

# Norms to Explain By (short version)

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## Abstract

Accounts of scientific explanation disagree about what's required for a cause, law, or other fact to be a reason why an event occurs. In short, they disagree about the conditions for explanatory relevance. Nonetheless, most accounts presuppose that claims about explanatory relevance play a descriptive role of tracking reality. By identifying and rejecting this descriptivist assumption, I develop an expressivist account of explanatory relevance. My account rescues explanatory irrealists from the dilemma of choosing between realism and relativism about explanatory relevance relations. Ethical expressivists have extensively defended their position from relativism, and I adapt these defenses to expressivism about scientific explanation. By respecting ordinary scientific practice, my account rehabilitates an irrealist conception of explanation.

## 1 Introduction

The puzzling nature of scientific explanation is manifest in an ever-growing list of competing philosophical accounts. At its core, philosophical disagreement about explanation concerns (i) which kinds of ontic structures are explanatorily relevant and (ii) under what

conditions. Candidates include laws of nature, causal mechanisms, difference-makers, causal patterns, grounds, and many more. Following van Fraassen (1980) and Skow (2016), I will treat (successful) explanations as (correct) answers to why questions. More precisely, a scientific explanation of an event is the *reasons why that event occurs*. These reasons why are the relevant ontic structures, such as causes or mechanisms. They are the states of affairs that in some sense produce or are responsible for the event.

My question concerns the relation between these ontic structures and explanatory relevance. What—if anything—makes an ontic structure explanatorily relevant? Most accounts of explanation presuppose that claims about explanatory relevance are *descriptive* or *representational*: they aim to mirror or represent explanatory relevance relations in reality. On this construal, different accounts of explanation disagree about which explanatory relevance relations obtain in reality. They are engaged in an ontological dispute, arising from the difficulty of knowing which explanatory relevance relations obtain. Section 2 demotivates this descriptivist assumption.

Section 3 advocates an alternative approach to understanding explanatory relevance relations. Rather than treat relevance descriptively, I will provide a *non-descriptive* analysis. Specifically, I propose to be an expressivist about explanatory relevance. Claims about explanatory relevance express acceptance of a set of norms governing what answers ought to satisfy us. My account is irrealist because it denies that claims about explanatory relevance are necessarily descriptive. At the same time, I agree with realists that an adequate account of scientific explanation should vindicate ordinary scientific discourse about explanation. This makes my account into a form of *quasi-realism* (Blackburn 1993), as opposed to an error theory. For instance, the following sorts of claims are true on the account that I defend: “lightning explains thunder” and “the correct explanation does not depend on us.” In its contemporary forms, expressivism accomplishes this vindicatory project by embracing minimalism about truth (Section 4).

## 2 Explanatory Relevance Relations

Barring countervailing epistemic reasons, our goal should be to vindicate ordinary scientific discourse, in the hopes that we can systematically understand how it works so well. To vindicate a discourse, one aims for what Gibbard calls an “internally adequate” philosophical theory. A theory is *internally adequate* provided that it accounts for the claims and judgments internal to a given discourse, at least those claims that are intelligible (2003, p. 186). In the case of ordinary moral judgments, this amounts to vindicating claims such as “murder is wrong” and “keeping promises is good.”

Here, my goal is to vindicate a subset of ordinary scientific discourse: explanatory claims and judgments. These judgments play a central role in our capacities for prediction and control. For instance, scientists have recently confirmed that human-caused climate change is responsible for an increase in extreme weather events.<sup>1</sup> As is well known, climate change is itself the result of greenhouse gas emissions from human activities. These inferences constitute triumphs of scientific reasoning that any philosophical account of explanation ought to vindicate. To do so, we must consider how scientists discern which events are explanatorily relevant for others, and which are irrelevant.

