Two Tokens of the Inference to the Best Explanation: No-Miracle Argument and the Selectionist Explanation

En İyi Açıklamaya Çıkarım'ın İki Türcesi: Mucize Olamaz Argümanı ve Seçilimci Açıklama

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Abstract: In this paper, I evaluate van Fraassen's critique of the Inference to the Best Explanation (IBE) by focusing mainly on his argument of bad lot. First, I argue that his attack is about the reliability of IBE as a rule of inference. Secondly, I evaluate the most famous realist IBE in the philosophy of science literature, namely the No-Miracle Argument (NMA). I stick to Mark Newman's attack to realist NMA and admit his claim that NMA is viciously circular. Thirdly, I introduce the anti-realist alternative to the NMA, which is argued by van Fraassen, namely the Selectionist Explanation. Ultimately, I claim that, even though van Fraassen finds IBE wanting, SA has a form of IBE and thus it is a token of IBE as well.

Keywords: Scientific realism, anti-realism, theoretical entities, observables, empirical adequacy.

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Introduction

In this paper, I evaluate van Fraassen's critique of the Inference to the Best Explanation (IBE) by focusing mainly on his argument of bad lot. First, I argue that his attack is about the reliability of IBE as a rule of inference. Secondly, I evaluate the most famous realist IBE in the philosophy of science literature, namely the No-Miracle Argument (NMA). In that evaluation, I stick to Mark Newman's attack to realist NMA and embrace his claim that NMA is viciously circular. Thirdly, I introduce an anti-realist alternative to the NMA, which is argued by van Fraassen, namely the Selectionist Explanation (SA). Ultimately, I claim that, even though van Fraassen finds IBE wanting, SA has a form of IBE and thus it is a token of IBE as well.

Ultimately, van Fraassen's alternative explanation faces the same circularity problem with the realist NMA. Conclusively, this shows that either van Fraassen should concede of his selectionist explanation of the success of science, or he should find a solution to this circularity problem. However, finding a solution to the circularity problem requires that all uses of IBE are reliable rules of inference. Hence, there is no way out for van Fraassen but to dismiss his selectionist explanation.

1. An Overview of the Inference to the Best Explanation

As I have stated above, it is not my purpose to evaluate the account of IBE *per se*. Because of this, we just need to get the basic idea of IBE, which will provide us the guidance in conceiving the circularity problem of NMA. As a method of argumentation, BE is used as an overarching method of inquiry in the scientific discourse. In its general form, IBE consists in accepting a hypothesis on the grounds that provides better explanation of the given evidence comparing to the other competing hypotheses. In this case what we commit ourselves to is that the hypothesis, which explains the phenomena better, serves the (best) explanation.

Actually, I must admit that when we focus on IBE in a more sophisticated manner, the formulation above seems insufficient to provide a precision for the application of IBE in our scientific practice. A scientific hypothesis must be justified in being ranked as the best of all competing hypotheses. So, we need to be specific in our way of arguing for the best

scientific explanation. Samir Okasha's brief but intense formulation of IBE for scientific practice is didactic. He formulates: "The basic schema of IBE is straightforward: you start with a set of data, and infer the probable *truth* of a hypothesis, on the grounds that the hypothesis provides a better explanation of the data than do competing hypotheses" (2000: 691; Italics added). What this formulation brings new is the requirement that the best hypothesis must be true. There are different views on this requirement, which argue for approximate truth, probable truth, ultimate truth, and etc. What is interesting to me is that almost all philosophers, who formulate IBE in the scientific context, somehow necessitate truth as the general criterion of truth. At face value, without granting the requirement of truth, we might react against it by asking: why are we obliged to the truth, and not to other epistemic criteria? This question can be seen as wanting, if we are committed to scientific realism. As Lipton (2004: 184) indicates, the practices of IBE are "truth-tropic" and the scientist, who uses IBE, is a "scientific realist". We will see that in NMA, we refer to the reality of theoretical entities by relying on the truth of our successful theories.

However, for the sake of the paper, let us not question this requirement and take it as it is granted. So, when an argument is an IBE, then this means that the best explanation is provided by (approximate, probable, etc.) truth. Van Fraassen finds IBE wanting because as a rule of inference it cannot provide truth of the best explanations. In other words, it is irrational to believe that the best explanation is a true explanation. I am not going to evaluate in detail what van Fraassen's objections to IBE are. For the purpose here, we just need to get the very basic idea of why IBE is wanting. In the proceeding sections, I will argue that the problem with IBE (different from van Fraassen's objections) is also applicable to non-IBE explanations of the NMA.

