

The Fundamentality and Non-Fundamentality of Ontological Categories

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Abstract

In this paper, I propose a solution to an almost ignored problem in metaphysics and metametaphysics: what is categorial fundamentality and non-fundamentality? My proposal builds on E.J. Lowe's view on the issue. By means of the newcomer notion of generic identity, I can give an account of something that Lowe did not explicate: the constitution of formal ontological relations. Formal ontological relations (e.g. instantiation) are internal relations that determine ontological form and category-membership. I argue that categorial *fundamentality* is having membership fully determined by a simple formal ontological relation or relations jointly in an order and categorial *non-fundamentality* is having membership at least partly determined by a derived formal ontological relation in an order. In contrast to Lowe, my proposal does not presuppose non-modal essentialism.

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Introduction

As Rickie Bliss and Graham Priest (2018) and Tuomas Tahko (2018) document, there is a rapidly growing literature on metaphysical fundamentality and non-fundamentality or derivativeness. This literature focuses almost exclusively on *the fundamentality and non-fundamentality or derivativeness of entities*: which entities are fundamental, which, in turn, are non-fundamental or derivative from the fundamental entities and what does derivation mean? The concern here is then no less than the ground of existence—if there is any. Therefore, this debate is a natural offspring of the literature on grounding and I propose that we call the fundamentality of entities “ontological fundamentality” (accordingly for their non-fundamentality or derivativeness).

The fundamentality and non-fundamentality of ontological categories (“categories”, for short) is practically ignored by the theorists of ontological fundamentality, which is a deficit. Categories are unavoidable in metaphysics (cf. e.g. Lowe 2006, 5; Schaffer 2009, 355; Paul 2017, 32). Even a Neo-Quinean has to presuppose categories when she states her questions of existence: for instance, are there numbers, are there sets, are there propositions, are there meanings? All these appear to be abstract entities, which is a putative category. Or, if they are not, then they should be concrete entities – another plausible candidate for a category. Equally, when a grounding theorist discusses the “worldly” grounding of entities in general, she is not only interested in asking which individual entities ground; rather, she is asking which *types* of entities ground and this either concerns directly or presupposes categories such as facts or substances. Schaffer 2009 is a good case in hand of the latter. Metaphysics is essentially study of a highly general nature.

There is therefore a dire need for a discussion of “categorical fundamentality” and “non-fundamentality”, which *prima facie* differ, as Tahko rightly observes, from ontological fundamentality and non-fundamentality or derivativeness. For instance, it is one thing to ask whether properties form a fundamental category of entities; it is another, whether some properties

are fundamental entities. (Tahko 2018) Actually, I believe, (*contra* Schaffer 2009, 356) that ontological fundamentality and non-fundamentality presuppose categorial fundamentality and non-fundamentality—a contention I do not have room to argue for fully here.

E.J. Lowe seems to be one of the few contemporary philosophers who has appreciated these points. He has a view on categorial fundamentality and non-fundamentality, as will be seen below. Even in his case, however, “fundamentality” is used in two different senses in the context of categories. On the one hand, he speaks about objects not being a fundamental category in their realist bundle theories since their existence and identity conditions are wholly determined by property universals (Lowe 2006, 8). On the other hand, he says (2013, 71) that his four fundamental categories of objects, modes, kinds and attributes allow “various *sub*-categories, *sub-sub*-categories, and so on.” The latter sense of “fundamental”, present in the Porphyrian tree, has to differ from the former since objects are not property universals in their realist bundle theories, whereas any member of a sub-category of objects is an object. Accordingly, I think “the highest” is the correct term for categories in the latter sense reserving “fundamental” for categories in the former sense.

My problem in the present paper is to consider what this fundamentality is. Elaborating on what Lowe says, my proposed solution is that *categorial fundamentality* is *having membership fully determined by a fundamental formal ontological relation or relations jointly in an order*, whereas *categorial non-fundamentality* is *having membership at least partly determined by a non-fundamental formal ontological relation in an order*. Fundamentality of formal ontological relations is their simplicity and their non-fundamentality is their derivativeness in the senses specified below. In what follows, I will also tell what determination in the membership determination of categories means.

The argument of the present paper consists in showing that this view works nicely not only in the case of Lowe's own category theory, or, formal ontology but also more generally. Since as far as I know, there are no sophisticated views of categorial fundamentality apart from what we can find in Lowe, I cannot discuss competing views or counter-arguments to my proposal.