Most philosophical accounts of scientific explanation implicitly presuppose *descriptivist realism*. They assume that claims about explanatory relevance i) track or represent features of reality and ii) purport to be objective and mind-independent. These accounts of scientific explanation disagree about which explanatory relevance relations obtain in reality. Whereas Hempel’s (1965) deductive-nomological model treats laws as explanatorily relevant, Skow denies that laws are ever reasons why (2016, p. 84). Instead, Skow holds that only causes and grounds of an event can be reasons why for that event (2016, p. 124). For those who restrict the relevance relation to causes, there remains the question of *which causes* count as explanatorily relevant; Strevens calls this “the problem of explanatory relevance” (2008, p. 49). Strevens’ account identifies the *difference-makers* as a special, explanatorily relevant subset of the explanandum’s causes. In cases of “distinctively mathematical explanations,” Lange’s (2017) account is even more restrictive, deny-

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<sup>1</sup>See the recent IPCC report on climate change for details (2021, Ch. 11).

ing that *any causes* of an event are explanatorily relevant. At the other extreme, both Railton (1981) and Lewis (1986) classify *any* information about the event's causal history as explanatorily relevant.

This rampant disagreement indicates that descriptivist realism faces at least a serious epistemic problem: ontic relevance relations appear to be relatively difficult to know about. I will briefly argue that descriptivist realism faces at least two additional problems: i) it seems unable to vindicate the ordinary causal relevance relations used in science and ii) it requires ontological commitments that are not necessary to vindicate explanatory reasoning.

First, as Neo-Russellians about causation have argued, there is plausibly only one mind-independent and objective causal relevance relation. I will call this a *complete history relevance relation*: it counts all events in an explanandum's backwards light cone as causally relevant (2003, p. 439). Any more selective relevance relation requires an anthropomorphic carving up of these events in the backwards light cone.<sup>2</sup> Yet, the complete history relevance relation is incompatible with ordinary scientific practice, which relies on more selective causal relevance relations. These pick out only a subset of events in an explanandum's backwards light cone (Hitchcock 2001).

Secondly, descriptivist realism requires additional ontological commitments that don't matter for the aim of internal adequacy. To see this, consider the debate between Lange vs. Skow over non-causal explanations. Lange (2013) argues that there are distinctively mathematical explanations of physical phenomena wherein no causes are explanatorily relevant. Instead, non-causal, mathematical facts are explanatorily relevant. In contrast, Skow denies that mathematical facts are ever reasons why a physical event occurs (2016, p. 114). If there really are ontic relevance relations, then at most one of Lange or Skow can be right. An omniscient agent could tell us whether we are in a Lange-world, a Skow-world, or neither. Nevertheless, both accounts equally vindicate the use of mathematical facts in giving explanations of physical phenomena. A scientist following Lange's account should engage in the same activities as a scientist following Skow's. It seems that disputes

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<sup>2</sup>Frisch (2022, p. 459) summarizes this argument using Field's example of a man praying to put out a fire while someone else sprays it with a hose. The praying is in the backward's light cone of the fire going out, but intuitively it is not a cause.

about ontic relevance relations are idle here.

I take these considerations to demotivate descriptivist realism. If a non-descriptivist approach succeeds at vindicating explanatory reasoning, it will have the advantage of requiring fewer ontological commitments. However, non-descriptivism about explanatory relevance faces an immediate problem. If we don't posit ontic relevance relations, how can we reject outlandish-sounding explanatory claims? Scientists' explanatory reasoning is clearly not a matter of "anything goes," so the non-descriptivist has to say more. We must combine non-descriptivism with additional criteria to distinguish legitimate explanatory claims from illegitimate ones.

Indeed, van Fraassen's pragmatic account of explanation runs into precisely this problem, which some have thought fatal to explanatory irrealism. According to van Fraassen, context determines what counts as explanatorily relevant (1980, 141ff.). His account places no ontological constraints on which explanatory relevance relations are appropriate (1980, p. 143). Kitcher and Salmon (1987) show that by not placing constraints on explanatory relevance relations, van Fraassen's account lacks the resources to rule out an "anything goes" attitude toward explanation. Within van Fraassen's framework, they show that *any* true proposition can be made into a maximally good explanation of *any explanandum*. All one needs to do is select an appropriately bizarre explanatory relevance relation.

Fortunately, there are now well-known non-descriptivist strategies for meeting this challenge. In metaethics, expressivism provides a non-descriptivist approach to morality that nonetheless aims to vindicate the objectivity of many moral claims. By adapting expressivism to explanatory relevance relations, Section 5 will recover a sense in which relevance relations are objective and mind-independent, without positing ontic relevance relations. When combined with expressivism, explanatory non-descriptivism successfully avoids both descriptivist realism and "anything goes" relativism.

