Accepting Our Best Scientific Theories

Abstract
Dawes (2013) claims that we ought not to believe but to accept our best scientific theories. To accept them means to employ them as premises in our reasoning with the goal of attaining knowledge about unobservables. I reply that if we do not believe our best scientific theories, we cannot gain knowledge about unobservables, our opponents might dismiss the predictions derived from them, and we cannot use them to explain phenomena. We commit an unethical speech act when we explain a phenomenon in terms of a theory we do not believe.

Keywords
Acceptance, Belief, Explanation, Inference to the Best Explanation, Prediction

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1. Introduction

We use a rule of inference called inference to the best explanation ('IBE' from now on) in our daily life and in our scientific practice. Darwin, for instance, argued that evolutionary theory is better than creationism because some biological phenomena can be explained in terms of evolutionary theory but not in terms of creationism:

> And we can clearly understand these analogies, if species have once existed as varieties, and have thus originated: whereas, these analogies are utterly inexplicable if each species has been independently created. (Darwin 1859/1993: 146)

Can we believe that a theory is true on the grounds that it is better than its competitor? Scientific realists and nonrealists diverge on the answers to this question. Realists say that the best of the conceived rival theories is (approximately) true, constructive empiricists say that it is empirically adequate, and instrumentalists say that it is the most useful instrument for generating predictions and explanations.

Gregory Dawes (2013) stakes out an original position that differs from scientific realism, constructive empiricism, and instrumentalism. He claims that we ought to *accept* as opposed to believe our best scientific theories. I will explicate Dawes's account of what it is to accept a theory, and then argue that we ought to *believe* rather than accept our best scientific theories. The disadvantages of merely accepting them is that we cannot gain knowledge about unobservables, that our opponents might dismiss the predictions derived from them, and that we cannot use them to explain puzzling phenomena around us. It will become clear that we violate the ethics of speech act when we explain phenomena in terms of a theory we do not believe.

2. Dawes's Position

Dawes rejects the realist suggestion that the best of the conceived rival theories is true on the grounds that truth may lie not in the range of conceived rival theories but in the range of unconceived rival theories, and that the criteria for making a comparative judgment of conceived rival theories are not truth-indicative:

> Firstly, the true explanation may be one we have not yet discovered. Secondly, at least some of the criteria by which we judge an explanation to be the best available (such as simplicity) are not clearly truth-indicative. (Dawes 2013: 64)

As van Fraassen puts it, the best available explanation "may be the best of a bad lot" (1989: 143). What follows from the possibility that our best scientific theories may be the best of a bad lot? Suppose that T_1 is better than T_2, i.e., T_1 is simpler than T_2, T_1 explains more than T_2, T_1 fits background theories better than T_2, and so forth. These virtues of T_1 indicate that T_1 is *closer* to the truth than T_2, but they do not indicate that T_1 is *close* to the truth. It is one thing that T_1 is closer to the truth than T_2; it is quite another that T_1 is close to the truth.

Let me use an analogy to illuminate Dawes's point. Suppose that John and Jane are located in the same place in London, and that John takes a few steps toward Paris. In such a situation, John is closer to Paris than Jane. It does not follow, however, that he is close to Paris or in Paris. He is in fact far from Paris. Analogously, T_1 might be far from the truth even though it is closer to the truth than T_2. Thus, IBE is a dubious rule of inference. We ought not to believe that T_1 is (approximately) true.

Should we abandon IBE altogether? Dawes answers no, claiming that we ought to *accept* the best available explanation. To accept a proposition is in contrast with to believe a proposition. To believe a proposition "is to consider it to be true" (Dawes 2013: 65). To accept a proposition is to use it as a premise to draw a conclusion with the goal of attaining knowledge:

> So, on my view, to accept a proposition is *to employ it as a premise in one's reasoning, whether theoretical or practical, in any domain to which it might apply, with the goal of attaining knowledge*. (Dawes 2013: 68)

For example, we ought to accept Newton's theory of motion, which means that we ought to use it as a premise to support predictions with the goal of attaining knowledge about the motions of objects. To accept the theory does not involve the belief that it is true. Thus, even if you accept Newton's theory of motion in Dawes's sense, you may not believe that gravitational force is real.

Dawes does not claim that we are *warranted* in accepting the best available explanation. He rather claims that we *ought to* accept the best available explanation. Why ought we to accept it?

> ..if we are committed to the extension of our knowledge, then we ought to accept the best available explanation of whatever puzzling fact it is we are attempting to explain (Dawes 2013: 75).

