

## Is Coronavirus an object? Metametaphysics meets medical sciences

*O Coronavírus é um objeto? A metametáfísica encontra as ciências médicas*

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**Abstract:** In ontological terms, what can we learn from the current state of the art in Epidemiology? Applying the Quinean criterion of ontological commitment, we can learn that there are several fundamental entities for the theory to work. One is a virus type entity, in which the (in)famous Coronavirus is a particular case. In metaphysical terms, this entity can, in principle, be understood in several ways. One of those ways, apparently, and perhaps intuitively, is the notion of object. Applying the metametaphysical method of Unavailable Metaphysical Stories, we found that Epidemiology is incompatible with an object metaphysics. **Keywords:** Naturalized ontology; Metaphysics; Metametaphysics; Epidemiology; Scientific realism; Unavailable metaphysical stories

**Resumo:** Em termos ontológicos, o que podemos aprender com o atual estado da arte na Epidemiologia? Aplicando o critério Quineano de comprometimento ontológico, podemos aprender que existem diversas entidades fundamentais para que a teoria funcione. Uma delas é uma entidade do tipo vírus, em que o infame Coronavírus é um caso particular. Em termos metafísicos, essa entidade pode, em princípio, ser entendida de diversas maneiras. Uma dessas maneiras aparentemente, e talvez, intuitivamente, é a noção de objeto. Aplicando o método metametafísico das *Unavailable Metaphysical Stories*, verificamos que a Epidemiologia é incompatível com uma metafísica de objetos.

**Palavras-chave:** Ontologia naturalizada; Metafísica; Metametáfísica; Epidemiologia; Ciências médicas; Estórias metafísicas indisponíveis

### 1. Science-oriented philosophy

Scientific realism, when it is conjoined with naturalism, is known as a philosophical practice guided by science. Scientific realism consists in the claim that science describes what the world is like. Similarly to a recipe, this is how scientific realists proceed: “[...] we choose our best theories; we read off the relevant features of those theories; and then we assert that an appropriate relationship holds between those features and the world”<sup>1</sup>. Naturalists often claim that, being a somewhat privileged means of access to the empirical world, scientific theories work like a guide for philosophy. In this sense, naturalism is perhaps best described as an attitude towards philosophy, that is, a *metaphilosophical* stance. We will adopt this approach in this paper, as a hypothesis to check if we have in hand required tools for the adoption of a scientific-realistic posture when we interpret Epidemiology from an object-oriented metaphysics.

Before we can shift to our primary focus, it is important to make explicit the distinction between the terms ‘ontology’ and ‘metaphysics’, which will be used throughout this paper. To put it succinctly, we consider that ontology deals with existence questions regarding certain entities while metaphysics deals with questions regarding the nature of such entities. Seen in this way, ontology would be a field in metaphysics that produces a sort of catalog of all existing entities, while metaphysics builds from that catalog and raises questions related to the entities’ characterisation that make up ontology<sup>2</sup>.

<sup>1</sup> FRENCH, S. *The structure of the world*, 48.

<sup>2</sup> THOMSON-JONES, M. *Against Bracketing and Complacency: Metaphysics and the Methodology of the Sciences*, 244.

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Such a distinction is important, as it allows to see the achievements and limits of the project of naturalizing philosophy. Common mistakes occur when these two terms are used interchangeably: the excessively high expectation of extracting or literally “reading” metaphysics from science<sup>3</sup>, rendering metaphysics, as a discipline, with no work to be done; as a result, the attempt to discontinue analytical metaphysics<sup>4</sup>.

As we will see below, with an appropriate distinction of terms, we will see that: (i) ontology is a “*naturalizable*” discipline, being possible, in principle, to read ontological commitments directly from scientific theories; (ii) metaphysics is not a naturalizable discipline, but it is essential for the philosophy of science when it provides the possibility conditions for a finer-grained understanding of the entities obtained in the ontology of scientific theories.

Before we go any further, however, and fortuitously, we settled another terminological question, which will prevent us from misunderstandings ahead. The authors with whom we will discuss in the next sections use the terms ‘entity’ and ‘object’ interchangeably. As it is going to be clear, the second term has very strong metaphysical connotations, while the first is used as neutrally as possible. When we talk about ‘entities’, we are referring only to “something”, a “stuff” that does not yet have the metaphysical guise of ‘object’, ‘individual’, ‘structure’ or ‘process’. With that being said, let’s move on.

## 2. Are there viruses? Ontology meets Epidemiology

It is expected that an ontology of a theory *T* should say what there is according to *T*. In naturalist’s terms, this means to “read off” the entities existing according to theory *T*. In realist’s terms, this means to “read off” what there is in the world. In many contexts, such as in physical sciences, both claims are extremely problematic. In medical sciences, this is not unproblematic either.