2. Van Fraassen's Critique of IBE

I will start first with van Fraassen's critique of IBE. Van Fraassen's main reason to object to IBE is that IBE pretends to be a rule of inference that involves in selecting the best true hypothesis (1989: 142). However, rationality does not provide such legitimacy. His main argument to

show this illegitimacy is the "Bad Lot" argument. He argues that when we try to select the best hypothesis, the set of competing hypotheses does not include all possible hypotheses that can give an explanation of the evidence. We are selecting the best hypothesis from the historically given hypotheses. However, this set does not guarantee that it includes the true hypothesis. "So our selection may well be the best of a bad lot" (Ibid: 143). Because of the possibility of the bad lot, we are not forced to believe in our best hypothesis. To believe something involves believing that it is probably true, and because we cannot be sure or give a high probability of truth of the hypothesis, rationality requires not believing in the best hypothesis. He concludes that IBE "cannot supply the initial context of belief or opinion within which alone it can become applicable. So it cannot be what "grounds" rational opinion" (Ibid: 149).

Okasha points out that van Fraassen does not argue against the "reliability" of the IBE rule. Some responds to van Fraassen's "Bad Lot" argument by claiming, "[W]e are by nature predisposed to hit on the right range of hypotheses" (Ibid: 143). However, according to Okasha, this point is not relevant to van Fraassen's objection. He does not give his argument as an objection to the reliability of the IBE rule. He argues against the rationality of using this rule in scientific practice (Okasha, 2000: 694). In this case, it seems to me that van Fraassen thinks that IBE might be reliable but still its application is irrational.

Here, separating reliability and rationality seems to me problematic. If a rule is rational, then could it be at the same time not reliable? In the reverse direction: if a rule is reliable, then could it be not rational? For the first, my intuitions are affirmative. On the other hand, for the second, they are interrogative. For instance, in football there is a rule for determining which team will start the match. The rule is to flip a coin. This rule is rational to use, when there are equally weighted competing sides and we are obliged to choose one of them. By being impartial, this rule is reliable. However, it is not rational. By applying this rule, we are without an answer, if we ask: "But why will A team start the match and not the B team?" The rule does not provide any reason for this. Hence, a rule can be reliable without being rational.

For the second question, a rule cannot be rational without being re-

liable. Let's suppose we change the rule to decide who will start the match. The new rule is: The side, which guesses where the referee will throw the coin, will kick off. This rule would be neither rational nor reliable.[1] This is because, the main objective of this rule must have been impartiality, but such a guess might involve some expertise. By being so, it loses its point of impartiality. Hence, it cannot be impartial and so it cannot be reliable too. It also cannot be a rational rule because the application of the rule does not provide a result of random choice. However, there is a possibility of random choice, if both sides are not expertise on calculating the movement of the coin considering all the external factors. Just as van Fraassen's bad lot argument suggests, this rule here cannot be rational to apply. So, because the answers to the questions that I have asked are not affirmative, rationality and reliability cannot be separated (at least in this context).

Psillos interprets van Fraassen's critique of IBE as a specific attack of its use in realism of unobservable entities. In this sense, he distinguishes two kinds of IBE; *horizontal* (for observable), and *vertical* (for unobservable), and claims that the horizontal IBE is acceptable for van Fraassen, if it is about the empirical adequacy of the explanation and this empirical adequacy coincides with truth. Additionally, Psillos says, "Van Fraassen does not doubt that IBE operates reliably in many 'ordinary cases' which involve unobserved entities, like the well-known case of the mouse in the wainscoting." (1996: 33).[2] Accordingly, Psillos' point is that van Fraassen rejects IBE as a rule for granting truth about unobservables. On the other hand, in general, or ordinary cases, IBE is a reliable rule of inference. Perhaps, Psillos' attack to van Fraassen is too quick and restricted in the arguments of *Scientific Image* (1980). In a paper, Ladyman, Douven, Horsten, and van Fraassen reply to Psillos. They deny that van Fraassen has made such a dichotomy of uses of IBE. They say that he rejects not only vertical IBE but also the horizontal IBE. They add that for ordinary cases, "IBE might be indispensable in acquiring reasonable expectations, and might thus be pragmatically indispensable, but that

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[1] Here reliability is not stringently related to the issue of reliabilism in epistemology. I use it as commonsensical.
[2] See also, van Fraassen (1980: 19-21).

