

How Models Are Used To Represent Physical Reality

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Abstract

What are models that they may be used to represent reality? Here is a first pass. Models are objects that can be used to represent reality by exhibiting a designated similarity to physical objects. To be more specific, I need to indicate the kinds of objects models may be and how they may exhibit a designated similarity to real objects. My prototype for a model is a standard road map. This is a physical object (usually made of paper) that I would say represents a terrain in virtue of quite specific spatial similarities. I move on to scale models, such as Watson's original physical model of DNA. Next I treat abstract models, which are abstract objects not to be confused with the linguistic entities that may be used to characterize them. Finally, I discuss theoretical models which I now regard as abstract models constructed according to the principles of an overarching theory.

Serious use of the notion of similarity is often criticized on the ground that anything may be similar to anything else in some respect or other. It is also often claimed that there is no satisfactory general characterization of similarity. I exploit these facts by insisting that claims of similarity between models and real objects must be accompanied by (perhaps tacit) specifications of the respects and the degrees to which similarity is claimed. Such specifications cannot be intrinsic to either a model or a physical object, but must be supplied by those using the model according to their own interests. Thus, taking the relationship between models and physical systems to be one of similarity implies that nothing is intrinsically a model of anything. It is only by intention, or convention, that some object becomes a model of some physical things. For models, at least, the motto is: No representation without representers. Moreover, no general characterization of similarity is needed. It is enough that we can say what counts as sufficiently similar for specific respects. This we can certainly do.

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