### 3 Expressivism about Explanation

Traditionally, expressivists distinguish between descriptive and non-descriptive claims or thoughts. Descriptive claims are what Field (2009) describes as *straightforwardly factual*.

They represent states of affairs, thereby mirroring reality (be it physical, platonic, divine, etc.). In contrast, non-descriptive claims perform functional roles that do not represent reality. Paradigmatically, this includes evaluative and normative roles, such as expressing action-directed states of mind (Chrisman 2007, p. 236). Expressivism focuses on the attitudes or commitments that non-descriptive claims express or voice.<sup>3</sup>

Expressivism admits many formulations, whose comparative virtues matter mainly downstream from the issues I consider here. Due to its consilience with the dominant framework for theory interpretation in philosophy of science, I begin with Gibbard's (1990) norm-expressivism. Gibbard develops his framework as an extension of possible worlds semantics, adjoining a set of norms to each possible world (where the worlds are specified through descriptive claims). This framework allows for expressivism about explanatory relevance relations alongside descriptivism about causation or laws of nature.<sup>4</sup>

To illustrate Gibbard's framework, consider judgments of rationality. When a norm-expressivist about rationality says that  $X$  is *rational*, they do not ascribe a property to  $X$  (at least not directly). Instead, saying that "X is rational" is equivalent to expressing acceptance of a system of norms that, on balance, permit  $X$  (Gibbard 1990, p. 84). In short, to think something rational is to accept a set of norms that permits it. For any given belief, judgment, or action, a complete system of norms renders it either required, permissible, or forbidden. Formally, we specify descriptive–normative worlds, given by a pair  $\langle w, n \rangle$ . The possible world  $w$  specifies the states of affairs (characterized by descriptive claims). The additional component  $n$  specifies a normative system.

Applying Gibbard's framework to explanation, the descriptive component  $w$  captures whether the explanans actually obtain. Explanans typically include ontic structures such as laws or causes, along with initial and boundary conditions. For instance, if phlogiston does not exist, then we cannot appeal to phlogiston in giving explanations of chemical reactions. Such appeals would not constitute bad or sub-optimal explanations: they would

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<sup>3</sup>See Kraut (1990, p. 159) for a detailed characterization of this "bifurcation" between descriptive and non-descriptive claims, although minimalism about truth eliminates some of the distinctions therein.

<sup>4</sup>Other expressivist frameworks include Gibbard's later plan-expressivism (2003) (which recasts the attitude of norm-acceptance in terms of planning attitudes), Blackburn's quasi-realism (1984, 1993, 1998), Schroeder's (2008) account in terms of a pro-attitude of 'being-for,' and Horgan and Timmons' (2006a) in terms of 'ought-commitment.'

be non-explanations.

The normative component  $n$  settles what it takes for an answer to be a reason why for the explanandum. To do this,  $n$  specifies the explanatory relevance relations  $R$  and what it takes to satisfy them. This involves at least two kinds of explanatory norms: (i) norms on which relevance relations are appropriate to use in answering scientific questions and (ii) norms governing what it takes to satisfy a given  $R$  optimally. These latter norms constitute the evaluative component of explanation, i.e. the evaluation of successful explanations as good or bad. In virtue of satisfying the right relevance relation  $R$ , bad explanations are still minimally successful explanations; they simply violate additional norms on good explanations. This second set of norms captures the idea that successful explanations can still be better or worse.

### 3.1 Expressivism about explanatory relevance

Gibbard's framework yields a simple expressivist treatment of explanatory relevance:

**Relevance Expressivism:** To judge that a relation  $R$  is an *explanatory relevance relation* for question-set  $\mathcal{Q}$  is to express acceptance of a system of norms that permit using  $R$  to answer questions from  $\mathcal{Q}$ .

The judgment that a relevance relation  $R$  is *not explanatory* expresses rejection of any set of norms on explanation that permit using  $R$  to answer  $\mathcal{Q}$ -questions.

