The Map, the Territory and the Cartographer – Linking the ‘Pure’ Formal Models to the ‘Murky’ Material World

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Commentary on **Bruineberg Jelle, Dolega Kryzstof, Dewhurst Joe, Baltieri Manuel – The Emperor’s New markov Blankets, BBS**

Abstract

Assigning to Pearl blankets an instrumental, a ‘pure’ formal role, tacitly delegates the thorny question of mapping the ‘murky’ territory to empirical sciences. But this move side-lines the problem, and does not offer a solution to the question: how do we relate the formal properties of an agent’s model of the world to the real properties of the world itself?

Main text :

This interesting paper aims at disentangling two distinct yet related interpretations of what it means to make an inference (a) *within* a model and (b) *with* a model. The Authors note that insights resulting from the formal description in (b) are ‘smuggled in’ via (a), leading to unwarranted metaphysical assumptions about what a Market blanket is or does in the real world. In short, the paper convincingly argues that the map should not be conflated with the territory.

How do we connect the map with the territory? And more importantly who makes this mapping and why? Here I suggest that the distinction between making an inference (a) *within* a model and (b) *with* a model, while important, leaves out the models’ makers (i.e. the cartographers) and what the formalisms are for (i.e. the ‘real’ world).

Here I suggest that while maps/maths (i.e. formal models) can be viewed as significantly more ‘pure’ and less ‘messy’ than the murky empirical territory, without the latter and a cartographer to interpret them, not only they would be worthless, they wouldn’t even exist. Maps/maths are indeed artifacts, while the territory is, as the Authors acknowledge, ‘real’.

Another way to express this idea is to say that maps/maths are real insofar they also part of the territory as being constructed, made, by someone for a particular purpose. In a way, everything belongs to the territory, even the numbers that a mathematician writes on a paper or on a screen. But in which sense ‘that’ reality is different from the reality of a snake that bites your skin?

The interesting debate sparked by this thought-provoking paper brings us back to at least two classical debates in philosophy. One is between Plato and Aristotle around the notion of “matter” and “form” which is key for our discussion here. Indeed, ‘Pearl blankets’ are after all “a *formal* property of nodes in a Bayesian network” where the latter is used as “useful abstractions of complex phenomena”(Bruineberg et al. 2022 :3, our italics). These complex phenomena may be things like the behaviour of atomic particles or stock markets, both of which belong to the category “matter”.

Aristotle introduces matter and form as contrasting notions, distinct causes, which together make up every ordinary object (Ainsworth 2020). In doing so, he distances himself from Plato’s theory of Forms, which exist quite apart from the material world. He does so in part by insisting that “his own forms are somehow enmeshed in matter (*Metaphysics* vi 1 and vii 11, and *De Anima* i 1). He also maintains that all natural forms are like something which is snub, where something is snub only if it is concavity-realized-in-a-nose (*Physics* ii 2; cf. *Sophistical Refutations* 13 and 31)” (Ainsworth 2020).

This is an important distinction because while in Plato’s view forms can exist apart from the material reality (in an “ideal “world), for Aristotle they are intertwined. Coming back to the target paper: the only way to keep the Pearl blankets on the safe territory of pure abstractions as useful tools to tackle complex phenomena is to detach from the murky territory, as Plato does. This is an option, but it is not very informative one. Because what matters in the end is *what we do* with maps/math in the real world, and how the cartographer enmeshes them with the territory. At some point, the Pearl blankets formalisms will need to meet the territory if they want to provide some useful information about our ‘real’ world, for example, to help us stay safe from snakes and predict stock markets.

A couple of 2000 years or so later, a second classical debate which echoes nicely the debate captured in the target paper, opposed within the Vienna Circle, Schlick to Neurath on the foundations of human knowledge. On the one hand, Schlick notes that “ all great attempts at establishing a theory of knowing arise from the problem of the reliability of human cognition, and this problem in turn originates in the wish for absolute certainty (1959:209, my italics). Scientific attempts are in search of “an unshakeable, indubitable foundation, a firm basis on which the uncertain structure of our knowledge could rest (...)the bedrock, which exists prior to all construction and does not itself vacillate.” (ibid.). One may argue that maths/maps provide such basis via the formal models.

Against this view, Neurath pointed out that our cognitive situation is that of a sailor who “far out at sea, transforms the shape of their clumsy vessel from a more circular to a more fishlike one (...) and must rebuild their ship upon the open sea, never able to dismantle it in dry dock or to reconstruct it there from the best materials” (Neurath 1944a: 47). Or to use again our metaphor: one cannot leave the “shacky” territory in order to make a “pure” abstract map/model of it. Not only we cannot leave the territory, but our maps are also parts of the territory, and highly influenced by it.

Here I suggest that both Pearl and Markov blankets have in common the fact that they are maps/models constructed by a cartographer with the purpose of making sense of an open and

constantly moving sea. However, while the former aims at sticking to the abstract formalism insisting on its instrumental role, the latter crosses the boundaries between map and territory and dives into the sea, by making ontological claims. These claims may be wrong, the same way many former theories were proven throughout centuries of scientific endeavour. Yet, we do know with certainty that sticking to the maps/math only will not give us interesting information about the territory, especially if we disregard the cartographer behind it and her relation to the map itself.

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