To use Dawes's analogy (2013: 77), if our aim is to reach the summit of a mountain, we ought to choose the best route to the summit. Analogously, if our goal is to extend knowledge, accepting the best available explanation is "the best means of attaining that goal" (Dawes 2013: 75). Of course, if we abandon the aim of reaching the summit, we need not choose the best route to it. Similarly, if we forgo the goal of extending knowledge, we need not accept the best available explanation.

By knowledge does Dawes mean knowledge about observables or knowledge about unobservables? So far as I can tell, he means knowledge about unobservables. After all, he claims that "scientific theories aim at truth, whether or not we have any reason to believe they have achieved their aim" (Dawes 2013: 68 footnote). Realists would concur with him that science aims at knowledge about unobservables.

Dawes (2013: 67) cites Cohen's analogy of a lawyer (1989: 369) to illustrate his view that to accept a theory involves the commitment to use it as a premise in our reasoning. A lawyer may be utterly convinced that his client is guilty, but he ought to accept the innocence

of his client, acting in court as if his client is innocent, as long as he has the goal of serving as his client's legal representative. Once the trial is over, however, the lawyer may no longer accept the innocence of his client. Likewise, we ought to use a theory as a premise in our reasoning, as long as we have the goal of attaining knowledge. We may no longer accept the theory, once we give up the goal of extending knowledge.

In a certain respect, Dawes's position is similar to instrumentalism. Both agree that only observational claims of science are believable. They have, however, different views on the cognitive status of a scientific theory. Instrumentalism asserts that a scientific theory is merely an instrument for organizing thoughts about observables. A scientific theory does not represent the world, so it is neither true nor false. It is only useful or useless, depending on whether it yields true or false predictions. Dawes, on the other hand, denies that a scientific theory is merely an instrument for predictions:

> It follows that my view of scientific theories is not 'instrumental' in the traditional sense. It does not regard a scientific theory as comparable to a tool, such as a hammer, which in no sense 'represents' the things it produces. (Dawes 2013: 77)

On Dawes's account, a scientific theory is true or false. We only do not have sufficient evidence to believe that it is true. In this sense, Dawes's position is similar to constructive empiricism.

Both Dawes's position and constructive empiricism agree that a scientific theory has a truth-value, and that only observational claims of science are trustworthy. They disagree, however, about what science aims at and about what acceptance amounts to. Constructive empiricism claims that science aims at empirically adequate theories, and that to accept a theory involves the belief that it is empirically adequate:

> *Science aims to give us theories which are empirically adequate; and acceptance of a theory involves as belief only that it is empirically adequate.* (van Fraassen 1980: 12)

For Dawes, on the other hand, science aims at knowledge about unobservables and to accept a theory does not involve the belief that it is empirically adequate. After all, he says that we ought to accept a theory even if it "has at least one indisputably false observational consequence" (Dawes 2013: 70). In other words, we ought to accept a theory even if it is empirically inadequate. For example, Newton's theory of motion makes false predictions about the motions of objects approaching the speed of light. Even so, we ought to accept Newton's theory of motion. In contrast, van Fraassen would say that we ought not to accept Newton's theory of motion because it is empirically inadequate.

Dawes's position is similar to realism in a certain respect. Both agree that science aims at knowledge about unobservables. They diverge, however, on the issue of whether our best scientific theories are trustworthy or not. Realism says that they are trustworthy, whereas Dawes's position says that they are not. Dawes's position is predicated on the observation that they are the products of the dubious rule of inference, IBE. They might be far from truths, although they are better than their rivals. Therefore, Dawes's position is distinct from realism.

Dawes presents another reason for accepting our best scientific theories. He observes that the general theory of relativity and quantum mechanics are mutually inconsistent, and that "it is difficult to make sense of the idea that scientists could *believe* inconsistent theories" (Dawes, 2013: 72). Based on this observation, he rejects Musgrave's realist contention (2009) that it is reasonable to *believe* our best scientific theories, including the general theory of relativity and quantum mechanics.

3. Inconsistency

In this section, I make two critical comments against Dawes's argument that since the general theory of relativity is inconsistent with quantum mechanics, we ought to accept our best scientific theories. First, the incompatibility of the two fundamental theories does not make it impossible that other scientific theories, such as evolutionary theory and the theory of plate tectonics, are approximately true. The approximate truth of those other theories are independent of whether quantum mechanics and the general theory of relativity are compatible or incompatible. Thus, the inconsistency between the two fundamental physical theories does not necessarily lead to Dawes's position that we ought to accept rather than believe the other scientific theories.