would not make it a rule of reasoning that issues in rationally compelled belief" (1997: 312). This point shows that van Fraassen wants to reject IBE not because it is not rational to use, but because it is not rational as a rule of reasoning. Thus, this implies its lack of reliability. Lastly, we may also quote the following passage from *Laws and Symmetry*: "Someone who comes to hold a belief because he found it explanatory is not thereby irrational. He becomes irrational, however, if he adopts it as a rule to do so, and even more if he regards us as rationally compelled by it" (1989: 142). Ultimately, I will conclude that based on the textual and contextual considerations, van Fraassen's attack to IBE focuses on its reliability thesis. However, perhaps, this is not strictly apparent in his writings.

So, if I am right that the bad lot argument is an argument against the reliability of the IBE rule, then we might wonder whether he argues as an epistemological internalist or externalist. There is perhaps no indication that van Fraassen appeals to either of them. Okasha says, "Van Fraassen never reveals his position on the internalism/externalism issue in episte-mology" (2000: 695). So, if my argument is convincing, then it seems that van Fraassen is forced to be in favor of externalism. However, my claim here is not conclusive. In the proceeding sections, I will put this claim in its relevant context concerning the "Selectionist Explanation" that van Fraassen suggests as a better (the best) explanation of the success of science.

3. No-Miracle Argument and Vicious Circularity

An attempt to explain why our scientific practice is successful is, in a sense, an attempt to argue that this success cannot be a miracle. In other words, if our scientific theories are successful, and they surely are, then this success cannot be explained by claiming that it is a miracle that we have successful scientific theories. The position that explains this success by claiming that the successful theories are true and posits that they pos-tulates refer to a mind-independent reality is scientific realism. The ar-gument that they offer is the "No-Miracle Argument" (NMA). Scientific realism has three different theses. First, the semantic thesis: Scientific theories are capable of being true or false. Secondly, the metaphysical thesis: The reality is a definite and mind-independent structure. Finally,

the epistemic thesis: Our predictively successful theories are (approximately) true, and the entities they posit are the same as, or at least similar to what there is in the world.

NMA is a defense of the epistemic thesis (Popper, 1963; Smart, 1963; Putnam, 1978; Boyd, 1984; Leplin, 1997; Bird, 1998; Psillos, 1999). Briefly, it argues that scientific theories have been historically successful. The only (best) adequate explanation for this success is that our scientific theories are (approximately) true. Otherwise, it would be a miracle that a false theory has (novel) predictive success. So in order to support scientific realism, Putnam concludes, "The positive argument for realism is that it is the only philosophy that doesn't make the success of science a miracle" (1979: 73). Additionally, concerning the relation between the posits and the truth of a theory, Laudan says, "If there were no entities similar to atoms, no atomic theory could be approximately true; if there were no subatomic particles, no quantum theory of chemistry could be approximately true" (1981: 33). Based on these, the NMA argument provides the best explanation of the success of science and it is an IBE.

Using NMA as a defense of the epistemic thesis, a realist commits himself to the reliability of the IBE as a rule of inference. Mark Newman argues that the realist assumes the thing that he wants to prove by NMA because he takes NMA as an IBE. He says, "[W]hen interpreting the NMA as an IBE it has been suggested that the realist assumes the very thing he wishes to prove –he uses IBE to conclude scientific inference is reliable, but this rule is itself the very rule science uses. This is clearly circular" (Newman, 2010: 112). Additionally, he argues that in order to avoid this circularity, it is argued that the argument is not circular but rule circular. It is rule circular because, realists evaluate the reliability of IBE with an externalist reading. By means of this, it is perfectly legitimate to use a rule of inference in order to argue for its reliability[3].

Newman's main proposal is that this reading of IBE in the case of NMA leads the argument not only to circularity, but also to vicious circularity. According to him, the externalist reading of NMA must presuppose some particular science of mind, and this requires realism or the use

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[3] See, Psillos (1999).

of IBE. The particular externalism requires the claim that "IBE is a *type* of inference which is even in principle *uniquely specifiable*". Then, he claims, "I will argue that making this *metaphysical* (rather than epistemic) assumption entails his reading of the NMA is not just circular, but *viciously* circular" (Newman, 2010: 115). I am not going to evaluate his overall argument for this claim. I will highlight the crucial parts of his assault. But, first, let us look at the Boyd/Psillos' formulation of the NMA:

a.   The instrumental success of science is remarkable.

b.   The best explanation of this success is that the methods of science (IBE) are reliable methods of inquiry.

c.   The methods of inquiry derive from and rely upon background theories that we accept based on their success.

d.   The best explanation of the reliability of our methods (IBE) is therefore that these background theories are approximately true.

e.   Therefore, the best explanation of the instrumental success of science is the approximate truth of our successful theories (Boyd, 1996: 222; Psillos, 1999: 78-81).

