Ontological Categories and the Transversality Requirement

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Abstract

Which categories of entities qualify as ontological categories? Which combinations of categories qualify as adequate systems of ontological categories? These are the two questions the author focuses on in this article. Contrary to the usual praxis in contemporary ontological literature, he addresses both questions conjointly. First, the author presents some problems of characterizing ontological categories in purely extensional terms, i.e. as widely inclusive natural classes. Second, he introduces the transversality requirement: ontological categories should be individually and naturally domain-transversal, i.e. ontological categories must be neutral concerning different scientific disciplines like physics, biology and mathematics. As a result, ontological categories must have instances in any domain of reality. Finally, the author checks the adequacy of some systems of ontological categories according to this criterion and meets some possible objections.

Keywords

ontological categories – meta-ontology – extension – intension – fundamentality

Ontological categories are the most fundamental categories of reality. They divide up everything that is or could be. Ontological categories are combined to form systems of ontological categories. A system of ontological categories (hereafter “soc”) is a metaphysical theory that, among other things, posits some ontological categories as fundamental and explains how these categories are constituted and how they are related to each other.
Two important questions arise at this context, one concerning the adequacy criterion for ontological categories and one concerning the adequacy criterion for socs:

1. Which categories of entities qualify as ontological categories?
2. Which combinations of categories qualify as adequate socs?

The first question has received increasing attention in contemporary ontological literature (see e.g. Westerhoff 2002, 2005, Rosenkrantz 2012, Thomasson 2013, van Inwagen 2014). It asks what conditions a class of entities has to meet in order to qualify as an ontological category. Why are e.g. objects, properties and states of affairs ontological categories, while red, tiger and water are not? These latter are “ordinary categories”. Sometimes the question is posed in a linguistic form: which predicates express ontological categories? (Rosenkrantz 2012)

For some metaphysicians (see e.g. Norton 1976, 106), ontological categories must be “the most general” categories, i.e. they have to be widely inclusive. Most, but not all,1 metaphysicians agree about an additional requirement: any entity should belong essentially to a category. If Socrates is an object, he is essentially an object, if being white is a property, it is essentially a property, if Socrates’ particular whiteness is a trope, it is essentially a trope, if Socrates’ being white is a state of affairs (or fact), it is essentially a state of affairs, etc.

The second question concerns entire socs: What conditions must a combination of ontological categories meet in order to qualify as an adequate soc? Like most classification systems, we expect that socs will obey the so-called “jepd” requirement, i.e. categories on the same level should be jointly exhaustive and pairwise disjoint. Everything that is or could be has to belong to a single category, and no entity can simultaneously belong to two or more different categories.2 Some obvious neat logical features are derived from jepd. But there are also metaphysical reasons for assuming them. The “jointly exhaustive” requirement is directly derived from the absolute universal scope of metaphysical inquiry and is, as far as I can see, uncontroversial. The “pairwise

1 Westerhoff (2004, 616–618) argues against the essentiality requirement. According to him, an entity e belongs contingently to an ontological category A. According to his holism (p. 616), it depends on what other objects there are in the entire world. Since essentiality is not central to the main topic here, I will not argue against this unorthodox view and simply assume essentiality.

2 For an explanation and defence of the jepd requirement, see Smith 2005, Jansen 2008 and Frické 2012.
disjoint” requirement seems to be implicitly assumed by nearly all metaphysicians, and I assume this here as unproblematic.3

The distinction between questions 1 and 2 is important, for it may be the case that A, B and C individually qualify very well as ontological categories, but that the combination A/B does not qualify as an adequate soc because, say, it fails to comply with JEPD. Even when we accept that objects, properties, states of affairs, abstract, concrete, tropes and processes all qualify individually as adequate ontological categories, the combination, for example, object/abstract (on the first level) does not qualify as an adequate soc, because there are arguably abstract objects and concrete non-objects. Thus, this system would be neither pairwise disjunctive nor conjointly exhaustive.

But here is where our problem arises. The fulfillment of these requirements is not sufficient for characterizing an adequate soc. I assume that no metaphysician would ever accept the combination of the two categories rational and non-rational as an adequate soc. Due to the logical features of negation, these categories obey JEPD: everything is rational or non-rational, and nothing can be both at the same time. Furthermore, this system obeys the essentiality requirement: everything that is rational (including human beings, angels and God) is essentially rational, and everything that is non-rational (including cockroaches, tables and numbers) is essentially non-rational. Now, why seems the rational/non-rational ontology unacceptable?4

At first glance, the answer to question 2 seems to presuppose the answer to question 1. It seems natural to decide, first, which classes of entities qualify as ontological categories, and after that, to select some of these categories to

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3 As always in philosophy, of course, a case could be made against it. For instance, Russell suggested in the unpublished manuscript “The Fundamental Ideas and Axioms of Mathematics” (1899) that numbers can exist both as objects and as properties. According to a common interpretation, Platonic universals are properties transformed into objects: redness is accordingly no longer a property but an abstract particular. But to discuss the “pairwise disjoint” requirement is not the aim of this paper.