Second, the inconsistency between quantum mechanics and the general theory of relativity does not preclude the possibility that they are both approximately true, and the possibility that one is exactly true and the other is approximately true.[1] Suppose that Bill Clinton is exactly 180cm. Consider the following four statements:

(1) Bill Clinton is 181.1cm.
(2) Bill Clinton is 179.9cm.

(3) Bill Clinton is 180cm.
(4) Bill Clinton is 179.9cm.

(1) and (2) are mutually inconsistent. So are (3) and (4). Both (1) and (2) are, however, approximately true. (3) is completely true, and (4) is approximately true. These examples show that the mere inconsistency between the general theory of relativity and quantum mechanics does not mean that they are completely false. It is possible that both are approximately true, or that one is completely true and the other is approximately true. Therefore, the inconsistency between the general theory of relativity and quantum mechanics does not necessarily lead to Dawes's conclusion that we ought to accept our best scientific theories. There is an alternative position that we ought to believe that our best scientific theories are approximately true.

4. Alternatives

Let me make use of the internalism-externalism debate in the meta-ethics literature to propose an alternative to Dawes's account of acceptance. Recall that, for Dawes, to accept a theory is to employ it as a premise in one's reasoning with the goal of attaining knowledge. His sentence suggests that the acceptance of p has as its content the motivation to use p as a premise, i.e., the disposition to use p as a premise is internal to the acceptance of p. The disposition and the acceptance are not separate mental states. The disposition is an essential element of the acceptance. Put another way, if we accept a theory, we are necessarily motivated to use it as a premise in our reasoning. On the alternative account, the motivation to use p as a premise is not internal but external to the acceptance of p, i.e., they are separate mental states. Of course, when we accept p, we are often disposed to use it as a premise, but the disposition is a distinct mental state that happens to accompany the acceptance of p. On this alternative account, we can conceive of the situation in which we accept p without being motivated to use p as a premise.

The advent of the rival theory of acceptance poses some difficulties to Dawes. First, in order to believe that his theory of acceptance is true, he ought to show that his theory of

[1] The literature on the notion of approximate truth is vast. For a comprehensive survey on the literature, see Oddie (2014).

acceptance is better than the rival theory of acceptance. It is not clear, however, that his theory of acceptance is simpler, explains more, and meshes better with background theories than the rival theory of acceptance. Second, even if his theory of acceptance is better than the rival theory of acceptance, it does not follow that his theory of acceptance is true because his theory of acceptance may be the best of a bad lot. In order to believe that his theory of acceptance is true, he ought to show that truth is more likely to be found in the range of conceived rival theories of acceptance than in the range of unconceived rival theories of acceptance. In short, Dawes's reasons for not believing our best scientific theories backfire on his own theory of acceptance.

Refuting my foregoing criticisms against Dawes's account of acceptance requires pinpointing a problem with them rather than merely claiming that the philosophical account of acceptance and the scientific explanation of phenomena should be judged by different standards. After all, it is not clear why the (possible) existence of unconceived rival theories poses a problem to the scientific explanation of phenomena, but not to the philosophical account of acceptance. Do philosophers have the magical method to dispel unconceived rival theories unlike scientists? Furthermore, the attempt to defend the philosophical account of acceptance by advancing its difference from the scientific explanation of phenomena would not sound plausible to philosophers who go along with naturalism (Quine 1969) that there is no fundamental difference between science and philosophy.

5. Goal

Dawes contends that the goal of accepting the best available explanation is to gain knowledge about unobservables. In my view, however, we can never achieve that goal, if Dawes is right that virtues such as simplicity, explanatory power, and coherence with background theories are not indicative of truth, and that they can only get us closer to the truth. As noted earlier, there is a huge difference between being closer and being close to truth. One may wonder why we ought to set such an unachievable goal.

Dawes might reply that if John constantly takes steps toward Paris, and if enough time passes, he will be close to Paris or will be in Paris. Analogously, if new scientific theories continuously replace old scientific theories, and if enough time passes, we will be close to truths or will arrive at truths about unobservables. Thus, the goal which Dawes has set is an achievable one.

