

The “Positive Argument” for Constructive Empiricism and Inference to the Best

Explanation

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Abstract: In this paper, I argue that the “positive argument” for Constructive Empiricism (CE), according to which CE “makes better sense of science, and of scientific activity, than realism does” (van Fraassen 1980, 73), is an Inference to the Best Explanation (IBE). But constructive empiricists are critical of IBE, and thus they have to be critical of their own “positive argument” for CE. If my argument is sound, then constructive empiricists are in the awkward position of having to reject their own “positive argument” for CE by their own lights.

Keywords: Constructive Empiricism; Inference to the Best Explanation; Positive Argument; Scientific Realism

According to Bas van Fraassen (1980, 73), the “positive argument” for Constructive Empiricism (CE), is that “it makes better sense of science, and of scientific activity, than realism does and does so without inflationary metaphysics.” Although van Fraassen would not characterize it as such, this “positive argument” for CE looks like an Inference to the Best Explanation (IBE), for in IBE, “a hypothesis is accepted on the basis of a judgment that it best explains the available evidence” (Psillos 2007, 442). And a “good explanation *makes sense out of* that which it is intended to explain” (Sinnott-Armstrong and Fogelin 2015, 198; emphasis added). In van Fraassen’s “positive argument,” CE is said to be supported by the premise that it “makes better

sense of,” or provides a better explanation for, scientific activity than Scientific Realism (SR) does. In other words, the phenomenon to be explained is scientific activity and the two competing hypotheses are CE and SR. Both CE and SR are supposed to explain scientific activity. Van Fraassen claims that CE “makes better sense of,” or provides a better explanation for, scientific activity than SR does, and he even makes an appeal to simplicity or parsimony when he says that CE “makes better sense of,” or provides a better explanation for, scientific activity than SR “without inflationary metaphysics” (van Fraassen 1980, 73).

If this is correct, then van Fraassen’s “positive argument” for CE is an IBE that runs as follows (see Psillos 2007 on the structure of IBE):

- (1) Scientists theorize about unobservables and then test their hypotheses by observation and experimentation (= scientific activity).
- (2) The best explanation for scientific activity is CE.
- (3) No hypothesis (e.g., SR) explains scientific activity as well as CE does.
- (4) Therefore, CE is (probably) true.

It is important to note that IBEs like the one outlined above are not uniquely *scientific* arguments. Rather, IBEs are used in both scientific and non-scientific contexts, which is why it would do constructive empiricists no good to protest that van Fraassen’s use of the phrase “makes better sense of” should not to be equated with “explains.” For, as Walton (2005, 51) puts it, “An *explanation* is successful if it communicates understanding of a sort needed to enable the questioner to *make sense of* the thing questioned” (emphasis added). Accordingly, an argument can still be an IBE even if the explanation it purports to support is not a *scientific* one, strictly speaking. As McCain and Poston (2017, 1) put it:

Explanatory reasoning is quite common. Not only are rigorous inferences to the best explanation (IBE) used pervasively in the sciences, explanatory reasoning is virtually ubiquitous in everyday life. It is not a stretch to say that we implement explanatory reasoning in a way that is “so routine and automatic that it easily goes unnoticed” [Douven 2017].

Perhaps for this reason, the fact that van Fraassen’s “positive argument” for CE is an IBE went unnoticed, but it is an IBE nonetheless. Given that a “good explanation makes sense out of that which it is intended to explain” (Sinnott-Armstrong and Fogelin 2015, 198), and CE is said to make “better sense of science, and of scientific activity, than realism does” (van Fraassen 1980, 73), i.e., CE is supposed to make sense out of or explain scientific activity, it follows that CE is said to provide a better explanation of scientific activity than SR does. In other words, van Fraassen’s “positive argument” for CE is an IBE.

The problem, of course, is that van Fraassen (and constructive empiricists in general) is critical of IBE. Van Fraassen (1980, 143) argues against IBE as follows:

[IBE] is a rule that selects the best among the historically given hypotheses. We can watch no contest of the theories we have so painfully struggled to formulate, with those no one has proposed. So *our selection may well be the best of a bad lot* (emphasis added).

This is van Fraassen's well-known argument from a bad lot against IBE. (Cf. Schupbach 2014.)