This formulation, they argue, escapes from circularity by treating IBE not as a premise of the argument, but as a rule of inference that is used within the argument. For the sake of the paper, let us assume that this modification is legitimate. The externalism that scientific realist must commit here is reliabilism. There are of course many different versions of reliabilism. The more general definition is: "a belief is justified if and only if it is produced by a reliable cognitive process–one that has a high enough number of true beliefs as output in proportion to true inputs" (Newman, 2010: 115). However, this definition is not specific enough for the purpose here. So, the intended attack is based on the following definition: "The relevant type for any process *token* is the *natural psychological kind* corresponding to the function that is actually operative in the formation of the belief" (Ibid: 116; Italics added). As we can see, this account of reliabilism enters to the distinction of type and token processes and also to the commitment to natural kind ontology.

Newman points out the general objection to this account. 'The Generality Problem' must be solved by the reliabilist, if this account is going

to work. Shortly, the problem is that token processes are instances of potentially many different types of processes. In this case, reliability can only be granted by type-processes and not by token-processes (Ibid: 117). The remedy for the externalist account is to rely on a metaphysical assumption that there is a unique "natural-kind-belief-forming-process-type," which is reliable and instantiated by a token belief formation process, and the existence of this is *metaphysically actual* (Ibid: 121).

However, the problem then, as Newman argues, is that the claim of the existence of these natural kinds can only be possible by using IBE. Otherwise, such a claim would have been unwarranted. So, in order to justify this existence claim by using IBE as a rule of inference, realists have to face the "Methodological Generality Problem": "Since there are indefinitely many IBE process types for any given token instance, there is no *unique* IBE process type that describes any given process of inference" (Ibid: 122). This problem shows that unless we give an account of specific types of IBE processes used in belief formation, we cannot judge the reliability of IBE. Newman concludes:

> The notion of IBE is not metaphysically coherent –at least not as a unique process of inference. If the reliabilist cannot show IBE to be unique, then his answer to the Generality Problem falls apart. If the realist who is a reliabilist assumes that IBE is metaphysically coherent as a unique inferential rule, then he is assuming as a premise something essential to his use of IBE– that the rule is even metaphysically possible-and this is viciously circular (Ibid).

First of all, Newman justifies this thesis by appealing to historical examples of variety of different types of IBE. Secondly, he shows that not all of these different types are reliable rules of inferences. Finally, he adds that each token IBE falls under different types. In this paper, I am not going to evaluate his list of IBEs (Ibid: 124-128). However, first, it is important to say that Newman's list indicates that in the history of science, scientists have used many different tokens of IBEs and all of them have relative reliability both synchronically and diachronically. Secondly, not all IBE tokens have been used in order to show that the best theory is true. Instead, but in addition to this, they have used IBEs for unification, investigating unobservables, coherence of the theory, simplicity, novel

predictive success, and etc. In this sense, we can conclude that IBE does not necessarily induce true theories. It can induce the best coherent, simple, fruitful, and intelligible theories as well.

In the light of these considerations, I will conclude this section by claiming that for NMA, it is legitimate for an anti-realist to use IBE not by claiming that the best explanation of success is the truth of the theories, but by postulating criteria other than truth. However, the anti-realist should face the same circularity problem of NMA, if he treats NMA as an IBE. We will see in the last section that van Fraassen's SA of the success of science treats NMA as an IBE and hence it is viciously circular.

4. Selectionist Explanation and Vicious Circularity

In *Scientific Image*, van Fraassen provides an alternative explanation of the success of science. Contrary to the realist contention of truth, van Fraassen treats the success of science as natural and claims that the successful theories survive and unsuccessful theories cease to exist. Because of this evolutionary situation, we have successful theories. In this paper, I am not going to evaluate van Fraassen's SA[4]. I will first reformulate the argument and then show that SA is a NMA as an IBE. Hence, it also suffers from the "Methodological Generality Problem".

