In sustain of M. Devitt's "Resurrecting Biological Essentialism"

By Francesca Bellazzi

Abstract

In this essay, I analyse Devitt's paper's "Resurrecting Biological Essentialism" (2008) to show that essentialism is a proper way to address the problem of the definition of species. In particular, I consider Devitt's thesis: *Linnean taxa* have essences that are, at least partially, underlying intrinsic essential properties. These essential properties are largely, but not entirely genetic and determine the belonging to a species. This "resurrection" of biological essentialism is proposed in relation to the insufficiency of the definition of species in current philosophy of biology. The major objection to essentialism challenges the notion of essence in view of variation and change and evolutionary theory. I propose two lines of response to this objection: the first concerning the concept of evolution, the second the concept of essential properties. In conclusion, I state that Devitt's essentialism stands up to scrutiny and that the essentialism account is an interesting position for further research about the differences in species.

Introduction

The debate about what makes an organism member of a species has a long history in philosophy and represents a central theme in the philosophy of biology. In particular, contemporary authors have abandoned the classic essentialist conception of species because it is deemed as incompatible with the Darwinian theory of evolution. However, Devitt (2008) suggests the adoption of an essentialist conception in the definition of species.

In this essay, I will consider Devitt's article and thesis. Then, I will expose the objection of variation and change as the significant critique to essentialism (Sober 1980, Griffith 2002). I will try to give a preliminary response to this objection in two ways. In conclusion, I will present that the shortcomings of essentialism do not undermine it, but represent a stimulus for future studies.

Devitt's argument

Essentialism about species is today a dead issue.
(Sober 1980, p.353)

Essentialism has already been dead for twenty-eight years when Devitt resurrected it. In his paper, *Resurrecting biological essentialism* (2008) he aims at reintroducing essences in relation to the definition of biological species in order to give a structural explanation of biological generalisations. In particular, his concern is to identify the properties in virtue of which an organism is a member of a species. He argues that essential properties have this role. More precisely, *Linnean taxa*[6] have essences that are, at least partially, underlying intrinsic essential properties; these essential properties are mostly, but not entirely genetic, and determine the belonging to a species rather than another. His view, and in general the essentialist position, has been criticised by many authors (Sober 1980, Richards 2010, Wilson *et al.* 2007). The most substantial objection to essentialism is based on evolutionary theory and change and variations in species. Indeed, evolution challenges the idea of an essence that remains stable within time and define the species.

Let us now consider more in detail Devitt's argument. Firstly, he separates the *category question* from the *taxon question* about the definition of species (Devitt 2008, 2010; Ereshefsky 2010, 2017). These can be summarised as follows:

- The category question concerns the definition of the species category, i.e. what is for a group or kind to be a species. It gives the *ratio cognoscendi* or *classificandi* of the species, that is, respectively, why we *know* that *Xenopus laevis* is a species and why we *classify* groups of frogs as species.
- The taxon question addresses the properties in virtue of which an organism belongs to a particular species, i.e. "what is for an organism to be a member of a particular kind" (Devitt 2008, p.334). It gives the *ratio essendi* of being a member of a species, that is why a *Xenopus laevis*

[6] *Linnaean taxa* are biological kinds that reflect the biological categorisations of Carl N. Linnaeus' hierarchy (1735-58): domains, kingdoms, phyla, classes, orders, families, genera, species, and subspecies.

> *is* a member of the species *Xenopus laevis* rather than, e.g. *Xenopus tropicalis*.

Devitt believes that the current positions in philosophy of biology about species are answers to the category question rather than to the taxon question. These positions can be summarised as the following:

- Phenetic concepts theory: species are based on overall similarities between phenotypic traits. This position is now generally considered naïve.
- Biological species concepts theory (BSC): species are groups of interbreeding natural populations that are reproductively isolated from other such groups.
- Ecological niche concepts theory (ENC): species occupy a certain ecological niche, and their members exploit the same set of environmental resources and habitats.
- Phylogenetic-Cladistic concepts theory (P-CC): species are identified regarding evolutionary history.