4 The category non-rational is meant here to include irrational and non-rational as well (so, it could be expressed by the disjunctive predicate “irrational or non-rational”, if you like). My example with the two categories rational/non-rational could be substituted without any essential difference for my argument by an example with the three categories rational/ non-rational/irrational: humans are essentially rational, cockroaches essentially irrational and stones essentially non-rational. This remark is important because some philosophers like Ryle (1938 and 1949) and Sommers (1959 and 1971) would resist to call stones “irrational” on the reason that this does not even make sense (only biological creatures can be rational or irrational). According to these philosophers, conceptual absurdity is the key to detecting category differences. More on this approach in section 5. Thanks to an anonymous referee.
construct a particular soc. This way of proceeding may have some advantages. If one has an inventory of all ontological categories, the JEPD requirement seems to be sufficient to establish an adequate system. For, if one decided from the start on which categories qualify as ontological categories, one could exclude the rational/non-rational system, for the simple reason that these are not ontological categories at all. In my proposal I will refuse this order of priority for reasons that will become clear in brief. Anyway, why should we reject the category non-rational as an ontological category, given that it is highly inclusive and essential?

One obvious way of doing this is by recurring to linguistic and logical analysis, e.g. denying that attaching the logical expression “non” to an unquestionable predicate yields another unquestionable predicate. I will not follow this line of reasoning for two reasons. First, this article intends to venture a purely ontological, non-linguistic solution to the problem. The adoption of a purely ontological approach may be seen as a simple methodological decision. But it is also a consequence of our choice: not the question “which predicates express ontological categories?” but “what is an ontological category?” is at stake here. The second reason is that attaching the negation to an unquestionable predicate or concept may actually in some cases yield an equally unquestionable predicate. Frege’s distinction “saturated/unsaturated”, which is based on this simple strategy via negation, may plausibly ground an interesting and adequate soc (although it is originally conceived as a logical-linguistic distinction).

In this article I propose a criterion that is both (1) an adequacy criterion for a category to qualify not as an ordinary but as an ontological category and (2) an adequacy criterion for any soc. Indeed, I think that both questions can and must be addressed conjointly. Criterion (1) will depend on criterion (2).

1 Fundamental and Primary Ontological Categories

First of all, we must distinguish fundamental ontological categories from primary ontological categories. The notion of a primary ontological category (as used e.g. by van Inwagen) has to do with a category’s level of generality. It is important because some metaphysicians (e.g. Chisholm 1996, Lowe 1997, Grossmann 1992, Hoffman & Rosenkrantz 1991) proposed socs that are tree-like, i.e. partial order structures: They have primary ontological categories at the top, which are the most general categories. Each of these primary categories is split into secondary categories, which are on the second level of generality and are
split into tertiary categories, and so on (how far we can go down in this hierarchy is a problem that we will deal with briefly).\(^5\)

An ontological category is *fundamental* for a given soc if it is considered irreducible in this soc. I presume that almost all metaphysicians accept that objects, properties, tropes and states of affairs are ontological categories, while dogs, red and tables are just ordinary categories. A nominalist can claim that in his soc there are no universal properties but only objects (its fundamental and primary category), which can be concrete or abstract (its fundamental secondary categories). Thus, for the nominalist, universal properties are not a fundamental ontological category. But this does not mean that for him the category of properties is not an ontological but a mere ordinary category. Rejecting the view that a given ontological category is fundamental does not amount to rejecting its status as an ontological category. The metaphysician who denies the existence of properties and the astro-physicist who denies the existence of black holes are not doing similar things. In any case, according to this terminology, it is entirely coherent to accept fundamental secondary categories or primary non-fundamental categories.

This distinction is important because, ideally, any proponent of a soc should offer a general strategy for reducing all derivative ontological categories to his fundamental categories. This is one central battlefield of competing socs. The vast literature on this topic includes many proposals of this kind: how to reduce objects and universal properties to tropes, or properties to classes (which are particulars), or objects to bundles of universals, and so on.

### 2 Classification versus Existence

There is a third question that will not be discussed here but which is also important to note:

(3) What are the criteria for any entity to belong to an ontological category?

When we propose a soc, we should be able to offer criteria for deciding to which category of this soc any given entity \(e\) belongs. MacBride, for instance,

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\(^5\) Some socs have a single highest "super-category," such as *entities* or *things*. In describing these socs, I will simply assume that the second level is the level of primary categories. This is not relevant for this paper; if you want, you can, in these cases, simply designate as the "secondary" category what I call the "primary" category.
showed in a series of articles (1999, 2004 and especially 2005) how difficult it is to give such criteria for the traditional categories of particulars and universals. Question 3 is connected with question 1 and 2 in an obvious way: the general criteria for belonging to the categories A and B, for example, have to guarantee that A/B obeys jepd (every entity must be uniquely classified) and that each entity belongs to a category in an essential way.