To start with, I have to say that SA of success of science takes place only in two passages of *The Scientific Image*. So the best textual place to find SA is the following passage. Van Fraassen writes:

> Species which did not cope with their enemies no longer exist. That is why there are only ones who do. In just the same way, I claim that the success of current scientific theories is no miracle. It is not even surprising to the scientific (Darwinist) mind. For any scientific theory is born into a life of fierce competition, a jungle red in tooth and claw. Only the successful theories survive–the ones which in fact latched on to actual regularities in nature (1980: 39-40).

The idea is fairly simple but at the same time powerful. This passage does not give us any indication of criteria, which explains why the selected theories are successful. This only states that the successful theories are

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[4] For a detailed evaluation and a critic of SA see, Erdenk (2014: 92-96).

selected. Wray remarks on SA as the following: "... his [van Fraassen] claim is that, despite the fact that we may not be developing true theories, given the structure of science and scientific research it is not surprising that we develop predicatively accurate theories" (2010: 367). Accordingly, the successful theories are the ones, which are selected from other alternative theories.

However, some philosophers argue that van Frassen's explanatory account is not an alternative for the realist explanation because realists and van Fraassen explain different things. Kukla says, "Truth and evolution are not explanatory rivals" (1996: 299). Lipton says, "[B]ut the truth explanation and the selection explanation are compatible, so we may infer both" (2004: 193). Considering this, the motivation of the selectionists is to explain why our current scientific theories are predictively successful and it cannot give a generic explanation of success in science[5]. This latter should, according to Wray, not bother a selectionist. Just as in evolutionary biology such a generic explanation for the survival of different species is not expected, in science, theories must be evaluated separately as well. Hence, no unified criterion is needed (Wray, 2010: 371-372). This is because; the scientific community for different theories differs as well. In terms of these ideas, expectations, motivations, and standards of success differ in each case. Ultimately, the selectionist explanation does not seek such a generic feature of theories: a feature, which makes all of the theories successful.

However, if we recall the constructive empiricism that van Fraassen suggests, then we can call back the idea of empirical adequacy of theories. In terms of this, the successful theories are expected to be empirically adequate. In addition to empirical adequacy, van Fraassen also praises explanatory powers like simplicity, coherence, logical structure of a theory, etc. (van Fraassen, 1980: 70-96). Combining all of these rules of inferences, we can say that the selection of a successful theory implies that the theory is empirically adequate, and also it can be simpler, more coherent, etc. Ultimately, van Fraassen's SA is an IBE, which uses empirical adequacy instead of truth.

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5 See, Leplin (1997: 9).

In order to make the formulation more cogent and suitable for our paper, we can reformulate selectionist NMA in the form of Boyd/Psillos formulation of NMA:

1. The instrumental success of science is remarkable.
2. The best explanation of this success is that the methods of science (IBE) are (reliable) *selected* methods of inquiry.
3. The methods of inquiry derive from and rely upon background theories that we accept based on their success.
4. The best explanation of the (reliability) *selection* of our methods (IBE) is therefore that these background theories are *empirically adequate*.
5. Therefore, the best explanation of the instrumental success of science is *empirical adequacy* of our successful theories.

What is changed in the original argument is italicized here. So, we have selection instead of reliability and empirical adequacy instead of truth. The latter replacement is less important for my claim. However, the first one expresses the core of the problem.

As I have said, selection is not a generic criterion of success and thus it requires more specific criteria for the justification of theories. I have mentioned some of them earlier. Here, if we need such specific criteria, then this means that we need to justify the reliability of them. This has two reasons. First, the argument is an IBE, and uses IBE as a rule of inference. In this case, in order to avoid circularity we need to know that the tokens of IBE suggested by this account must be reliable. Second, this reliability must be justified in externalist grounds because the selection depends on other standards.

So, here we have NMA as an IBE, but we should be cautious that this is not the type of IBE that van Fraassen argues against. Here we have no reference to truth. In this sense, one might wonder whether this argument is really an IBE. But that does not matter. So long as a reliability argument is required for the argument's inference rule, we are licensed to ask for one. Hence, we need to know whether the IBE here is a reliable rule of inference.

