passed the crucial test,[2] and that it appears to be true. But is it really true? In my view, to take it that the contextual theory is true on the grounds that it passed the crucial test requires the prior belief that it is more likely that the contextual theory was pulled out from the T-space than from the O-space. This view is similar to van Fraassen's view that to take it that our best theories are true on the grounds that they passed crucial tests requires the prior belief that it is more likely that they were pulled out from good lots than from bad lots.

Mizrahi (2020) infers the comparative truth of our best theories from his observation that they are more successful than their rivals. They may appear to be comparatively true, given that they are more successful than their rivals. But are they really comparatively true? In my view, to take it that they are comparatively true on the basis of the observation that they are more successful than their rivals requires the prior belief that it is more likely that they were pulled out from the T-space than from the O-space. This view is also similar to van Fraassen's view above, which motivated Mizrahi to develop relative realism.

5. Conclusion

The T-space is not the space of true theories, and the O-space is not the space of false theories. The T-space is rather the space of unconceived theories whose appearances agree with their realities, and the O-space is rather the space of unconceived theories whose appearances may agree or disagree with their realities. Whenever philosophers infer that a theory, be it scientific or philosophical, has a semantic property on the grounds that it appears so, the argument from double spaces can come into play, requesting that they adduce evidence for the belief that it is more likely that it was pulled out from the T-space than from the O-space. This request is similar to van Fraassen's request that scientific realists adduce evidence for the belief that it is more likely that a theory was pulled out from a good lot than from a bad lot.

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[2] Edwin Hung (1997, 179) would not say that it has passed the crucial test, given that the contextual theory fails to explain the example of the tower.

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