Alternatively, we could formulate Relevance Expressivism using Schroeder's (2008) framework, based on a pro-attitude of *being-for*. To see how this works in the moral case, consider the judgment that murder is wrong. This expresses an attitude of *being for blaming for murder* (or at least, being for disapproving of it). Likewise, the judgment that murder is not wrong expresses an attitude of *being for not blaming for murder*.

To formulate Relevance Expressivism within Schroeder's framework, we replace the action of 'blaming' with the action of 'using to answer.' The judgment that relation  $R$  is explanatorily relevant expresses an attitude of *being for using  $R$  to answer the given question*. Likewise, the judgment that relation  $R$  is not explanatorily relevant (i.e. is explanatorily irrelevant) expresses an attitude of *being for not using  $R$  to answer the question*. Of course, we might wonder why someone favors using  $R$  to answer a particular class of questions.

Here, Gibbard's appeal to norms is illuminating. We can understand attitudes such as *being for using explanatory relevance relation  $R$*  as elliptical for the more complex attitude *being for accepting a set of norms that permit using  $R$* .

### 3.2 An account of binary and graded explanation

Expressivism about explanatory relevance entails expressivism about explanation. When we say that an answer to a why-question is explanatory, we implicitly reference a relation  $R$  that we take to be explanatorily relevant. Hence, giving an expressivist treatment of explanatory relevance yields an expressivist treatment of answers to why-questions. In the simple case of binary explanations, we can put this as follows:

**Explanatory expressivism:** to judge that an answer  $B$  to a why-question  $Q$  is *explanatory* (i.e. a reason why) is to express one's acceptance of a system of norms that permits this answer. Alternatively, it amounts to *being for answering  $Q$  with  $B$* .

Part of the criteria here is descriptive: if we require successful explanations to be veridical, the explanans must actually obtain, which is settled by the way the world is. Another part of the criteria is non-descriptive, namely determining whether or not the answer  $B$  is explanatorily relevant. This requires a judgment that some relation  $R$  is explanatorily relevant, which the expressivist treats as expressing acceptance of a system of norms.

When we reject an answer as explanatory, we reject any system of norms that permits this answer. One way for a purported explanation to fail is to rely on a relation  $R$  that is not explanatorily relevant, i.e. that is explanatorily irrelevant. Consequently, the preceding expressivist account of explanatory irrelevance also leads to an expressivist analysis of failed explanations, i.e. non-explanations:

**Explanatory Failure:** To say that an answer is *not explanatory* is to express one's rejection of any set of norms on explanation that permit this answer. Alternatively, it amounts to *being for not answering this question with that answer*.

So far, my account concerns a binary notion of explanation. This is because permissibility is binary: an answer is either permitted or not permitted. Ideally, we would like to accommodate common ways that a successful explanation can still be better or worse than another. This suggests that some answers are more explanatory than others.



To accommodate this gradated notion of explanation, we need a suitably gradated attitude. The attitude of satisfaction seems particularly fitting. When an answer is explanatory, one ought to be satisfied by it. Likewise, when searching for an explanation, we are dissatisfied with our current knowledge in some regard. We are puzzled by something. These considerations suggest the following expressivist account of gradated explanation:

**Explanatory expressivism<sub>gradated</sub>:** to judge that an answer *B* is explanatory to degree *X* is to express acceptance of a system of norms that permit being satisfied with this answer to degree *X*. Alternatively, it amounts to *being for being satisfied by this answer to that degree*.

By suppressing degrees of satisfaction, we also gain another binary account of explanation: to judge that an answer is explanatory is to express an attitude of *being for being satisfied by that answer*. Unlike the preceding binary account, however, the feeling of satisfaction is naturally gradated.

## 4 Vindication through Selective Minimalism

Like realism, expressivism shares the aim of vindicating a given piece of discourse, be it moral or scientific. In ordinary moral discourse, we take it to be true that mistreating animals is morally wrong. Despite viewing moral claims non-descriptively, expressivism aims to vindicate them. In its older incarnations, expressivism was a kind of non-cognitivism, denying truth-values to non-descriptive claims. Yet, it is difficult to see how non-cognitivism could vindicate claims that we standardly take to be true. Largely for this reason, expressivists have—for more than two decades now—embraced minimalism about truth.<sup>5</sup> As a deflationary theory of truth, truth-minimalism relies on a disquotation principle such as “*p*” is true if and only if *p*.<sup>6</sup>

To recover a sense in which scientific explanatory claims are true or false, we can combine truth-minimalism with Section 3’s expressivist analysis. When we say that “Relation *R* is explanatorily relevant for a class of questions  $\mathcal{Q}$ ,” the disquotation schema permits us to say “it is true that *R* is explanatorily relevant.” Similarly, when we say that “*B* explains

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<sup>5</sup>See Blackburn (1996) for a clear statement that expressivists should reject non-cognitivism.