Let me point out, however, that no matter how many times new theories supersede old theories, we can never obtain knowledge about unobservables if we follow Dawes's recommendation that we ought to accept as opposed to believe our best scientific theories. After all, belief is an essential ingredient of knowledge. In order to know that p, we ought to *believe* that p. If we merely accept p, we can never *know* that p, even if p is true, and even if we have sufficient evidence for p. Therefore, we will never be able to gain knowledge about unobservables if we merely accept our best scientific theories. Such knowledge is beyond our reach, even if our best scientific theories are true, and no matter how highly they are confirmed.

Dawes claims that we ought to accept the best available explanation because accepting it is the best means to achieve the goal of attaining knowledge about unobservables:

> And the reasons why we should accept the best available explanation are pragmatic: they have to do with adopting the best available means to an end. (Dawes 2013: 75)

In my view, however, to *believe* our best scientific theories is a better means of attaining knowledge about unobservables than to accept them. Suppose, for example, that the special

theory of relativity is true, and that we have adequate reason for believing it. Under such conditions, we *know* that the speed of light is invariant across different frames of reference, if we believe, but not if we merely accept, the special theory of relativity.

6. Premise

6.1. Prediction

Dawes contends that we ought not to believe but accept our best scientific theories. His position implies that we ought to employ our best scientific theories as premises in our reasoning without believing them. In my view, however, if we do not believe them, they are powerless as premises, i.e., our audience would not take the conclusions derived from them seriously. No one believed, for instance, that light bends near the sun until Einstein proposed the general theory of relativity. Imagine that Einstein offers the following argument for the first time in history:

Spacetime is curved near a massive object.
Light travels along the curvature of spacetime near the sun.
$\therefore$ The relative positions of stars change when observed during the solar eclipse.

Note that Einstein uses the general theory of relativity as a premise to derive the prediction. His critics ask him a perverse question: "Do you believe spacetime is curved near a massive object?" If he says yes, they would take his conclusion seriously and take pains to ascertain whether it agrees with the world or not. If he says no, however, they would respond, "If you don't believe your premise, why should we take your conclusion seriously?" Accordingly, they would reject Einstein's entire argument, and they would not bother to ascertain whether his prediction is true or false. To generalize, our opponents might dismiss the predictions of our best scientific theories simply on the grounds that we do not believe our best scientific theories. Should this happen, our best scientific theories perform the function of generating predictions but not the function of making the predictions persuasive, i.e., we can derive predictions from them, but we cannot use them to convince our audience that the predictions are true.

Even if we do not believe our best scientific theories, however, our opponents would believe the predictions of our best scientific theories, *provided* they have convincing independent premises for the predictions. Suppose, for example, that the general theory of relativity has the past record of making true predictions. In such a case, our critics would believe a prediction of the general theory of relativity that is not yet ascertained, even if we do not believe the general theory of relativity. They would believe the prediction not because the general theory of relativity serves as a premise for it but because the past record of the general theory of relativity serves as a convincing independent premise for it. In the absence of the independent premise, they would dismiss it on the grounds that we do not believe the general theory of relativity.

Let me provide a slightly different example to illustrate the point that even if we do not believe our best scientific theories, our opponents would believe our conclusions, provided they have convincing independent premises for our conclusions. Imagine that Newton offers the following argument to his critics:

$F=Gm_1m_2/r^2$.
A stone is thrown upward.
$\therefore$ It will fall down.

Newton's critics ask, "Do you believe the law of gravity"? Even if Newton answers that he does not, they would believe his conclusion that the stone will fall down because they observed in the past that stones fell down. Their previous experiences serve as a convincing independent premise for his conclusion. In the absence of the independent premise, they would dismiss his prediction, asking him a similar blunt question: "Why should we believe your premise and conclusion when you don't believe your premise?" Therefore, this example does not refute my criticism against Dawes's position that if we do not believe our best scientific theories, they are impotent as premises, i.e., they do not have the power to make the predictions derived from them persuasive.

6.2. Explanation

Dawes claims that we ought not to believe but to accept our best scientific theories. In my view, however, if we do not believe them, we cannot use them as explanantia (the plural form of 'explanans') to explain puzzling phenomena around us, and we commit unethical speech acts if we explain phenomena in terms of our best scientific theories without believing them. In this section, I offer a few examples to establish the thesis that an adequate explanation requires that an explainer should believe an explanans.