But the point I want to make here concerning 3 is that we should accept as a methodological principle that questions concerning classification are independent from questions concerning fundamental categorical existence. To say that an entity e belongs to the category A does not imply accepting the existence of category A as fundamental. This may appear inconsistent with the requirement of exhaustiveness. If a soc is supposed to classify everything that is or could be, and if a given entity e belongs to the category A, then we are apparently forced to accept the existence of category A. But this would lead us to a drastic multiplication of categories. Socrates is an object, to be human is a property, the particular humanity that inheres in Socrates is a trope, the entire fact that Socrates is human is a state of affairs, the first year of Socrates’ life is a process. Should we, as a result, accept a soc with five categories: objects, properties, tropes, states of affairs and processes? This seems to be too excessive. Now, if we accept that classification and existence are independent issues, we can avoid such multiplication of categories.

Here is another important reason for defending this methodological rule: just like the Quinean may say without contradiction that Pegasus is correctly classified as a fictional character and, at the same time, that fictional entities do not really exist, the nominalist may say without contradiction that red is (correctly classified as) a property without committing himself to a soc with properties as fundamental categories. Thus, the acceptance that a given category qualifies as an ontological category (question 1) and that it has some instances (question 3) does not imply the acceptance of this category as fundamental. Even the nominalist who accepts only the category of objects as fundamental can accept the view that properties, states of affairs, tropes, processes, etc., are genuine ontological and not merely ordinary categories. To claim that there are only objects, or that only the category of objects is fundamental, as the nominalist does, is one thing; to reject the view that properties, states of affairs, tropes and processes are ontological categories at all is quite another thing.

This point should be generalized to all of metaphysics. Take, for example, the case of fictional objects: one can classify some objects, e.g. Queen Elizabeth, as real and others, say Sherlock Holmes, as fictional and at the same
time, without contradicting oneself, claim that fictional objects do not “really” exist. Similarly, we can accept the view that the best way of categorizing entities is in terms of the object/property distinction and at the same time assert, as the nominalist does, that only objects really exist, i.e. that only objects are fundamental. Of course, to justify the claim that properties do not exist, the nominalist has to offer a general strategy of reduction or elimination for this category. As a matter of fact, such reductions must be (and actually are) offered in class, resemblance, predicate and in many other kinds of nominalism. Indeed, the whole debate between Platonism and Nominalism presupposes the distinction of objects and properties as fundamental.

3 What Is Wrong with the Traditional Approach?

We all agree that ontological categories have to be very inclusive. After all, they are the most general categories for classifying everything. But, as we saw with the rational/non-rational example, something is seriously wrong with the traditional approach. The class of non-rational things is extremely inclusive, but it is certainly not an ontological category. My diagnosis of the problem is simple: in the traditional approach, ontological generality is conceived in a simple extensional way. In general, the naive understanding seems to be this: take the domain of all entities and organize it in sequences of nested classes. Smaller classes are subclasses of ever larger classes. At the top there are classes that contain all the other classes as subclasses but are not proper subclasses of any larger classes. These have to be ontological categories. Or, as a better metaphor for visualizing the basic idea: we start with a classification tree for everything, such as the famous Porphyrian tree, and look at the top in order to find the most general categories.

Van Inwagen’s (2014) characterization of ontological categories is paradigmatic for this traditional approach. He defines ontological categories as “large” natural classes, i.e. as natural classes whose membership comprises a “really significant proportion” of all the things that exist. One evident problem here is the vagueness of the notions employed. What is a “really significant proportion” of reality? How large a part of reality does it have to be? Van Inwagen himself recognizes that his characterization is too vague but tries to defend it by arguing that vagueness is not the same as subjectivity. Indeed, it isn’t. But this is not an improvement, for it still leads to undesirable results. Take an example offered by van Inwagen himself: imagine someone who believes that only bosons and fermions exist and who is a mereological nihilist. Would we
say that for him bosons and fermions are ontological categories, simply because he thinks they are \textit{jezd}, essential and comprise a very significant proportion of reality?

There are additional problems. For van Inwagen, a \textit{primary} ontological category is a large natural class that is not a proper subclass of any other natural class. A \textit{secondary} ontological category is the largest natural subclass of a primary ontological category. A \textit{tertiary} ontological category is the largest natural subclass of a secondary ontological category, and so on. Again, we have a picture of nested classes or of a classification tree for everything. Van Inwagen himself recognizes a problem here: can dog turn out to be a 23-ary ontological category? In Lowe’s (1997) \textit{soc}, for instance, universals and particulars are on level 2 (just below level 1 of entities), while organisms are on level 6 and cats on level 11. Which was the last ontological and which was the first ordinary category? This is what Westerhoff (2002, 338; 2005, 35) called the “cut-off point problem”. It concerns the vagueness of the predicate “most general” used to define the notion of ontological category, and it affected many proposals before van Inwagen’s. Indeed, when one conceives ontological categories simply as the “most” general categories of the one big classification tree for everything, the inevitable question is how far we may go down the partial ordering before we stop doing ontology and start doing other sciences. Fortunately, I think there is a way out of this problem.