To be able to go directly to the main subject of this paper, we must place ourselves in the debate about realism and anti-realism about medical sciences. Suppose the case where a person feels sick and goes to a medical doctor for a diagnosis. The differences between the possible realistic and anti-realistic stances of such a medical doctor are exemplified as follows:

According to the realist, if the doctor is correct when she says that her patient’s cough and abdominal pain are part of the same disease (token), then there is some underlying physical entity that unites these symptoms. The anti-realist, however, believes that even at this level the doctor has made a subjective, perhaps pragmatic, choice. The second question that distinguishes medical realists from anti-realists is, are the types into which we organize disease tokens real? Do they represent features of the underlying structure of the world, essentially, natural kinds, or do we arrange tokens and choose means of identifying the types to which they belong based on various subjective criteria? As a slogan, we can say that the realist believes that diseases are discovered, the anti-realist, that they are invented<sup>5</sup>.

We will assume here, as a working hypothesis, some kind of naturalistic realism towards Epidemiology: there are, in this world in which we live in, entities called ‘viruses’ and ‘diseases’. In particular, we are interested in the virus named ‘Severe acute respiratory syndrome coronavirus 2’ (SARS-CoV-2, henceforth just ‘Coronavirus’) and the disease named ‘Coronavirus Disease 19’ (COVID-19). It must be clear, however, that some ethical and political implications, *e.g.* the development of public policies, such as “[...] social-distancing

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<sup>3</sup> MAUDLIN, Tim. *The metaphysics within physics*.

<sup>4</sup> LADYMAN, J.; ROSS, D. *Every Thing Must Go: Metaphysics Naturalized*.

<sup>5</sup> SIMON, J. *Medical Ontology*, 67–68.

policies that do not bias against any population group”<sup>6</sup>, are not disputed between realistic and anti-realistic attitudes.

Epidemiology is ontologically committed to viruses. The following claim is a crystal-clear example of that.

[...] there are causal interactions between being in a disease-state and entities that are uncontroversially natural and real (for example, viruses, bacteria, and solar or nuclear radiation)<sup>7</sup>.

The Coronavirus is a particular case of such entities<sup>8</sup>. So, applying a Quinean-like “ontological commitment” criterion, we may say that theory *T* is ontologically committed to *x* if *T* talks about *x*. But the very concept of ‘disease’ is not straightforwardly accepted throughout the medical sciences’ community: “[t]he various attempts to define a coherent disease are an ontological, epistemological, and conceptual mess, with lacunae filled by ideological and social norms and meanings at each turn”<sup>9</sup>. We suspect that the term ‘ontology’, as read in the previous quote, refers to the term ‘metaphysics’, as defined briefly at the beginning of this paper, because the debates in the philosophy of medicine and the philosophy of biology revolve around issues related to the *nature* (not the *existence*) of diseases.

That said, suppose the following working hypothesis: that we are willing to adopt a scientific-realistic stance in relation to the ontological commitments of Epidemiology, treating, then, the term ‘disease’ as something real and that could be discovered – and not artificially constructed – by the medical sciences. In other words, this realistic attitude towards the entity ‘COVID-19’, for example, implies that such an entity does not exist only in Epidemiology, but is a real entity in the world of the phenomena in which we live: it is not a theoretical construct, it is the real deal. The famous ‘miracle argument’ in favor of scientific realism can then be spelled out specifically for medicine as a scientific discipline:

Medicine is clearly successful, at least in the twenty-first century, in treating certain diseases and in developing therapies for others that we were previously unable to treat. If diseases are real entities, we can easily explain this success. By identifying a real disease, we identify an entity whose features are fixed by nature and therefore repeat each time it is instantiated. We can then study these features, learn how they fit into the causal structure of the world, and thus predictably manipulate them in research, diagnosis and treatment<sup>10</sup>.

Is successfulness enough to adopt such scientific-realist stance towards Epidemiology? The short answer is “no”.

### 3. What are viruses? Epidemiology meets metaphysics

Addressing the “question of nature” is a pressing issue, since the “[...] interrelated questions ‘what is health?’ and ‘what is disease?’ are central to the philosophy of medicine”<sup>11</sup>. The “what it is” is, since Aristotle’s *Metaphysics*, a metaphysical question *par excellence*. To answer that, we need to discuss metaphysics. Such a need is made explicit in the following claim: “one cannot fully appreciate what it might mean to be a realist until one has a clear

<sup>6</sup> LEWNARD, J; LO, N. *Scientific and ethical basis for social-distancing interventions against COVID-19*.

<sup>7</sup> D’AMICO, R. *Disease and the Concept of Supervenience*, 43.