Let me begin with the example of near death experience (NDE). Many people claim that they have been to the world of the dead, telling a similar story that they went through a long tunnel, saw the bright light at the end of the tunnel, experienced euphoria when they faced the bright light, and saw their family members and friends who previously died. Neuroscience tells us, however, that when people have an NDE, a large amount of endorphin is released in their brain. A neuroscientist gives the following explanation of why John has an NDE:

> We have an NDE, whenever a large amount of endorphin is released in our brain.
> A large amount of endorphin is released in John's brain.
> ∴ John has an NDE.

Note that the first premise is a psychophysical law. Can the neuroscientist explain John's NDE in terms of the psychophysical law without believing it? The answer is no because in order to explain John's NDE, the neuroscientist should utter the psychophysical law, the first premise. By uttering it, he expresses his belief of the psychophysical law. If his critics ask him whether he believes the law or not, he cannot answer in the negative because if he does, they will be puzzled, and they will ask him embarrassing questions: "If you don't believe the psychophysical law, how can you utter it? If you don't believe it, why should we believe it?"

Dawes would reply that a scientist can use a scientific theory to explain phenomena without believing it, just as a lawyer can use the assumption that his client is innocent to explain the evidence presented in court without believing the assumption. Suppose, for example, that a lung cancer patient sued a tobacco company for having caused lung cancer in him. The tobacco company hired a lawyer. The lawyer is skeptical that the tobacco company is innocent, but he accepts the innocence of the tobacco company, so he says in court, "The plaintiff has lung cancer not because he smoked but because he was exposed to radon for a long time." Similarly, a physicist is skeptical about von Neumann and Dirac's version of quantum mechanics, but he accepts the version, so he explains an experimental outcome in terms of the version. He says, for example, "The interference pattern occurs in the double-slit experiment because an electron goes through two slits at the same time with equal chances." Both the lawyer and the physicist explain explananda in terms of explanantia they do not believe.

In my view, there is something wrong with the lawyer's speech act and the physicist's speech act. Their speech acts do not match up with their beliefs. The lawyer does not believe that the tobacco company is innocent, but he speaks as if he believes that the tobacco company is innocent. Recall that he speaks as follows:

> Lawyer: "The plaintiff has lung cancer not because he smoked but because he was exposed to radon for a long time."

The lawyer cannot utter this sentence without the intention to deceive his explainees. His jurors and judges may come to believe that the tobacco company is innocent as a result of being exposed to the lawyer's explanation of the lung cancer. Similarly, the physicist does not believe von Neumann and Dirac's version of quantum mechanics, but he speaks as if he believes it. Recall that he speaks as follows:

> Physicist: "The interference pattern occurs in the double-slit experiment because an electron goes through two slits at the same time with equal chances."

The physicist cannot utter this sentence either without the intention to deceive his explainees. His explainees may come to believe von Neumann and Dirac's version of quantum mechanics as a result of being exposed to the physicist's explanation of the interference pattern. In short, the lawyer's speech act and the physicist's speech act are misleading to their explainees. As a result, the explainees may come to believe what the explainers do not believe.

Relatedly, suppose that you are a member of a cult. Your cult leader talks as if he has special epistemic access to a god. He says, for example, "Complex things exist in the world because my god created them to be complex." You are persuaded of his explanation of the complex things, so you encourage your family members and friends into your cult community. You even donate all of your property to your cult leader. It turns out, however, that your cult leader does not believe that his god exists but *accepts* the statement that his god exists. You would feel that he is an insincere person, his speech acts were deceptive, and he should not have uttered the sentences like "Complex things exist in the world because my god created them to be complex."

Analogously, it involves unethical speech acts to use our best scientific theories to explain phenomena without believing them. For example, it is unethical for the physicist to utter sentences like "The interference pattern occurs in the double-slit experiment because an electron goes through two slits at the same time with equal chances," if he does not believe von Neumann and Dirac's version of quantum mechanics. After all, his explainees will feel that he is an insincere person, and that he deceived them, once they later discover the truth that he merely accepted the version. Therefore, if you aim to explain phenomena in terms of our best scientific theories, you ought to believe them. The other side of the coin is that if you do not believe them, you ought not to explain phenomena on their terms.

All the foregoing examples of the neuroscientist, the lawyer, the physicist, and the cult leader indicate that when you explain phenomena in terms of a theory you are doubtful about, you are proliferating to your explainees the belief you do not have. If you tell them the truth that you do not have the belief, they will point out that your speech act does not match up with your doxastic state, and they will not believe your explanation on the ground that you do not. It is not clear how merely accepting our best scientific theories contributes to the epistemic goals of obtaining truths and avoiding falsities. This criticism applies not only to Dawes's position but also to constructive empiricism and instrumentalism.