4 The Transversality Requirement

Here is my proposal. Global science is subdivided into various different particular sciences. Each particular discipline investigates a domain or sphere of reality. Physics, biology, mathematics, psychology and the social sciences are a few of these disciplines. Of course, some sciences arguably investigate some subdomains of others, for example, botany investigates a subdomain of biology, which is a subdomain of natural science as a whole.

Let us suppose, for the sake of the argument, that the set of all our current disciplines is complete, i.e. that every domain of reality is investigated by some science. Thus, there is no entity in reality that is not the subject of some particular science. Further, let us suppose that each particular science is complete in the sense that all the possible knowledge in each field has been acquired.

\footnote{Westerhoff (2005, 25) offers an excellent analysis of how the cut-off point problem affects the traditional account of ontological categories in terms of generality, as in Ryle 1949, Sommers 1971, Norton 1976, Katz 1966 and some others.}
Now, suppose we collect all the sentences considered true by all these sciences and bring them all together in a global encyclopedia of all scientific knowledge. Despite its exhaustiveness, this book would not be a book on metaphysics (I am supposing, of course, that metaphysics is not one among these particular sciences). Even worse: this book would not contain even a single metaphysical sentence. It would certainly contain some true sentences about some interface issues of, say, biochemistry, molecular biology or social psychology. But there would be nothing metaphysical in this book. The reason for this is that metaphysics is always about the whole in a “transversal” or “cross-domain” way. That means it is about the whole of reality considered as a unified totality, and not just as an exhaustive enumeration.

Further, take ordinary categories like dogs, tables and electrons. Where are they located on the great classification tree for everything? No doubt: in the domains of biology, artifacts and physics respectively. Now, where are the categories of objects, properties or states of affairs located? They are ubiquitous: in every domain of this big tree there are objects, properties and states of affairs. But how is this possible? Given the JEPD principle, we should never have instances of two categories A and B, which are mutually exclusive on a higher level, inside the lower categories C and D, since A and B have to be exclusive. Thus, apparently ontological categories violate the JEPD logic of classification because they are “omnipresent” or, as I prefer to say, “transversal”. But why should we see this as a problem instead of a virtue?

Indeed, I suspect that this domain-transversality is a key notion of metaphysics as a whole, similar to the notion of topic-neutrality in logic. Metaphysical principles are expected to be transversal in this sense: every entity of any domain is supposed to obey the principle of identity, the principle of sufficient reason, etc. (whether they are valid or not is, of course, another problem). The notion of domain-transversality is the key to solving our problem. Adding the transversality requirement to the JEPD and essentiality requirements, we obtain a set of necessary and sufficient conditions for being a system of ontological categories. (In fact, transversality can be taken as a necessary condition or as a simple “virtue” of a SOC. For simplicity, I will present it first as a necessary condition, but later we will discuss a weaker version.) Accordingly, an adequate SOC is a system in which the categories are

(i) jointly exhaustive,
(ii) pairwise disjoint,
(iii) predicatively essential and
(iv) individually and naturally domain-transversal.

The additional requirement (iv) states that each of the system’s categories has to have instances in all domains of reality. Take, for example, a system with two
ontological categories A and B. This ontological system is only adequate if there are mathematical As and Bs, physical As and Bs, biological As and Bs, psychological As and Bs, etc. Take as an example an ontology with the three categories A, B and C. This ontology is only adequate if there are mathematical As, Bs and Cs, physical As, Bs and Cs, biological As, Bs and Cs, psychological As Bs and Cs, etc.

Note that I am not claiming that non-C can be an ontological category at all only if C is also an ontological category *simpliciter*. Object is an ontological category, non-object not, property is an ontological category, non-property not. My claim is rather that non-C can be an ontological category *in a soc* only if both C and non-C are (naturally) transverse.

The restriction to “natural” classes is necessary to avoid the obvious objection of miscellaneous classes. Without it, a miscellaneous class like {God, 2, this horse, redness, the property of being a second order property, the Constitution of the USA, the proposition that snow is white} would be an adequate ontological category. For, together with its complement, it would trivially constitute an adequate soc. Of course, it is not easy to explain exactly what “natural” means. Van Inwagen (2014) suggests that it means something like “has strong inner unity” – an explanation that is also in need of explanation. In any case, I do not want to define naturalness here, but I strongly suspect that this question will automatically be solved in the development of the answer to question 3. For, the criterion for any entity to belong to a category (supposing this criterion is a genuine rule and not a simple extensional list) must work as a principle of unity for the class. In order to avoid misunderstandings, let us stress that “natural class” does not mean “a class of the natural domain”. The relevant domains are all domains of reality, and not only the “natural” domains in the restricted sense. Mathematical entities, for instance, are certainly not part of the natural domain, and if there are Cartesian souls, then the spiritual domain is also part of reality.