However, none of them seems to explain why, for example, a horse is a horse rather than a cat. Indeed, these positions are able to give a definition of the *category* species, i.e. they are able to define the category species, but they do not provide any further structural explanation on its members. As far BSC as is concerned, it is possible to identify the *category species* because it is a group of interbreeding natural populations. However, this does not give us any explanation of why a member of a species interbreeds just with a member of the same species. In consequence, Devitt claims that essentialism is the only position that can answer properly to the *taxon* question. In fact, essentialism individuates the structures thanks to which an organism is a member of a particular species. He presents his intrinsic essentialism in the following way. At first, he individuates intrinsic properties as the ones that are possessed by an entity independently from outside forces. Then, he defines essential properties as those intrinsic properties that characterise the entity as a member of the species. In *Linnean Taxa*, intrinsic essential properties are at least partially

genetic. In conclusion, he states that an individual is a member of a particular species, partially, in virtue of such essential genetic makeup that it possesses. It is important to notice that his essentialism is not committed to a fully intrinsic essence position. Devitt's essentialism wants to underline that there are common shared genetic properties between members of the same species and those, with others such as a specific relation with the environment, can explain, i.e., why a horse is a horse rather than a cat. Essential properties are explanatory structures not used to obtain the definition of the individual itself, but to the definition of the individual as a member of a species.

Moreover, this kind of essentialism is interesting because it is a *taxon-answer* compatible with different *categories-answers*. Indeed, it is compatible with BSC: species are groups of interbreeding natural populations that are reproductively isolated from other such groups because members have the same essential properties. The same holds for with ENC: members share the same ecological niche because members share the same essential properties. As P-CC is concerned, essentialism can be in agreement also with this position. In fact, essentialism is not committed to a fully intrinsic essence, and the interaction with the environment is acceptable.

Variation and change

Devitt's argument is interesting and well explained. Indeed, I agree that current positions in philosophy of biology are insufficient and not satisfactory in the explanation of why an organism is a member of a species rather than another. However, there are some points in the argumentation that need further development and can be subjected to critiques. The primary critique concerns change and variations in species and the evolution of species gradually in time. Indeed, it seems difficult to identify essences that will not be affected by changes. In particular, due to the brevity of this essay, I will focus on Sober's (1980) and Griffith's (2002) arguments against biological essentialism. Sober (1980) claimed that the genetic make-up of a species is something that continually changes and evolves. The variety of the genetic composition is central to the concept of evolution and adaptation itself. He assumes that

essences that are central in the definition of species are stable and fixed. Thus, this implies that intrinsic genetic essences are in contradiction with the contemporary theory of evolution. Secondly, Sober (1980) and Griffith (2002) affirmed that essentialism does not entail the importance of genetic variation in the Darwinian selection and evolution. In particular, Sober (1980) claimed that "Aristotelian" essentialism interprets variation as taking the organism away from its original nature and from the ideal, according to the theory of "Natural State Model". In this way, differences caused by variations are unpleasant effects of the modifications of the organisms (Sober 1980, p. 362). This, in his opinion, is strictly in opposition to Darwinian Theory. Indeed, according to the evolutionary theory differences are not effects, but causes of evolution and better adaptation to the environment. An essentialist conception would be necessary in contradiction with this because essences are presented as stable and ideal properties that must be preserved. Devitt himself replies to these objections stating that essentialism is not committed to a wholly intrinsic essence position that avoids any form of change. This "weak" version of essentialism has two implications: only a part of the genetic material is essential and the essence of the species is influenced by external factors without. In consequence, it is possible to combine small variations in the genetic set and still preserve the belonging to a particular species.

Two possible answers to the objection of variation and change

Whatever it was that Darwin was up against, it was not Aristotelian essentialism.

(Lennox 2001, p.162)

In this section, I will try to propose two other possible answers to the "evolutionary objection". The first one is based on the definition of evolution in this context. The second one is based on a better explanation and understanding of what an essential property is. Let us now consider the first answer to the objection. In the contemporary philosophy of biology, there are two broad conceptions concerning the concept of evolution: "evolution **within** the specie or *microevolution*" and "evolution **of** the species or *macroevolution*"

(Godfrey-Smith 2014). If evolution is considered only as "evolution **within** the species", then essentialism can be problematic. Indeed, the species need to be the same even if the essential genetic properties are changing and this is contradictory. However, if we conceive evolution as an "evolution **of** the species", then evolution is the substitution of a species by another and essentialism can be saved. In particular, it can be possible to identify two families of changes in the genetic make-up. The first one is a change of the essential part of the genetic set so that the species is substituted by another and this refers to *macroevolution*. It can be possible to identify a "critic threshold" in the modification of genetic material beyond which it is correct to identify the substitution of the species with another. The second one is a change in genetic set that is not essential: it merely diversifies the individual from another member of the species and this is the case of *microevolution*. Indeed, it would be a simple variation that differentiates an individual from others, without undermining its membership to a particular species. In this way, essentialism entails for both micro and macro evolution.