My proposal is motivated by the Loweian view that standings in formal ontological relations ("FORs", for short) determine category membership because being an entity of a category is an ontological form (or, mode of existence) and ontological forms are standings in FORs.¹ Lowe's four fundamental categories may serve as an illustration. The membership of each of them is fully determined by the standing of entities in the fundamental FORs of instantiation and characterization jointly in an order. Modes such as the whiteness of Pippo the cat, to use an everyday example, characterize objects such as Pippo and instantiate attributes like whiteness.

The paper has three main parts. First, I defend an interpretation of Lowe's view of the fundamentality and non-fundamentality of categories. In the second section, I put forward my proposal. I elaborate on Lowe's view by first giving a full account of the distinction between fundamental and non-fundamental or derived FORs. Then I draw consequences from this distinction to distinguishing fundamental categories from the non-fundamental. In the final main section of the paper, I argue that my proposal works more generally than in Lowe's category system. Therefore, it is reasonable to hold my view.

¹ This seems to have close affinities with Peter Simons's view from the turn of the millenium that "factors" determine categories (Simons 1998, 381, 389; 2005, 561). About a decade later, he concluded that factors are relational: they are FORs (2010; 2012). So perhaps the view that FORs determine category membership should be called "Loweian-Simonsian". Simons is explicitly influenced by Roman Ingarden who thinks that, to put it roughly, "existential moments" (i.e. aspects of existence, such as existential in/dependence) determine "modes of being" (e.g. real and ideal being), in which the "forms" of entities (i.e. their categories, such as properties) consist (Ingarden 2013, 99ff.; 1965, 5, 38, 96; cf. Simons 1992).

1 Lowe on Categorical Fundamentality and Non-Fundamentality

In two of Lowe's monographs on general metaphysics, we can find a formulation that the membership of categories is determined by the existence and/or identity conditions of the entities concerned. This is how he puts it in the *Possibility of Metaphysics*: "Entities belong to different ontological categories on account of their different existence-conditions and/or identity-conditions." (Lowe 1998, 179; cf. 2006, 20, 44). To use Lowe's own illustration:

"For example, what is distinctive of a *mode* is that it depends for its existence and identity upon the object that it characterizes and that it instantiates a property—a universal—that is non-rigidly existentially dependent upon the modes that are its particular instances." (2006, 44)

Ultimately, this is so "in virtue of the intrinsic [i.e. non-relational] natures of these entities" (Lowe 2006, 43). It is the intrinsic nature of the white of Dobbin the horse, for instance, that an object, Dobbin gives the existence and identity conditions to it: the white would not exist and be the very entity it is without it being the white of Dobbin and Dobbin existing. Likewise, the intrinsic nature of the whiteness attribute is such that it would not exist without there being at least one instance of it: a white. However, it could exist without the existence of the white of Dobbin, the existence of which requires that it is an instance of the whiteness attribute. Thus, the white of Dobbin is a mode.

Following this lead, it is hardly a surprise what Lowe says about *fundamental* categories:

"What does it mean to describe a certain ontological category as being 'fundamental'? Just this, I suggest: that the existence and identity conditions of entities belonging to that category cannot be exhaustively specified in terms of

ontological dependency relations between those entities and entities belonging to other categories.” (2006, 8)

Lowe’s contrast here is the category of objects in their realist bundle theories, according to which the existence and identity conditions of objects are “wholly” given in terms of property universals (ibid.). I think we can generalize this to concern the nominalist bundle theories of objects. These theories share at least the characteristic that property universals or tropes give sufficient and necessary existence conditions for objects. Most likely, they also agree on the point that certain property universals or tropes exhaustively determine the fact which object a bundle of universals or tropes is (cf. e.g. Keinänen & Hakkarainen 2014). For these reasons, Lowe thinks that objects form a non-fundamental category in the bundle theories.

These passages also suggest that Lowe thinks the ontological dependence relations that exhaustively determine the existence and identity conditions of entities concerned are *rigid* and *non-rigid existential dependences* and *identity dependence* (for their considered definitions in Lowe, cf. Tahko & Lowe 2016). He seems to take it that the members of non-fundamental categories are ontologically dependent cross-categorially and this exhausts the existence and identity conditions of the members, which is denied about the members of fundamental categories. The latter may be cross-categorially ontologically dependent but that does not exhaust their existence and identity conditions.