The transversality requirement entails the idea that ontological categories must be expressed by discipline independent predicates. Thus, on the one hand, since “mammal”, “fermion”, “set” are discipline bounded predicates (biology, physics, mathematics), they cannot express ontological categories. On the other hand, “object”, “property”, “fact” are clearly not bound to any specific discipline and are, therefore, adequate candidates to express ontological categories. So, even if materialism and the Standard Model of particle physics are both true, i.e. if everything that exists is constituted by bosons and fermions, bosons and fermions are not ontological categories.

It is clear that our requirement is sufficient to solve the problem of the rational/non-rational ontology in a natural, i.e. non-*ad hoc* way. This ontology
clearly fails to meet the transversality requirement: some entities of biology are *rational* and some are *non-rational*, but there is no rational entity in mathematics, physics, etc. *Rational* is empty in almost all domains. It is obvious that the transversality of a class does not imply the transversality of its complement. Thus, although *non-rational* is domain-transversal, *rational* fails to meet the transversality requirement, and thus the whole system *rational*/*non-rational* is inadequate. This ontology does not carve up reality transversally at the joints.

My proposal also solves the cut-off problem in a natural way. In my view, ontological categories are not simply the categories that belong to a large classification tree for everything in which ontology is on the top and particular sciences on the lower levels. Thus, there is no continuity between ordinary and ontological categories and no cut-off problem.

Furthermore, with the transversality requirement, we give ontological substance to the usual epistemological claim that ontological categories are given a priori, while ordinary categories are a posteriori products of observation and scientific theory. One interesting case concerning this difficulty is Lowe’s (1997) soc proposal. On the one side, he claimed that “categorial structure is an a priori matter, while taxonomic relations between natural kinds are an a posteriori matter of natural law” (1997, 42). Because of this, natural kind taxonomy is “an empirical matter open to constant revision”, while a categorical scheme “should not be open-ended or provisional in this way”. On the other side, as we saw, he suggests a system of categories with entities on level 1, universals and particulars on level 2, organisms on level 6 and cats on level 11. How do we migrate from the a priori domain of categories to the a posteriori domain of natural kinds? Where exactly do we stop doing a priori metaphysics and start doing a posteriori natural science? This is an additional epistemological aspect of the cut-off problem. With the transversality criterion, this difficulty simply vanishes.

It may be appropriate to compare our proposal to the Ryle/Sommers approach (Ryle 1949, Sommers 1971). For these authors, the range of meaningful predication determines a category: only concrete objects can be colored, only numbers can be even or odd, etc. Thus, concrete objects and numbers constitute (different) categories. J. J. C. Smart (1953) and Westerhoff (2005, 40–59, and 2002, 338–343) already presented many difficulties with this approach. The main problem in this approach, besides the cut-off point problem, is that it still follows the categorical divisions based on particular sciences. A soc based on divisions imposed by predicates of particular sciences affronts the a priori epistemological claim mentioned in the last paragraph. Only animals can be vertebrate or invertebrate: shall we then conclude that *animal* is an ontological
category? Even if we accepted that animal is an ontological category, the recognition of this category would be based on a posteriori empirical knowledge. One may still insist that the question of which predicates can be meaningfully predicated of things is usually taken to be an a priori matter. Indeed, when a conceptual scheme is adopted by a speech community, it is a matter of choice how certain concepts are to be used, and in this sense conceptual distinctions are a priori. Unfortunately, the issue about the epistemological nature of the development and revision of conceptual schemes is an extremely extensive topic that we cannot properly discuss here. But it should be reminded that conceptual development is always based on empirical knowledge, or, at least, it is much closer to empirical knowledge than deep syntactical distinctions (e.g. between singular and predicative terms) which ground transversal distinctions. Further, the notion of “meaningful predication” is highly subjective, even among trained philosophers: compare the opinions of Fregeans, Neo-Aristotelians and Wittgensteinians about a sentence like “Caesar is a prime number”.

It should also be clear that my proposal is not contrary to the usual characterization of ontological categories as the “most general” categories. It just offers an alternative to the characterization of generality in purely extensional terms. The complement set of the singleton \{Socrates\}, which includes all abstract entities such as transfinite real numbers and all concrete objects but Socrates, is extremely general in the extensional sense. As a matter of fact, it is more inclusive than all genuine ontological categories, since it includes all of them as proper subsets (except the category of objects, of course). But it certainly does not qualify as an ontological category. Domain transversality entails genuine, ontologically interesting, generality, i.e. domain-generality.

All this makes clear what the strong connection is between questions 1 and 2, as stated above. Considered in isolation, the class of non-rational entities apparently qualifies as a genuine ontological category because it is very general (almost all-inclusive), predicatively essential and domain transversal. But its complement is not transversal, and thus not only rational but also non-rational fails to qualify as an ontological category. The same holds for the complement of \{Socrates\}. Thus, via question 2 we also get a solution to question 1. Given any SOC, each of its categories considered individually is a genuine ontological category if and only if it and each of its complementary categories is domain-transversal. If one employs the strategy of first selecting all classes that are genuine ontological categories and only after this deciding which of them should be taken as fundamental in the system, one has to offer independent criteria for a class to qualify as an ontological category. According to the
strategy proposed here, *rational* and *non-rational* are not ontological categories, simply because they are not individually transversal.\(^7\)

Let us dispose of one possible misunderstanding. Transversality is not the same as *transcendentality* in the medieval sense. Transversality is, let me stress, *domain* transversality, while traditional transcendentality is *categorical* transversality. Transcendentals are notions (I resist calling them “entities”) that can be applied to all categories. Existence and identity, for instance, are good candidates for transcendentals: we can apply existence and identity to objects, first and higher order properties, states of affairs, tropes, etc.