According to van Fraassen, whenever we infer that one hypothesis is better than alternative hypotheses on explanatory grounds, we could simply be selecting the best hypothesis among several bad ones (i.e., hypotheses that are not even close to the truth). The reason for this is that, for constructive empiricists, explanatory considerations, such as simplicity and explanatory scope, are not truth-conducive. As van Fraassen (1980, 87) puts it:

When a theory is advocated, it is praised for many features other than empirical adequacy and strength: it is said to be *mathematically elegant, simple*, of great *scope, complete* in certain respects: also of wonderful use in *unifying* our account of hitherto disparate phenomena, and most of all, *explanatory*. Judgments of simplicity and explanatory power are the intuitive and natural vehicles of expressing our epistemic appraisal. What can an empiricist make of these other virtues which go so clearly beyond the ones he considers pre-eminent? (emphasis added)

In other words, van Fraassen distinguishes between theoretical virtues that are *epistemic* or truth-conducive and those that are merely *pragmatic*. For constructive empiricists, non-epistemic theoretical virtues, such as simplicity and explanatory scope, are merely pragmatic virtues, which are irrelevant to a theory's truth.

Now the problem is clear: How can constructive empiricists be critical of IBE on the one hand and then use IBE to argue for CE on the other? Van Fraassen (1980, 73) argues that we should choose CE over SR, but "our selection may well be the best of a bad lot" (van Fraassen 1980, 143). Perhaps CE and SR make up a bad lot of explanations for scientific activity (see Mizrahi 2012 and 2014). Likewise, the fact that CE does not carry the "metaphysical baggage" that SR does is no reason to favor CE over SR, by the constructive empiricist's own lights, since parsimony, simplicity, elegance, and the like are not epistemic virtues but merely *pragmatic* virtues, which are not truth-conducive. If this is correct, then constructive empiricists cannot accept their own "positive argument" for CE, given that this "positive argument" is an instance of IBE, which is a form of inference that constructive empiricist reject as illegitimate.

But perhaps there is a way out of this problem for constructive empiricists. They could argue that IBE is a legitimate form of inference in philosophy, but not in science. This move,

however, is rather *ad hoc*. First, as mentioned above, the structure of IBE is pretty much the same whether the explanation argued for is scientific or not. For instance, compare Psillos' (2007, 442-443) analysis of IBE in formal, scientific contexts with Sinnott-Armstrong and Fogelin's (2015, 196) analysis of IBE in informal, non-scientific contexts.

D is a collection of data (facts, observations).	(1) <i>Observation</i> : Your lock is broke, and your valuables are missing.
H explains D.	(2) <i>Explanation</i> : The hypothesis that your house has been
No other hypothesis can explain D as well as H does.	burglarized, combined with previously accepted facts and principles, provides a suitably strong explanation of observation 1.
Therefore, H is (probably) true.	(3) <i>Comparison</i> : No other hypothesis provides an explanation nearly as good as that in 2. (4) <i>Conclusion</i> : Your house was burglarized.

In both cases, the structure is that of an inference from observations and a comparison between competing hypotheses to the conclusion that one of those hypothesis best explains the observations, for "To explain is to 'make sense' of the observed facts" (Watling 1964, 164). (See also Douven 2017.) Moreover, the criteria for selecting the best explanation among competing hypotheses are also shared between scientific and non-scientific IBEs. According to Sinnott-Armstrong and Fogelin (2015, 195), "common standards for assessing explanations" include explanatory power, falsifiability, and simplicity, whether those explanations are scientific or not.

Second, why think that IBE works in philosophy but not in science? After all, one of the main issues constructive empiricists have with IBE is that it is an inference from the observable to unobservable “objects, events, and processes” (van Fraassen 2001, 162), or from observable phenomena to unobservable theoretical entities. As Muller (2008, 143) puts it:

[An inference] going *from observable behavior to unobservable mental states*, smacks too much of an Inference-to-the-Best-Explanation (IBE), which is a mode of inference that Van Fraassen is very critical about, in particular when it concerns an *explanandum* about observables only and an *explanans* which is also about unobservables (emphasis added).

Indeed, Muller (2008, 143) cites the constructive empiricist’s criticism of IBE as a reason to reject a premise in Maxwell’s (2002) “refutation of standard empiricism,” of which CE is a version.

Surely, however, IBEs in philosophy involve inferences from observable phenomena to unobservable theoretical entities as well. For example, the main argument for SR, known as “the No-Miracles Argument,” is an IBE according to which SR “provides the best explanation of a robust phenomenon that stands in need of explanation, namely, the empirical success of the sciences” (Sankey 2016, 35). This is an IBE from the observable success of science to the existence of the unobservable entities of the scientific theories that supposedly make this empirical success possible. For constructive empiricists, such IBEs from observable phenomena to the existence of unobservable theoretical entities are illegitimate. As van Fraassen puts the point with respect to sense-data:

Such events as experiences, and such entities as sense-data, when they are not already understood in the framework of observable phenomena ordinarily recognized, are theoretical entities (van Fraassen 1980, 72).