<sup>6</sup>For this use of truth-minimalism, see Gibbard (2003, p. 18), Horgan and Timmons (2006b, p. 88), or Field (2009, p. 267).

*P*” or “*B* is a reason why *P*,” the disquotation schema permits us to say “it is true that *B* explains *P*.” In this way, expressivism can vindicate ordinary scientific claims such as “greenhouse gas emissions explain global warming,” and also “socks do not explain why laptops work.”

Of course, these are not the only kinds of explanatory claims internal to ordinary scientific discourse. Scientists also typically believe that the correct explanation does not depend on us. Section 5 describes how expressivism even vindicates these realist-sounding claims concerning the objectivity and mind-independence of scientific explanation.

## 5 Objectivity and Mind-Independence

Section 5.1 discusses how higher-order norms on explanatory relevance vindicate the objectivity of scientific explanation. Section 5.2 discusses how expressivism can accommodate the possibility of mistakes about explanatory relevance. To do so, I introduce a notion of improvement. Rather than by more accurately representing relevance relations in reality, explanatory norms improve by approaching a more optimal functional role relative to the aims of science. Finally, Section 5.3 considers the implications of a particular first-order account of improvement.

### 5.1 Higher-order norms

In the moral domain, expressivists point out that we endorse higher-order norms that prevent first-order norms from changing based on our inclinations or attitudes.<sup>7</sup> According to these higher-order norms, the wrongness of tripping people is unaffected by people’s attitudes toward tripping people. Through these higher-order norms, expressivism recovers a sense in which moral facts are mind-independent and objective.<sup>8</sup> For instance, Gibbard argues that expressivists can vindicate realist-sounding claims such as “it’s a normative fact, out there independent of us, that one ought not to kick dogs for fun” (2003,

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<sup>7</sup>See Blackburn (1984, pp. 217ff.) and Gibbard (1990, p. 165, 2012, p. 233, 2015, p. 172). Blackburn (1993, pp. 127–9) presents an earlier version of this argument (originally from 1973).

<sup>8</sup>Field (2018, p. 16) refers to this as a kind of counterfactual objectivity. For criticism see Street (2011); Gibbard (2011) provides a response.

p. 186). On his account, “accepting this might amount to planning to avoid kicking dogs for fun, planning this even for the contingency of being someone who approves of such fun, and who is surrounded by people who approve” (2003, p. 186).

Similarly, as part of ordinary scientific practice, we endorse higher-order norms that explanation is not anything goes. These include the norm that “matters of explanatory relevance are not settled by scientific opinion.” Even if we were to endorse different views about relevance, this would not affect what *ought* to count as explanatorily relevant. These higher-order norms provide a kind of counterfactual objectivity (Field 2018, p. 16).

## 5.2 Instability and error

At least two substantive worries remain. First, why should we endorse one system of explanatory norms over another? If two systems of norms rule each other out, while neither purports to represent ontic relevance relations, why privilege one over another? I’ll call this concern the *instability problem* for expressivism.<sup>9</sup> Secondly, how can expressivism accommodate the possibility of error about explanatory claims? A scientist might say “I believe this explains it, but I could be wrong.” Since expressivists seek to preserve ordinary scientific discourse about explanation (rather than undermine it), they must accommodate these ordinary assertions of explanatory fallibilism. Call this the *fallibility problem*.<sup>10</sup>

To solve both problems, it suffices to provide an account of how our norms improve. Let’s consider fallibility first. Judgments of fallibility arise from the epistemic possibility that our norms could be improved. Horgan and Timmons (2015) use this observation to provide a detailed expressivist treatment of judgments of the possibility of moral error.<sup>11</sup> Simplifying their account, we can analyze assertions of the form “*B* is explanatory (or explanatorily relevant), but I might be wrong” as expressing the following attitude: it is epistemically possible that on an improved system of norms, *B* is not explanatory (or not

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<sup>9</sup>See Blackburn (1984, p. 197) for these worries, sometimes called the “schizoid attitude problem.”