However, we have not heard the whole story. Lowe also says (2006, 37; cf. 34 and 47) that no ontological dependence relation is “*basic*” or “*fundamental*”, which suggests that ultimately it is basic or fundamental ontological relations founding ontological dependences that determine which categories are fundamental. This fits perfectly with his own formal ontology of the ontological square, in which the FORs of instantiation and characterization in varying orders determine the

membership of the four fundamental categories of objects, modes, kinds and attributes. Objects instantiate kinds and are characterized by modes, which instantiate attributes characterizing kinds. Lowe states, indeed, that instantiation and characterization are “fundamental” (2006, 58). Why does he think so? He has slightly varying answers in different places. On the one hand, he says that instantiation and characterization “are not reducible to, or definable in terms of, other formal ontological relations” (2006, 114). On the other hand, he writes (2006, 40) that they are not “constituted”.

I am not saying that these formulations are incompatible, but there is a compelling reason to believe that constitution here should not be understood as reducibility or definability in the sense of conceptual analysis. Lowe does not think that FORs are concepts or words, since he considers them internal relations holding among entities (2006, 44–7). He holds an eliminativist view of internal relations that internal relations are not entities numerically distinct from their relata (Lowe 2012, 48, 241–4). Still their holdings can be in principle stated by true relational propositions, the truth-makers of which are the relata of these internal relations (ibid.). If Pippo and Misu are numerically distinct cats, then numerical distinctness truly holds between them rather than just only applying to them as a word or concept. A further relevant point is that FORs determine the “ontological form” of entities (Lowe 2012, 48).² All in all, the constitution of FORs has to be a worldly rather than a conceptual matter. This suggests that instantiation and characterization are

² I agree on this although unlike Lowe, I give a full account of FORs and ontological form (Hakkarainen 2018). My view is that FORs are *character-neutral internal relations*. When their holding is stated, the statement as such, even if true, does not say anything whatsoever about the character of the relata: what the relata are like. Rather, they describe the character-neutral relational way in which the relata exist. For example, the statement that x is numerically identical does not tell us anything about the character of x without further assumptions. It only describes a way of existence of x as an individual (x may be, say, a bare particular). Hence, for an entity to have an ontological form is for it to be a relatum of a character-neutral relation or relations jointly in an order. My character-neutrality view of ontological form has affinities with Ingarden’s distinction between matter or content and form as formal ontological concepts in terms of “qualitativeness” (*das Qualitative*) and “non-qualitativeness” (*das Unqualitative*). The matter of an entity is its qualitativeness in the widest sense, “pure quality” (*die reine Qualität*) in it, such as its mass and shape. Its form is the “radical non-qualitativeness as such” (*das radikal Unqualitative als solches*), in which its qualitativeness exists, for example the mass exists in the form of property. (Ingarden 1965, 28, 38) When we describe the form of an entity, we do not say anything about its qualities (in the widest sense including quantities), that is, what it is like. So also Ingarden seem to think that the ontological form of an entity does not tell us anything about the character of the entity.

fundamental FORs because they are *unconstituted*. At this point, I am not saying anything about “constitution” but considering it a placeholder waiting for a more precise account below.

By contrast, exemplification between objects and attributes “is a relation that comes in two different varieties or species, but in each case, it is *constituted* by a certain combination of two other relations—instantiation and characterization—so that these latter relations should in all cases be deemed to be more fundamental than exemplification.” (2006, 40) According to Lowe, exemplification between, say, Dobbin and the whiteness attribute is a *non-fundamental* FOR due to being *constituted*, or, as he sometimes puts it: “indirect” (2006, 22, 126 and 207).

One should not conclude from this, however, that he thinks that objects and attributes are non-fundamental categories because of standing in the constituted FOR of exemplification. As was seen above, Lowe believes that their membership is fully determined by the fundamental or unconstituted FORs of instantiation and characterization in an order. Objects and attributes do stand in exemplification but that does not do any work in their category-membership determination.

Still, that fundamental or unconstituted FORs wholly determine which categories are fundamental suggests, I think, that the membership of non-fundamental categories is determined by the non-fundamental or constituted FORs. This systematizes Lowe’s account nicely although as far as I know, he does not say so anywhere (below I shall argue that this proposal works well in many formal ontologies).