Dawes might insist that we can explain phenomena in terms of our best scientific theories without believing that they are true. For example, we can explain why the stone falls down without believing the law of gravity. After all, we can change the modes of speech from (A) to (B):

(A) The stone falls down because the stone is thrown upwards, and because $F=Gm_1m_2/r^2$.
(B) The stone's being thrown upward and the law of gravity jointly explain why the stone falls down.

There is an important difference between (A) and (B). When we utter (A), we are expressing our belief that the law of gravity is true. We cannot say (A), if we do not believe the law of gravity. In contrast, when we utter (B), we are not necessarily expressing our belief that the law of gravity is true. We can say (B), even if we do not believe the law of gravity. Therefore, we can explain phenomena in terms of our best scientific theories we do not believe. We can merely accept our best scientific theories, and still use them to explain phenomena. Dawes's position is coherent.

On close examination, however, (B) is not an explanation of why the stone falls down but a *description* of the explanation of why the stone falls down. When you say (B), you are not explaining the phenomenon yourself but describing the explanation of the phenomenon. Therefore, my previous point stands that you cannot explain phenomena in terms of a theory unless you believe it. Furthermore, when you say (B), your explainee may ask you an embarrassing question: Do you believe the law of gravity? You cannot say yes because you merely accept the law of gravity. But if you say no, your explainee may say, "If you don't believe it, why should I believe it? Since I don't believe it either, it is still puzzling to me why the stone falls down." Thus, if you do not believe the law of gravity, we cannot relieve your explainee of the puzzle.

Hempel's deductive-nomological model of explanation (1966) holds that some scientific explanations can be reconstructed as a deductively valid argument, that one of the premises is a law of nature, and that the conclusion is an explanandum. Note that a law of nature serves as a premise for the explanandum. This part of the deductive-nomological model of explanation dovetails with Dawes's suggestion that we ought to use our best scientific theories as premises in our reasoning.

In my view, the deductive-nomological model of explanation captures the logical aspect of some scientific explanations, but it does not capture the doxastic aspect of scientific explanations, viz., you ought to *believe* an explanans to explain an explanandum on its terms. In other words, unless you believe an explanans, you cannot invoke it to explain an explanandum. Your explainees will accuse you of having the intention to deceive them, if they know that you explain an explanandum in terms of an explanans you do not believe.

7. Conclusion

For Dawes, to accept a proposition is to employ it as a premise in our reasoning with the goal of attaining knowledge about unobservables. To accept a proposition does not involve the belief that the proposition is true. We ought to accept rather than believe the best of conceived rivals because truth may lie in the set of unconceived rivals; because virtues such as simplicity, explanatory power, and coherence with background theories are not indicative of truth; and because the general theory of relativity and quantum mechanics are mutually inconsistent. Dawes also claims that accepting the best of conceived rivals is the best means to attain knowledge about unobservables.

I replied that the inconsistency between the general theory of relativity and quantum mechanics does not necessarily lead to Dawes's position that we ought to accept our best scientific theories, including the general theory of relativity and quantum mechanics. It remains unscathed that they are approximately true. After proposing an alternative theory of acceptance to undercut Dawes's account of acceptance, I argued that we ought to believe our best scientific theories to gain knowledge about unobservables, to prevent our best scientific theories from becoming powerless as premises, and to explain phenomena in terms of our best scientific theories. Finally, it goes against the ethics of speech act to explain phenomena in terms of our best scientific theories without believing them.

In this paper, I did not fully address Dawes's worry that truth may lie in the set of unconceived rivals. The same worry is raised by van Fraassen (1989: 143), Ladyman, Douven, Horsten, and van Fraassen (1997), Wray (2008; 2012), and Khalifa (2010). Their worry goes by the names 'the argument from a bad lot' and 'the argument from underconsideration.' The argument says that our best scientific theories may be the best of a bad lot, so realists ought to prove first that truth is more likely to exist in the set of conceived rivals than in the set of unconceived rivals, or that scientists have the epistemic privilege to generate true theories. To tackle this interesting argument goes beyond the scope of this paper. I can only make a quick criticism against it here. It backfires on antirealists' positive philosophical theories, such as Dawes's theory of acceptance, as demonstrated in Section 3.2 of this paper. In other words, antirealists' positive philosophical theories fall prey to it, if it is a strong argument.

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