5  **Evaluating Some Systems of Ontological Categories**

The example of the book of all sciences and the natural solution of the cut-off point problem are strong arguments in favor of the conception presented here. Further, by obeying the transversality requirement, ontology will fulfill its original vocation, i.e. to be general metaphysics, a discipline about the whole domain of reality.

Let us check, using some concrete (real or imaginary) examples of socs, whether the proposed conception works as expected to separate the wheat from the chaff. But one caveat is important here. If a suggested test does not yield a result that perfectly matches to our expectations, there are two possible reactions: first, to reject the test itself or, second, to fairly renounce our expectations. We must be open for the second option. One clear example of this concerns the status of numbers. Since numbers belong exclusively and essentially to the domain of formal entities, they do not constitute an ontological category in my view, despite contrary opinion of some metaphysicians. Honestly, the category of number strikes me as an ordinary category of arithmetic just like animal as an ordinary category of biology. Something similar could be said about propositions, at least as they are conceived not as identical to facts but as semantic (or “quasi-semantic”) entities.

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\(^7\) The requirement of individual transversality makes clear why, even under the supposition of panpsychism, also the distinction conscious/non-conscious fails to mark a distinction between ontological categories. Firstly, I suppose that even the most radical panpsychist will deny that mathematical entities are conscious. Secondly, if conscious really counts as transversal and universal for the panpsychist, by hypothesis non-conscious lacks instances in all domains and is therefore non-transversal. As a result, the conscious/non-conscious distinction does not satisfy our requirements of an adequate soc. (Thanks to an anonymous referee).
At first glance, one could feel justified to expect that there were two possible cases: some socs satisfy the transversality requirement and so should be assumed to be adequate, while some don't satisfy it and, as a result, should be rejected as inadequate.

Unfortunately, things are not so simple, for transversality comes in degrees, and that for different reasons. First, each ontological category can be more or less transversal, depending on the number of domains in which it has instances and, correspondingly, the number of domains in which it fails to have any. But should a soc in which a single category fails to have instances in a single domain be rejected as inadequate? Second, we do not have a clear inventory of all domains; and it is an a posteriori question to ask what the scientific domains of reality are, and what their boundaries are (if there are clear boundaries between them at all). Third, can we require transversality only for the primary categories or for the categories of all levels? Of course, clear cases of transversal socs are welcome and will support the proposed criterion. Unclear cases seem to confront us with a dilemma: either we reject them as plainly inadequate, or we raise doubts about the validity of the requirement. I will suggest a way out, taking transversality not as a strictly necessary condition but rather as an ontological virtue.

Let us start with positive cases. The traditional particular/universal ontology is probably the most successful soc in the history of metaphysics; and, indeed, it fits very well with the proposed criterion. In all scientific domains, some entities are arguably particulars: the number 3, this horse, this molecule, this man and the state of Bavaria are particulars of mathematics, biology, physics, psychology and social science; and in all domains, particulars instantiate universals like being prime, being a mammal, having mass m, being neurotic and being mainly Catholic. The natural application of the particular/universal distinction to all domains is certainly one of the reasons for its great theoretical success, i.e. for its long-term and widespread acceptance. A soc based on Frege's distinction between saturated and unsaturated entities may be seen as a variant of this soc, and for similar reasons perfectly adequate.

The soc with states of affairs as its single category is another example of an entirely adequate system: there are mathematical, biological, physical and social states of affairs. Take, for instance, that the number 3 is prime, that this horse is a mammal, that this molecule has mass m, that this man is neurotic and that Bavaria is mainly Catholic. There is no domain without its specific states of affairs. Note that given the principle that classification is independent from fundamental categorical existence, the fact that one soc proposes just one category as fundamental does not trivialize the transversality requirement. The next case will be of this kind.
Pure trope theory, according to which tropes are the only fundamental category, partly (or conditionally) satisfies the requirement. If we assume the transversality criterion in its full strength, pure trope theory is only adequate if it is plausible when applied to all domains. Thus, the primeness of 3, the mammality of this horse, the particular mass \( m \) of this molecule, the neuroticism of this man, the Catholicism of Bavaria must all be tropes of different domains. But would someone seriously argue that the number 3 is an aggregate of com- present tropes: the primeness of 3, the oddness of 3, etc.? Indeed, the apparent inability of trope theory to deal with mathematical entities should be seen as a weakness. Trope theorists have two options concerning mathematics: either they succeed in making it plausible that numbers can be explained in terms of tropes, or they have to assume the burden of showing why mathematics is not part of reality at all.