<sup>10</sup>As Gibbard notes in the moral context, “we have to make sense of the possibility that we might feel approval for an action that isn’t good” (2015, p. 184).

<sup>11</sup>Horgan and Timmons relate their framework to Neurath’s boat, as do Blackburn (1993, p. 79) and Field (2018, p. 3). However, I believe that an analogy with optimization surfaces is more apt. I plan to develop this approach elsewhere, based on similar models used in complex systems theory.

explanatorily relevant).<sup>12</sup> Likewise, we can analyze assertions of the form “I was wrong to say that *B* is explanatory” as expressing the following attitude: I have since arrived at an improved system of norms according to which *B* is not explanatory.

The improvement of norms also addresses the instability problem. A set of norms is *stable* provided that there are no nearby or obvious improvements. When we consider alternatives, we should switch only if we view an alternative as an improvement. Provided that we have reason to believe our current explanatory judgments are stable (or close to stable), we should not be overly concerned about alternative systems of norms that we could have endorsed. As with most epistemic defeaters, we may become increasingly concerned about alternatives as they are raised to salience. But that is simply to subject our current system of norms to scrutiny, and scrutiny may itself be conducive to further improvement. In general, improving a system of explanatory norms will not require jettisoning most current beliefs about explanation.

### 5.3 But what *are* the norms?

So what are the norms on improvement? Or, more interestingly, what should they be? Any answer to this question takes us from a meta-theoretical account of explanatory relevance to a first-order proposal.<sup>13</sup> Although my primary goal is to rehabilitate an irrealist conception of explanation, it is instructive to consider a first-order proposal regarding norms on improvement.

First, I assume that to count something as an improvement, one must presuppose an aim. For instance, when we count an increase in accuracy as an improvement, we presuppose that belief aims at truth (or at least a subset of truths). Without this aim, it would be unclear why greater accuracy is an improvement rather than neutral or worse. Given this assumption about the concept of improvement, we should ask what non-descriptive functional roles explanatory judgments perform (or ought to perform).

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<sup>12</sup>For their part, Horgan and Timmons are inclined to regard epistemic possibilities as descriptive (2015, p. 198). However, anyone tempted to expressivism about scientific explanation will likely endorse expressivism about epistemic possibility, e.g. along the lines of Yalcin (2007).

<sup>13</sup>See Gibbard (2003, p. 185) for discussion of how expressivism is a metaethical framework, rather than a first-order normative theory.

At least three related functional roles of explanatory judgments stand out. First, they guide our predictions about what will happen under various actual or hypothetical circumstances. Secondly, they help us exert control on physical subsystems, by guiding what we should do in order to achieve certain ends. Finally, due to their role in guiding predictions, explanatory judgments also influence whether we think a given theory or model is empirically adequate, i.e. saves the observable phenomena in the past, present, and future. Collectively, these three functional roles seem intricately connected to what Woodward (2003) calls *what if things had been different questions*. This form of counterfactual or subjunctive reasoning involves considering how an output variable would change if we were to alter an input variable.

Focusing on these three functional roles leads to an *instrumentalist* interpretation of explanation. According to *explanatory instrumentalism*, explanations do not possess final value; instead, they are instrumentally valuable for the non-explanatory aims of science. These aims are standardly taken to include empirical adequacy, prediction, and control.<sup>14</sup> If we construe explanation as instrumentally valuable for these aims, then changes to our explanatory norms that facilitate these aims count as improvements. For the explanatory instrumentalist, one system of norms is better than another provided that it better facilitates the non-explanatory aims of science, *ceteris paribus*. These aims thereby provide criteria for assessing whether we have arrived at the right system of explanatory norms.

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<sup>14</sup>For discussion of instrumentalism about explanation, see Lombrozo (2011). Van Fraassen—a chief proponent of explanatory instrumentalism—takes explanations to be instrumentally valuable for greater empirical adequacy (1980).

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