Indeed, the “positive argument” for CE itself is an IBE from observable phenomena to unobservable theoretical entities. After all, according to van Fraassen (1980, 12), CE is the view that “Science aims to give us theories that are empirically adequate; and *acceptance* of a theory involves as *belief* only that it is empirically adequate” (emphasis added), and “to *accept* a theory is (for us) to *believe* that it is empirically adequate—that what the theory says about what is observable (by us) is true” (van Fraassen 1980, 18; emphasis added). Beliefs, and thus acceptance, which is defined by van Fraassen in terms of belief, “are mental states or events” (Evnine 1991, 7; see also Schwitzgebel 2015). As the constructive empiricist, Muller (2008, 133), explicitly acknowledges, “Acceptance is [...] taken to be the dispositional *mental state* guiding our behaviour” (emphasis added). But mental states or events are theoretical entities, i.e., they are “unobservable” (Muller 2008, 143). Therefore, the “positive argument” for CE is an IBE from observable phenomena, namely, scientific activity, to unobservable theoretical entities, namely, mental states or events, such as belief and acceptance. As Van Dyck (2007, 23) puts it:

The distinction between acceptance and belief can be put to good use in making sense of scientific practice. *Hence, constructive empiricism is an attractive position, which “makes better sense of science, and of scientific activity, than realism does”* (1980: 73) (emphasis in original).

In fact, like sense-data, mental states or events are the worst kind of unobservable theoretical entities, by the constructive empiricist’s own lights, because they are “the theoretical entities of an armchair psychology that cannot even rightfully claim to be scientific” (van Fraassen 1980,

72). Insofar as he is sure that sense-data “do not exist” (van Fraassen 1980, 72), van Fraassen should also be sure that mental states or events do not exist. And yet, mental states or events, such as beliefs, which are “entities postulated by folk psychology” (Schwitzgebel 2015), are key theoretical posits of CE.

By their own lights, then, constructive empiricists should reject the “positive argument” for CE as an inference that “smacks too much of an [IBE]” (Muller 2008, 143) because it is an inference from observable behavior, which is *scientific activity* as far as the “positive argument” for CE is concerned, to “unobservable mental states” (Muller 2008, 143), which are *belief* and *acceptance* as far as the “positive argument” for CE is concerned.

This is also the reason why van Fraassen’s voluntarist epistemology cannot provide a way out of this problem for constructive empiricists. On van Fraassen’s voluntarist epistemology (1989, 171-173; 2000, 277; 2002, 92), one is rationally entitled to believe anything that one is not compelled to disbelieve. In other words, for van Fraassen (1989, 157), one can rationally believe anything that does not sabotage its own possibility of vindication (1985, 248). Accordingly, constructive empiricists might wish to appeal to van Fraassen’s voluntarist epistemology in order to argue that the conclusion of “positive argument” for CE is merely that we are rationally entitled to believe CE over SR, not that CE is probably true because it is a better explanation for scientific activity than SR is. This move, however, is ineffective in resolving the tension between the “positive argument” for CE being an IBE from the observable phenomenon of scientific activity to unobservable theoretical entities like mental states or events and the constructive empiricist’s critique of IBE. For even van Fraassen’s voluntarist epistemology itself is couched in terms of unobservable theoretical entities, namely, the *mental states or events of rational belief and disbelief*. As such, appealing to van Fraassen’s voluntarist

epistemology does not change the fact that the “positive argument” for CE is an IBE from *observable* phenomena (i.e., scientific activity) to *unobservable* theoretical entities (i.e., mental states or events), which is an inference that constructive empiricists have to be critical of by their own lights.

To sum up, I have argued that the “positive argument” for CE, according to which CE “makes better sense of science, and of scientific activity, than realism does” (van Fraassen 1980, 73), is an IBE. But constructive empiricists are critical of IBE, and thus they have to be critical of their own “positive argument” for CE. If my argument is sound, then constructive empiricists remain in the awkward position of having to reject their own “positive argument” for CE by their own lights. If CE is to be a credible antirealist alternative to SR, as Monton and Mohler (2017) claim it is, constructive empiricists must resolve this tension.

Acknowledgments

I am grateful to an anonymous reviewer of the *Journal for General Philosophy of Science* for helpful comments on an earlier draft and to editor, Helmut Pulte.

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