My claim is that this use of IBE cannot be a reliable rule of inference. Following Newman's argument, we cannot say that any type of

inference to the best explanation can be reliable because of the "Methodological Generality Problem". This generality problem has nothing to do with the standard requirement of truth in the case of the realist IBE. This problem was that there are many token IBEs that cannot be unified with a type of IBE. Moreover, in order to claim that they can be unified, we need to commit ourselves to the existence of some psychological natural kind types. Alternatively, we should show that each token IBE has a reliable type of IBE. Neither would be welcome for van Fraassen. For the commitment to psychological natural kinds, van Fraassen should allow scientific realism. For the second, he should allow the standard use of IBE that he has already rejected. In other words, he should admit that it is rational to use IBE as a rule of inference. This is so, because it is not important for an IBE to induce either truth or empirical adequacy. In either case, both of them are tokens of the same type of IBE and if there is a Generality Problem for the type of IBE, then neither tokens of the type of IBE can be reliable. Additionally, because there is generality problem for the standard use of IBE, the same goes for SA as well.

Let us look at briefly what the problem with the criterion of empirical adequacy is. First, empirical adequacy cannot be reliable because it is time relative. For instance, a theory about the radio would be empirically inadequate, if it were given at the time of Stone Age; or alternatively Newtonian mechanics would be empirically inadequate, if it were given before Kepler. These examples show that the reliability of empirical adequacy depends on the time when the theory is established. However, this type of reliability is unjustified on externalist grounds. Secondly, when we select between two equally empirically adequate theories, we have to apply pragmatic virtues like simplicity, coherence, and etc. in order to select one of the others. In this sense, it is dubious by which of these virtues will we be selecting the best empirically adequate theory. It seems that we can rely on any of these, or we can consider a subset of any of these virtues by which new types of IBE processes would be constructed. Newman remarks on this, "Without specifying for any given token instance of IBE the unique type under which it falls, the varying reliability of types undermines the appeal to such a token use" (2010: 129). In short, each token of selective virtues falls under multiple types of selective vir-

tues. Hence, we still have the generality problem. As a result, SA is no different than the realist NMA in terms of being viciously circular. They are both viciously circular because they treat NMA as an IBE, their rule of inferences are not reliable. Additionally, van Fraassen's rule of selection, which induces empirical adequacy, is just another token of the very same type of IBE.

Conclusion

In this paper, I argued that van Fraassen's critique of IBE is an attack to IBE's reliability as a rule of inference. This attack is mainly grounded by his "Bad Lot" argument. Additionally, I showed that the prominent realist argument, the "No-Miracle Argument", is a version of IBE and it suffers from a type of vicious circularity by means of its commitment to IBE as a premise and the acceptance of a realism of psychology. In that sense, IBE is doomed to be unreliable as well. As an alternative explanation of the success of science, I introduced van Fraassen's SA. About SA, I argued that this explanation, too, is a version of NMA, and it treats NMA as an IBE. The reasons why the realist NMA is viciously circular are also shared by SA. So I claimed both that the realist and the selectionist use of IBE are just two tokens of the same type of IBE. Ultimately, they both share the "Methodological Generality Problem". Hence, I conclude that the use of IBE, which induces empirical adequacy gains no more credits than the realist use of IBE, and hence van Fraassen's SA is not legitimate either. Accordingly, I conclude that van Fraassen should reject all uses (tokens) of IBE, if he thinks that IBE as a rule of inference is wanting. This means that he should dismiss his selectionist explanation of the success of science.

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Öz: Bu makalede van Fraassen'in En İyi Açıklamaya Çıkarım (EİAÇ) görüşüne getirdiği "kötünün iyisi" itirazını ele alacağım. İlk olarak getirilen eleştirinin, bir çıkarım kuralı olarak EİAÇ'nin güvenilirliğine dair olduğunu tartışacağım. İkinci olarak, bilim felsefesi literatüründe en meşhur gerçekçi EİAÇ'lerden biri olarak anılan Mucize Olamaz (MO) argümanını ele alacağım. Mark Newman'ın gerçekçi EİAÇ eleştirisine bağlı kalarak, EİAÇ'nin bir kısır döngü ihtiva ettiğini tartışacağım. Üçüncü olarak, EİAÇ'nin karşıt-gerçekçi alternatifi olan ve van Fraassen tarafından ortaya koyulan Seçilimci Açıklama (SA)'yı ortaya koyacağım. Sonuç olarak her ne kadar van Fraassen EİAÇ'yi eksik ve kusurlu buluyor olsa da SA da bir EİAÇ formuna sahiptir ve o halde, aynı zamanda SA da bir EİAÇ örnekçesidir.

Anahtar Kelimeler: Bilimsel gerçekçilik, karşıt-gerçekçilik, teorik varlıklar, gözlemlenebilirler, deneysel yeterlilik.