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Perspectivism, inconsistent models, and contrastive explanation

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ABSTRACT

It is widely recognized that scientific theories are often associated with strictly inconsistent models, but there is little agreement concerning the epistemic consequences. Some argue that model inconsistency supports a strong perspectivism, according to which claims serving as interpretations of models are inevitably and irreducibly perspectival. Others argue that in at least some cases, inconsistent models can be unified as approximations to a theory with which they are associated, thus undermining this kind of perspectivism. I examine the arguments for perspectivism, and contend that its strong form is defeasible in principle, not merely in special cases. The argument rests on the plausibility of scientific knowledge concerning non-perspectival, dispositional facts about modelled systems. This forms the basis of a novel suggestion regarding how to understand the knowledge these models afford, in terms of a contrastive theory of *what*-questions.

> 'The notion of a physical world that emerges from the interaction of the objective and the subjective is difficult to grasp, even if you are a philosopher.'
>
> – Lipton, 2007, p. 834

1. Perspectivism and relativism

Over the past two decades, the terms 'abstraction' and 'idealization' have become widespread in discussions of scientific modelling and representation. As one might expect, these are terms of art: there is no strictly uniform use of them in the philosophical literature; their various uses are closely related, but serve somewhat different ends. What these discussions have in common is the idea that talking about abstraction and idealization may explicate some of the ways in which models characterize their target systems in something other than "perfectly" accurate' terms, whatever it might mean to achieve such a lofty ambition. For instance, abstraction is often described as a process in which only some of the features of a given target system are represented in a model of that system. Here, one excludes other factors that are potentially relevant to the nature or behaviour of the system under consideration. Idealization is often described as a process in which features of a given target system are represented in a distorted way—a way that they simply could not be, for example, given the laws of nature.

It is natural to think that the reasons we abstract and idealize in the sciences are broadly pragmatic. We abstract, naturally, because the numbers of factors that are relevant to the nature or behaviour of a system are often very numerous, making the construction of an equally refined model impractical and often impossible. Often, the relative importance of many and sometimes most potentially relevant factors is negligible given the explanatory or predictive purposes relevant to the context. We idealize, again naturally, because often undistorted representations of target systems are too complex or mathematically intractable to formulate. And again, even when undistorted representations are possible, they often go well beyond what is required for explanatory or predictive purposes, in terms of complexity or mathematical sophistication. Clearly, then, pragmatic constraints and tendencies go a long way toward explaining why one might be tempted to deviate from the truth by means of abstraction and idealization.

In this paper, I want to consider the idea that, quite apart from the pragmatic reasons one might have for deviating from the truth, there are *principled* reasons to expect that one *must* do so. More specifically, I want to consider the idea that because our

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observations, detections, measurements, theories, and models are in some sense unavoidably *perspectival*, this rules out the possibility of our uncovering non-perspectival facts—"the truth"—about target systems in the world. Variations on this theme have become popular in recent work in the philosophy of science, and although the variations I will examine here are possible interpretations of these accounts, it is also important to note that they differ in significant ways.[1] Thus, I will make no pretence of engaging a group of authors with a univocal view, but rather seek to engage the notion of perspectivism as a philosophical thesis in its own right. While it is surely correct to say that there are some perfectly uncontroversial ways in which one may regard the knowledge associated with observations, detections, measurements, theories, and models as perspectival, the term 'perspective' also has misleading connotations in this context—some of which, I believe, are propounded by this recent literature. My aim here is to offer a corrective and an alternative to what I consider to be these misleading connotations.

I will begin by examining the notion of perspective and what, more precisely, it means in the present context. I will then elaborate the forms of relativism this perspectivism may connote, and consider whether they give us good reason to reject the prospect of non-perspectival knowledge. My ultimate contention is that even though there are thoroughly reasonable senses in which scientific models—and in particular, inconsistent models, which will be my focus here—are perspectival, this does not entail that we do not or cannot learn non-perspectival facts relating to the things these models model. Furthermore, I will suggest that scepticism regarding non-perspectival facts rests on a hidden and unmotivated premise concerning the nature of scientific properties and relations represented by models. Once this premise is replaced with a more compelling view of scientific properties as dispositional, it turns out that perspectivism does not entail any potentially worrying sort of relativism after all; neither does it rule out the prospect of non-perspectival knowledge.[2] In closing, I will propose this suggestion as a contribution toward a novel understanding of knowledge and explanation in connection with modelled systems, by means of a contrastive theory of *what*-questions, inspired by Peter Lipton's work on contrastive why-questions.