<sup>8</sup> ANDERSEN, K. *et al. The proximal origin of SARS-CoV-2*.

<sup>9</sup> KUKLA, R. *Infertility, epistemic risk, and disease definitions*.

<sup>10</sup> SIMON, J. *Medical Ontology*, 72.

<sup>11</sup> KINCAID, H. and MCKITRICK, J. *Introduction*.

picture of what one is being invited to be a realist about”<sup>12</sup>. The balance between obtaining this “clear picture” and a certain degree of epistemic humility is called in the literature “Chakravartty’s Challenge”<sup>13</sup>. According to the challenge, to claim “uncontroversial reality” about something is not enough to claim *realism* about such something.

How are those things that exist like? That is the metaphysical question. Notice: not everyone is up to take this further step on interpreting the items in *T*’s ontology. Instrumentalists are fine with things working for all practical purposes. Taking Chakravartty’s Challenge seriously is a necessary step just to those willing to adopt a scientific-realist stance towards Epidemiology.

How, then, can we complete Chakravartty’s Challenge? By attributing a *metaphysical profile* to the entities found in the theory’s ontology<sup>14</sup>. A well-known way to do this is to employ the Viking Approach to metaphysics<sup>15</sup>. This approach basically consists of searching the philosophical literature for methods and content that can assist in the attribution of metaphysical content to the entities with which scientific theories have ontological commitment. Briefly, this approach consists in engaging:

[...] with extant metaphysics, draw on the tools it has already developed, and work with metaphysicians themselves to hone and sharpen them in various ways, so that they can be developed more precisely to help us understand what it is that science is telling us<sup>16</sup>.

There are many metaphysical options available for understanding entities as objects, in the Viking style. With the exception of eliminativism, most metaphysical theories about objects, such as conservatism and permissivism, will say that objects have certain modes of existence<sup>17</sup>. For the purposes of this paper, it is enough to assume that viruses exist as objects, and that such objects, in turn, have such a nature that they are considered real.

So we may state that viruses, such as the Coronavirus, and diseases, such as COVID-19, are entities that exist in the world *modulo* a particular science called “Epidemiology” – that is, they are entities that make up the ontology of Epidemiology. Such entities, in its turn, can be *metaphysically* understood as *objects*. This is in tune with the dominant conception of the concept of “disease” in the philosophical literature concerning Biomedicine<sup>18, 19</sup>.

But is this object-oriented metaphysics (sometimes called “thing-ontology”) really compatible with Epidemiology? To answer this question, we need to make certain assessments about such a metaphysical profile. For that, we will use a metametaphysical method called ‘Unavailable Metaphysical Stories’ (UMS)<sup>20</sup>. The method was used, with another nomenclature in the philosophy of quantum mechanics<sup>21, 22</sup>. The application of the method in the philosophy of medical sciences is, however, a novelty brought about in this paper.

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<sup>12</sup> CHAKRAVARTTY, A. *A metaphysics for scientific realism: Knowing the unobservable*, 26.

<sup>13</sup> FRENCH, Steven. *Handling Humility*.

<sup>14</sup> ARROYO, R.; ARENHART, J. *Between physics and metaphysics: A discussion on the status of the mind in quantum mechanics*.

<sup>15</sup> FRENCH, S. *The structure of the world: Metaphysics and representation*.

<sup>16</sup> FRENCH, S. *Realism and metaphysics*, 405.

<sup>17</sup> KORMAN, D. *Ordinary Objects*.

<sup>18</sup> VALLES, S. *Philosophy of Biomedicine*.

<sup>19</sup> LEE, K. *Epidemiology is ecosystem science*.

<sup>20</sup> ARROYO, R. *Discussions on physics, metaphysics and metametaphysics: Interpreting quantum mechanics*, Chapter 5.

<sup>21</sup> ARENHART, J. *Ontological frameworks for scientific theories*.

#### 4. Unavailable metaphysics: object-oriented Coronavirus

The method consists in assessing whether there is incompatibility between a metaphysical profile and an ontology that has been extracted from a scientific theory. In a first step, we extract from Epidemiology the commitment to entities of the type 'virus' and 'disease'. In a second step, the entity obtained in the ontology was metaphysically dressed with an object's metaphysical profile. As in any metaphysical profile, object metaphysics has certain characteristics that deal with the nature of entities, here understood as objects. Finally, the third and final step of the UMS method would be to check if there are restrictions in the theory (as well as in the ontology extracted from the theory) for the application of the metaphysical profile in question – which, in turn, was obtained from the Viking methodology.

