

Organisms and evolutionary individuals: a metaphysical perspective

What counts as a biological individual? This question, which have been heavily debated among philosophers of biology, has crucial implications for our ontology of biology. In this presentation, I will explore some of them, by focusing on the distinction between the notion of an organism and the notion of an evolutionary individual.

For most people (including a large number of biologists), a biological individual is simply an individual *organism*, i.e. a living creature such as a dog, an oak tree or a bacterium, with relatively well-delineated boundaries and functionally integrated parts. But for most philosophers, this definition is too *reductive*, and does not account for the nature (as well as the diversity) of biological individuals in the living world.

Currently, the dominant view about biological individuality relies on two fundamental claims:

- (i) many biological entities—which do *not* look like traditional organisms (like viruses, chromosomes or some animal societies)—nevertheless exhibit a sufficient amount of cohesion or autonomy to count as genuine *individuals* (as opposed to mere aggregates),
- (ii) biological individuals are *evolutionary* individuals; hence, the properties which make an entity *x* a genuine biological individual are equivalent to those which make *x* a proper candidate for participating in evolutionary processes—(e.g. being a unit of selection).

Taken together, these (logically independent) assumptions provide a unified framework for thinking about the varieties of biological individuals that we observe in the living world. But recently, some philosophers have made vivid objections to this picture (Dupré and O'Malley 2009; Pradeu 2010, 2016; Godfrey-Smith 2013) and have instead defended an alternative view, where the notion of an organism and the notion of an evolutionary individual refer to two distinct—though *partially overlapping*—categories within the broader class of biological individuals.

Pradeu (2010, 2016) is perhaps the most representative of these authors, so the bulk of this presentation will be structured on the discussion of his most recent argument. In his paper, Pradeu (2016) denies that the category of biological individuals can be reduced to the category of evolutionary individuals. For him, the former category is much broader than the latter, and includes many biological entities which lack the sort of properties associated with evolutionary individuals but that are still sufficiently cohesive (at a functional level) to count as genuine biological individuals. Among the latter, especially, figure numerous physiological units—such as multispecies host-symbiont associations—which do not count as unit of selection (because their constituents form different lineages) but which can still be legitimately considered as *bona fide* organisms, with a high degree of functional and physiological integration.

In Pradeu's view, therefore, the categories of organisms and evolutionary individuals correspond to partially overlapping categories associated with *different criteria of individuation*: on the one hand, the individuality of organisms depends on the physiological cohesion among their parts (Pradeu proposes an immunological criterion to specify the nature of this cohesion), but on the other hand, the individuality of evolutionary individuals depends on their ability to get involved in evolutionary processes.

Pradeu, however, is silent on the question of how we should *interpret* these categories from a metaphysical point of view, and this is the question that I will address in this presentation.

At a metaphysical level, the problem can be formulated as one of determining whether the distinction between these two overlapping categories corresponds (or not) to a genuine ontological distinction between different *kinds* of biological individuals. To address this issue, I will start by introducing the distinction between the notion of a *natural kind* and the notion of an *accidental property* as it is traditionally understood in the metaphysical (neo-aristotelician) literature (Lowe 2009). Thus, I will assume that a natural kind is a property which is part of the *identity* of the object that is individuated (hence, the object cannot be individuated without this property), and I will assume that a mere accidental property (such as “being red” or “being round”) is a property that can be instantiated by different kinds of individuals—and which is not, therefore, an essential part of the identity of these individuals.

From there, I will envisage four possible interpretations of Pradeu’s scheme—who represents the two categories of organisms and evolutionary individuals as two distinct but overlapping ontological categories. According to the first interpretation, both categories correspond to natural kinds. According to the second interpretation, both correspond to mere accidental properties (in this case, the properties “being an organism” and “being an evolutionary individual” are defined over the broader domain of the biological individuals). According to the third and the fourth interpretations, one category corresponds to a natural kind, and the other corresponds to an accidental property. Each of these interpretations will be envisaged successively, with a special emphasis on their implications concerning the ontology of biology.

The first interpretation, as I will show, leads to an *inconsistency* if we accept the distinction between natural kinds and accidental properties as defined above; for according to this distinction, two objects that belong to different kinds can only be identical if (a) there is an *inclusive* relationship between these kinds and if (b) the two objects belong simultaneously to both kinds. Yet the relation suggested by Pradeu between the two categories of organisms and evolutionary individuals is an *overlapping* one, so (a) cannot be satisfied. The second interpretation somehow begs the question, for if one admits that “being an organism” and “being an evolutionary individual” are both accidental properties, one should admit that the domain of objects to which they apply (i.e. the domain of all the biological individuals) is *already* given—that is, one should admit that what makes a given entity a biological individual is already known, independently of any physiological or evolutionary criterion. But this view is problematic, as there is no satisfactory way of individuating biological entities apart from these two criteria. The third interpretation (which assimilates the category of organisms to a natural kind and the properties associated with evolutionary units to mere “accidental properties”) faces important difficulties when it comes to *explaining* the functional structure of entities that belong to the category of organisms but not to the category of evolutionary individuals. Finally, the fourth interpretation (which assimilates the category of evolutionary individuals to a natural kind and the properties associated with organisms to mere “accidental properties”) turns out to be the least problematic, but conflicts with some core assumptions defended by Pradeu (2016)—even when alternative interpretations of the notion of a natural kind are envisaged instead of the “traditional”, neoaristotelician conception (e.g. the “cluster kind approach” of Boyd 1991, 1999).

References

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