So, to begin, what is meant by 'perspectivism' here? The idea of perspective is formally defined in the realm of art, referring to the practice wherein three-dimensional entities are represented on a two-dimensional surface, in such a way as to give the viewer the same sort of impression of certain features, such as relative positions and magnitudes, as they would have if viewing the original (that is, if directly viewing whatever is depicted). In the process, however, some features of the original are inevitably represented in ways that they are not. Indeed, part of the process of being properly acculturated with or "trained into" a particular perspectival convention is learning how to ignore these deviances.

Interestingly, the mathematical conventions according to which perspective is rendered can be varied, resulting in different sorts of veracity with respect to the original. The different projections available for mapping the three-dimensional surface of the earth onto the two-dimensional maps with which we are more familiar are a good example of this. The Mercator projection, for instance, gives better approximations of the shapes of land masses on the earth's surface, but at the cost of a relatively poor representation of their relative sizes. The Peters projection gives better approximations of relative sizes, but at the cost of shapes, and so on. Taking a perspective, it seems, has interesting epistemic consequences. Moving from the case of art to more generic usage, the idea of "taking a perspective" on something entails precisely the same sorts of consequences. We commonly speak of how something "looks", figuratively speaking, from one perspective, and how this can differ from the way it "appears" from another. Different perspectives, then, may yield different and apparently conflicting descriptions of their subject matter.

By itself, the idea that different representations may offer different and conflicting perspectives is uncontroversial. The idea of multiple perspectives does not by itself rule out the possibility that, quite independently of any given perspective on something, there are non-perspectival facts of the matter about it; neither does it rule out, by itself, the possibility that one might come to know what those facts are. It was tacit in my description of the Mercator and Peters projections, for example, that there are non-perspectival facts of the matter relating to the shapes and surface areas of the land masses on the surface of the earth. After all, I described these projections as furnishing better or worse representations of these features, the tacit assumption being that "better" and "worse" are judged with respect to the way these things are, non-perspectivally. From the perspective I had of Peter over lunch in the Senior Common Room, he seemed a fairly tall man, but as I saw him in the distance some time after parting, he seemed rather small. This sort of perspectivism is uncontroversial because there are non-perspectival facts of the matter about the dimensions of Peter in our inertial reference frame that, in conjunction with facts about optics and my visual sensory apparatus, underwrite the differences in the appearance of his size. There is a height that he *is*, and then many ways he may appear to be from different perspectives.[3] In cases in which non-perspectival facts underwrite perspectival ones, perspectivism is commonplace, and not philosophically controversial.

Perspectivism becomes a philosophically controversial thesis, however, when one adds to the notion of perspective the notion that perspectival facts are *all that can be known*. On this view, truths concerning target systems of interest and, more specifically, scientific truths such as those afforded by models, are not underwritten in the way the apparent shapes and surface areas of land masses or apparent heights of friends are. As Ronald Giere (2006, p. 81) puts it: 'For a perspectivist, truth claims are always relative to a perspective'. And, regarding multiple perspectives on the same thing (2006, p. 92): 'The knowledge that we get comes from one perspective or another, not from no perspective at all'. Perspectivism, thus understood, is controversial because it engenders one or another form of relativism, and the prospect of relativism raises alarm among those, including most (but by no means only) scientific realists, who are attracted to the idea that there are non-perspectival facts about things, and that at their best, the sciences succeed in telling us what these non-perspectival facts are. A philosophically interesting perspectivism would appear to do away with these sorts of facts, and any sort of epistemic position defined in terms of them.

I have just claimed that the philosophically controversial version of perspectivism in the present context (I will reserve the term 'perspectivism' *simpliciter* for this variety henceforth) engenders relativism 'of one form or another'. Let me now be more precise.

[1] For example, see Teller (2001) and Giere (2006). Van Fraassen (2008) also explores perspectivist themes (see especially Chapter 3), but with a different emphasis. All three hold that perspective *qua* human action and purpose is central to scientific representation, and van Fraassen agrees that observation and measurement are in a sense perspectival, but only Giere and Teller suggest that scientific theories and models yield perspectival descriptions (compare van Fraassen, 2008, p. 86).

[2] As I will emphasize again later, I adopt a realist idiom, here, with respect to dispositions. That is, I will speak as though dispositions are genuinely occurrent properties. Those who worry about dispositions may substitute their preferred paraphrases—in terms of causal structures or empiricist-friendly conditionals—as they go.

[3] If one is sceptical of the idea that there is any fact of the matter regarding a person's height, because of variations due to spinal compression and extension or the possible vagueness of the predicate, replace 'height' with 'height ± δ' for a reasonably chosen height and δ.