Let us suppose, in comparison, that the category of objects of the object/property ontology is really transversal through all domains except mathematics. Accordingly, there would be physical, biological, psychological and social objects (in the sense of “particular”, and not of “concrete physical object”), but no mathematical objects. For, one could argue, numbers are best defined as second order properties, and sets are eliminable as extensions of functions. As a result, the object/property ontology becomes “less” adequate, although not “fully” inadequate. Interestingly, in this case the decision about the adequacy of a soc would depend on a particular regional ontological decision.

In virtue of cases like this, a distinction between the strong and the weak version of the transversality requirement becomes important. According to the strong version, full transversality is a necessary condition, and thus any soc that does not satisfy it should be rejected as inadequate. In the weaker version, transversality comes in degrees and is merely an ontological virtue, just like simplicity. The more categories of a soc are transversal, the more adequate it is. Trope theory and object/property soc under the assumption that there are no mathematical objects are two examples of partially inadequate socs.

The notion of “applicability” may be important here: when we require the simple “applicability” of a soc to all domains, we do not necessarily have to require that each fundamental category effectively has instances in all domains. In fact, anyone will probably agree that prima facie, the number 3 can be plausibly seen as an object, being a prime number can be seen as a property, and the primeness of 3, as strange as this entity may seem, can be seen as a trope. Even an opponent of trope theory will recognize that, at first glance, the expression “the primeness of 3” is intelligible and, if it had a reference, this would be something like a mathematical trope-like entity. Of course, it may be
the case that in the end, after some ontological investigation, we discover that numbers are not objects and that there are no tropes in mathematics. Nevertheless, prima facie applicability shouldn't be rejected. In this sense transversality is preserved.

In order to understand that the acceptance of a weak version of transversality is not an ad hoc solution for adjusting the requirement to cover some cases of not fully transversal socs, we must stress the following point. The core of the idea of transversality is not effective extensional transversality (the fact of ontological categories having instances in different domains) but the idea that socs should not be conceived as simple extensions of taxonomic trees of scientific investigation. Whoever proposes a soc must be clear that she is not simply extending the usual scientific systems of classification to higher levels of generality. Metaphysics is not just extended science.

Let us now consider an example of a soc that is highly inadequate according to our criterion. Suppose that, for some metaphysical reasons, we conclude that tropes are perfectly suited for physical reality and that the object/property categorization is the best ontology for explaining biological reality. Suppose further that for social reality the most suitable category is the category of processes, since social entities are essentially dynamic. Finally, suppose that mathematical entities are best understood in terms of Platonic “universals” (which I assume to be different from Aristotelian “properties”), for each number is no more than a bundle of formal properties, and no substratum remains when we abstract the properties of numbers. Based on such considerations, one could suggest a soc with five categories to account for all of reality: tropes/objects/Aristotelian properties/processes/Platonic universals. Each of them would be peculiar to a given scientific domain. Now, I think no metaphysician would be happy to accept this soc. The reason is that it clearly fails to satisfy the principle of transversality. Each category is introduced here for no global but only for local reasons. This makes this soc highly inadequate.

There are too many proposed socs. Thus, there is not enough space here to discuss all of them. To support the transversality criterion, let me just mention two further socs that, I think, satisfy the criterion quite well. The first is Hoffman & Rosenkrantz’s (1994) soc with entity as its super-category and abstract and concrete as its two primary categories (I am just removing the “super-category” from my level-counting). Of course, one could suppose that abstract entities are restricted to mathematics and concrete ones to empirical science, and this would make this soc highly inadequate. But a close look at this soc shows that this is wrong. Abstract entities are subdivided into properties, relations and propositions, and, as we saw, there are properties and relations in all domains. Whether there are propositions in all domains depends on the particular conception of propositions one defends. On the one hand,
if we conceive (true) propositions as identical to facts, certainly there are propositions in all domains, as I explained above. On the other hand, it would be odd to say that there are Fregean propositions “in” all domains, although we may plausibly claim that there are propositions “about” all domains. (I have already expressed my doubts that propositions in this sense constitute a genuine ontological category.) Anyway, there are abstract entities in all domains (of course, for a nominalist there are no abstract entities in any domain, but this is another matter). Since the category concrete is subdivided into event, object and collection, among others, this category is highly transversal. It may be inapplicable to the domain of mathematics, but, as we saw before, this only makes this soc a little less adequate.

The same can be said of Chisholm’s (1996) soc, with entity as its supercategory and contingent and necessary as its two primary categories. Again, one could object that the category necessary would be restricted to mathematics, while the category contingent would be restricted to the empirical sciences. But since both categories have states of affairs as subcategories, and since there are arguably necessary states of affairs in all domains (e.g., 2 is prime, water is H2O, animals are multicellular organisms, every human society is grounded in language, etc.), this soc is also highly transversal and adequate.