Let us now move to the second answer that is based on a deeper understanding of the concept of essential properties. At first, individuals of the world have some properties, and these can be divided into essential properties and non-essential properties. Essential properties are the ones that characterise the species of the individual, and they are a sort of "necessary condition" for the identity of it *as a member of a species*. Non-essential properties are extrinsic or functional properties that don't define the identity of the individual *as a member of a species*. These distinctions were made by Aristoteles in the *Categories*, where he divided the properties that explain the *essence of an object* from the ones that are *merely* in the object. In the *Metaphysics* he separated what is *accidental* (συμβεβηκός) and what is *essential* (καθ' αὐτό). Being as accidental is something that is "not forever nor mostly", which means it can change in the individual under consideration without any affection to the identity of it. Being as essential, on the other hand, is what the individual is "for itself". The essential properties represent the content of the definition and, in the classic

conception[7], essential properties are what characterise the kind or the species of an individual. In this context, species can be identified as groups of individuals that share the same essence. The classical conception of essential properties is consistent with Devitt's thesis. Indeed, species can be identified as groups that share, at least partially, the same set of genetic makeup that represents the intrinsic genetic property of the species. Furthermore, a deep understanding of this conception of essential properties can undermine the objections reported in the previous section. At first, Sober's (1980) presentation of the Aristotelian conception of essential properties seems incorrect and a result of a combination of the Platonic conception of essences with the Aristotelian one as a result of Mayr's analysis of essentialism (1959). Indeed, in the Platonic conceptual framework, essences are the ideal of the objects, they are immutable and stable, and they have an ontological priority compared to the individual which instantiates them. This version is incompatible with evolution. On the opposite, in the "Aristotelian conception", the concrete individual with all of its characteristics has an ontological priority. The essential properties define it as a member of a species because these properties are instantiated in all the individuals that are the member of that species. In this second view, variation and change in the essential properties are possible because they are a consequence of variation and change within the concrete biological organisms. These changes can lead to a substitution of a species by another and so macroevolution. Thus, this kind of essentialism seems not to be in contradiction with evolutionary theory. Furthermore, let us consider more precisely Sober's (1980) critique about the incompatibility between the Aristotelian conception and the evolutionary theory one. At first, in the Aristotelian conception changes in the individual are not conceived as effects of external factors. On the contrary, variation is interpreted as a cause, specifically, the final one, and it is a movement from potentiality to act. The theory of potentiality and actuality is crucial in order to understand the development of biological entities, and the idea of movement and variation is of fundamental importance in the development of biological life (cfr. *Generation*

[7] With classical conception I am referring to Aristoteles and Thomas Aquinas, in particular *De ente et essentia*.

of Animals, *Parts of Animals*). Secondly, to mention the theory of "Natural State Model" in this context is incorrect. Indeed, the Natural State Model is presented in the *Physics* and in *On the Heavens* and concerns the movement of physical objects. This theory does not apply to Aristoteles's biological theory, where the idea of change is central about potentiality and actuality. Aristotle himself separates the method of study physical objects from the method of study biological ones (Parts of Animal I,1), and he recognises that the two domains describe different kinds of necessity. Indeed, if physical objects respect the Natural State Model, biological objects change according to a form of hypothetical necessity. This hypothetical necessity refers to the fact that biological beings are not directed toward a specific form or species, but rather to the fact that they have to be alive and survive (Lennox, 2001a). Thus, in natural beings, modifications are not seen as a deviation from ideal concepts of species, but rather as something that permits the survival of the being. In conclusion, I think that a conception of essential intrinsic properties that are close to the Aristotelian conception of essences is compatible with evolutionary theory. Furthermore, the identification of at least partially genetic essential properties in the definition of species can help us in answer to the taxon question.

In conclusion, I find that Devitt's argument stands up to scrutiny. I agree with him about the inadequacy of other accounts in the answer of what he calls the "*taxon question*" and the efficacy of the essentialist position. However, I find that his argument needs further explanation about what he intends with genetic makeup and further specifications about the commitment to a "not fully determined essence". Indeed, the identification of a specific genetic set and of a specific "threshold" beyond which evolution leads to a new species can give a crucial advantage to the argumentation. Nonetheless, I do not think that this lack of further explanations undermines the argument, but it represents a reason to develop this position further.

Conclusion

In this essay, I have exposed Devitt's paper "Resurrecting Biological Essentialism" (2008) to show that it is possible to sustain essentialism about the definition of biological species. The result of this analysis is that species have essences that are at least partially genetic. Then, I have exposed the major objection to essentialism: variation and change in evolutionary theory. I have tried to answer this objection in two ways. The first one concerns the concept of evolution, the second one the concept of essential properties. In conclusion, Devitt's thesis is sound and that the lack of relation to the identification of "specific genetic set" represents a stimulus for further researches.

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