How well, then, does the metaphysical notion of 'object' fit the interpretation of entities (obtained via ontological commitment) in Epidemiology? Well, it will depend on how we define the concept of 'object'. Suppose we define it through the notion of 'individual'. There is a very counterintuitive, but well accepted, argument in the philosophy of biology, that says that entire strains are individuals<sup>23, 24</sup>. In that sense, the Coronavirus lineage would be an object, and that would be of great importance for things like tracing origins through lineages, that is, methods that study lineages, called phylogenetics.

However, the notion of 'individuality' by itself already presupposes object-oriented metaphysics. For example, there is a heated debate in the metaphysics of quantum mechanics between people who interpret quantum objects as individuals and those who interpret quantum objects as non-individuals<sup>25</sup>. Still, this underdetermination in relation to the nature (or metaphysics) of quantum objects is sometimes claimed to be a problem for object-oriented metaphysics – not a problem, for example, for structure-oriented metaphysics<sup>26</sup>. Thus, the notion of 'object' seems to be even more fundamental than the notion of 'individuality'.

It is important to say that the term 'object-oriented metaphysics' has its own meaning in the philosophical literature, specifically in the field of phenomenology<sup>27</sup>. We are, however, one step behind, once we are in a methodological discussion. Therefore, the definition of 'object' we have in mind is as basic as possible:

To many people the idea that the world is populated by objects, that have properties, that in turn are related in ways that the laws of science describe, seems unassailable. It can be characterized as a 'bottom-up' metaphysics obtained from our interactions with 'everyday'/'mid-sized white goods'/macroscopic objects and it amounts to little more than a prejudice, or as many philosophers are fond of saying, an intuition<sup>28</sup>.

A key feature to object-oriented metaphysics is the understanding of entities as "[...] existing separately from its actions, activities, and experiences"<sup>29</sup>. In that case, would a viral particle be an object? The question is whether it is fruitful for biology to conceive of viruses as objects, and we believe it is not, because of the issue of reproduction. A "loose" viral particle floating in the air means nothing from a biological point of view. It's just a protein capsule with a genetic material inside. But it could be any other heap of molecules, which only gains

<sup>22</sup> ARROYO R.; ARENHART, J. *Between Physics and Metaphysics: A Discussion of the Status of Mind in Quantum Mechanics*.

<sup>23</sup> GHISELIN, T. *A Radical Solution to the Species Problem*.

<sup>24</sup> HULL, D. *Are Species Really Individuals?*

<sup>25</sup> FRENCH, S; KRAUSE, D. *Identity in physics: A historical, philosophical, and formal analysis*.

<sup>26</sup> FRENCH, Steven. *The structure of the world: Metaphysics and representation*, Chapter 3.

<sup>27</sup> HARMAN, G. *An outline of object-oriented philosophy*, 193–197.

<sup>28</sup> FRENCH, Steven. *The structure of the world: Metaphysics and representation*, v.

<sup>29</sup> RESCHER, N. *Process metaphysics: An introduction to process philosophy*, 109.

biological interest when it integrates with a cellular process<sup>30</sup>, invading a cell to hijack protein-making machinery, etc. Thus, for a virus to even be considered as an object, it must be integrated into some process – be it evolution by natural selection, be it the simple process of infection, or something else.

To conclude, we can also mention that there is a demand in the literature to change the metaphysical interpretations of object-oriented bias<sup>31, 32, 33</sup>.

Now, let us reflect on what the alleged abandonment of object metaphysics means. What UMS did, ultimately, was to show the incompatibility of a specific metaphysical profile with a specific scientific theory. In this paper, we argued that a realistic metaphysics about objects is incompatible with the current state of Epidemiology. This does not mean that such a metaphysical profile is false, incorrect, or that it should be abandoned. It simply means that we should not associate it with Epidemiology due to ontological restrictions that were extracted from the theory itself.

At this point, it seems safe to say: Coronavirus is not, in metaphysical terms, an object. What would it be then? As indicated in the above-quoted passage, process metaphysics could be an alternative to metaphysically interpret Coronavirus, COVID-19, or any other entity extracted from current Epidemiology, in order to enable a legitimate scientific realism in relation to this medical science – in particular, to entities with which it is committed ontologically.

An interesting question that can be asked at this point in the discussion is whether there is a process metaphysics, acquired by the Viking methodology, that is compatible with the ontological restrictions of Epidemiology. If so, what would it be? If not, the fate of process metaphysics will be, as far as the interpretability of the ontology of Epidemiology is concerned, the same as that of object metaphysics. Alas! Beyond the scope of this paper.

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<sup>30</sup> DUPRÉ, J.; GUTTINGER, S. *Viruses as living processes*, 113.

<sup>31</sup> LEE, K. *Epidemiology is ecosystem science*.

<sup>32</sup> DUPRÉ, J.; GUTTINGER, S. *Viruses as living processes*.

<sup>33</sup> RIEPPEL, O. *Species as a Process*.

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