6 Three Possible Objections

I conclude by presenting three possible objections to my proposal. Here is the first one: As soon as we accept that transversality is a matter of degree, we have a new version of the cut-off problem. For now the original problem seems to become that of specifying the degree of transversality required for a kind to qualify as an ontological category. This is a fair objection. Of course, one could fly in the face of the objector and insist that only perfectly transversal categories are adequate. As a result, only the object/property, states of affairs, saturated/unsaturated (and maybe trope theory) socs were fully adequate. But two more palatable things can be said here. The first one is that even if it is true that there are degrees of transversality, its gradation is much smaller than that of the original cut-off problem. For, there are reasonably fewer domains of reality than categories in the huge pyramid of classification of everything. Hence, it is much easier to compare and decide any arbitrary cut of transversality than a cut in generality (if an arbitrary cut were necessary at all). Second, if it is true that the transversality approach suffers from the same affliction as the traditional extensional approach, the fair conclusion should be that the first has as much right to be taken seriously by metaphysicians as the second one. Hence, transversality must be accepted as an option, at least as an ontological virtue.
Here comes the second objection. One could argue that the notion of “domains” of reality used here is fully unexplained, i.e. it is not metaphysically grounded but only naively presupposed. Indeed, at first glance this notion seems to be excessively pragmatic, at least when it is simply accepted that each man-made science determines a particular domain of reality.

Two things can be stated here. Firstly, it would indeed be a weakness if the proposal were based on an arbitrary or man-made subdivision of reality. For metaphysics presupposes “real divisions among things” in reality. After all, metaphysics aims to carve reality at the joints – its joints, not our joints. Sciences are obviously products of human activity. But, and this is the answer, scientific subdivision is plausibly imposed by the constraints of reality. This is the reason why “naturalism” and “scientific a posteriorism” have become a general trend of contemporary metaphysics. Despite strong disagreement on the exact procedure, many metaphysicians today accept science as a whole as the primary guide for deciding what really exists and which are the real subdivisions of reality. The principle of transversality is simply a natural extension of this general claim. After all, the subdivision of domains of reality seems to be grounded in reality by some objective constraints of causal (and other) connections of things.

Furthermore, notice that this dependency on scientific decisions does not threaten the advantage I claimed for the transversality requirement of separating the a priori investigation of ontological categories from the a posteriori decision about domains. What becomes dependent on a posteriori investigation are not the socs in themselves but exclusively the evaluation of their adequacy in describing reality. As we already argued in the last section, the core of the insight of the transversality requirement is not pure extensional transversality but the idea that socs should not be conceived as simple extensions of scientific investigation.

Secondly, it is a widely accepted practice in investigations of regional ontology to accept the authority of the scientific community and its division of labor to determine their regions. Philosophers of mathematics generally agree that the realm of mathematical entities is defined by the activity of mathematicians; philosophers of physics agree that the realm of physics is defined by the activity of physicists, and so on. Thus, this proposal is absolutely in accordance with the general metaphysical principle of respecting the division of expertise in global human knowledge.

One may still insist that, even if scientific division tracks objective spheres of reality, there might be a degree of indeterminacy, if not arbitrariness, in choosing the scientific domains that undermine the transversality require-
ment. For couldn't there be something like a science of properties, that by definition exclusively deals with properties? Likewise, couldn't there be a science of objects, a science of events, etc., all of which are concerned with specific aspects of reality while excluding others? In general, couldn't there be a division of sciences in accordance with the metaphysical structure of the world, chosen in just such a way that transversality fails? Indeed, there could be such sciences of properties or objects or even events. In fact, there are such sciences. But, and this is the important point, they have been correctly classified as sub-disciplines of metaphysics, not as particular sciences in general. Metaphysicians have been the ones developing theories of properties with all their subdivisions, like natural and non-natural properties, essential and accidental properties, intrinsic and extrinsic properties, categorical and dispositional properties, etc. They have also been the ones developing theories of objects with all their subdivisions: concrete and abstract, complex and simple, etc. The same holds for events, facts, etc. This is strong evidence for the hypothesis that these concepts and their sub-concepts are essentially ontological and, as such, transversal.

Now, what if these sciences of properties, objects, etc. were the only disciplines, i.e. if the division of disciplines were in full accordance with the metaphysical division of reality? Would in this case the transversality requirement fail? I don't think so. We must distinguish two possibilities here. First, it is possible that the absence of scientific domains is simply due to the absence of non-metaphysical objective divisions in reality. In this case, there would be just one single domain. As a result, the transversality requirement would be valid: it would be trivially the case that all categories would be present in all domains, viz. in the “one big domain”. Second, it is possible that the absence of scientific domains would be simply a result of our epistemological inability or, more prosaically, lack of interest. However, even in this case, the transversality requirement would not fail. Of course, we would simply not recognize ontological categories as transversal, but they would still be objectively (mind-independently) transversal.

This leads us to the third possible objection. What if in the end we achieve a unified theory of everything, i.e. if all the sciences collapse into a single domain of everything? I think there are more than enough arguments in twentieth-century philosophy to show the implausibility of this idea. Moreover, even in the extreme case, if there were a single domain of reality, as assumed in the last objection, the transversality approach would still be valid – although in a trivial way.
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