It also has a perfect fit with what I showed Lowe to say in the beginning of this section: non-fundamental categories are such that their members are cross-categorially ontological dependent, which exhausts their existence and identity conditions. He is explicit that any ontological dependence relation is constituted: “If I am right about this, there are no ‘brute’ or ‘unconstituted’ dependence relations between entities.” (2006, 37; cf. 47) So ontological dependences including

identity dependence are non-fundamental FORs. If they, when holding cross-categorially, exhaust the existence and identity conditions of an entity, then this entity is a member of a non-fundamental category. To generalize: cross-categorial ontological dependences, which are constituted FORs, exhaust the existence and identity conditions of the members of non-fundamental categories.

Above I discussed Lowe's view in the beginning of the *Four-Category Ontology* that entities divide into categories in virtue of their intrinsic or non-relational character. Lowe's considered view, which is also explicitly stated at least once in the *Four-Category Ontology*, is that this intrinsic character is actually *individual non-modal essence*: "that in virtue of which it is the very entity that it is" (2006, 207). He says that "it is part of the essence of any entity that it belongs to a certain ontological category" (ibid.). Non-modal essences are expressed by real definitions (Lowe 2012, 935). So part of the real definition of an entity is its category-membership. For example, it is part of the individual essence and real definition of the white of Dobbin that it is a mode.

As a consequence, Lowe's considered view is (e.g. 2012, 242–3) that entities stand in fundamental and unconstituted FORs in virtue of their individual non-modal individual essences: "It is surely *part of the essence* of Dobbin's whiteness mode that it characterizes *Dobbin*", for instance (2012, 242). Individual non-modal essences, then, also ground the membership of entities in categories. The white of Dobbin, for example, is a member of the fundamental category of modes in virtue of its individual non-modal essence.

The picture emerging from the discussion of the present section is the following. According to Lowe, *categorial fundamentality is having membership wholly determined by unconstituted or fundamental FORs*. By contrast, *categorial non-fundamentality is having membership determined by constituted or non-fundamental FORs*. All these FORs hold ultimately in virtue of the individual non-modal essence of their relata.

A crucial question is left unanswered, however: *what is the constitution of FORs?* Lowe does not tell. He only says that constitution, “it would seem, is the closest way in which two entities can be related while still remaining numerically distinct.” (Lowe 2006, 51) Clearly, it is not material constitution because the relata of material constitution are entities but FORs are not entities (cf. Lowe 2006, 50–1). In the subsequent section, I will propose that we can make good sense of it by a newcomer notion in philosophy: generic identity. But my proposal about categorial fundamentality and non-fundamentality can be adopted by anyone holding a view of grounding that allows that the terms of grounding are not entities (just like it is for generic identity). One just substitutes “ungrounded” for “fundamental”, “grounded” for “non-fundamental” and “to ground” for “to determine”. Indeed, Lowe himself at least once uses the verb to “ground” for “to constitute” in this context (2006, 47). My proposal of using generic identity is an option for the people who are not friends of grounding.

2 My Proposal: Lowe Elaborated

2.1 Fundamental vs Non-Fundamental Formal Ontological Relations

Consider exemplification again in Lowe’s formal ontology. In each case, its holding is constituted by the joint holding of instantiation and characterization in an order. Dobbin, for example, exemplifies whiteness because he is characterized by a mode that instantiates the attribute whiteness. This is contingent to the existence of Dobbin and the attribute whiteness since the existence of Dobbin’s white mode is contingent, given Dobbin’s and the attribute’s existence. He also exemplifies warm-bloodedness in virtue of instantiating the kind horse that is characterized by the attribute warm-bloodedness. This holding of exemplification is necessary to the existence of Dobbin and the attribute. In each metaphysically possible world where Dobbin exists, he instantiates the kind horse that is characterized by warm-bloodedness. (Lowe 2012, 244). Thus, whether exemplification is contingent or necessary, its holding between Dobbin and an attribute

just is the joint holding of instantiation and characterization in an order via a third entity: a mode or kind.³ More precisely, *for Dobbin to exemplify an attribute is for Dobbin to stand in instantiation and characterization relations in an order to the attribute via a mode or kind.*

Untensed “for” clauses of this type (“for an entity to be ___ is for it to be ...”) are familiar to us philosophers:

“for an entity to be a bachelor is for it to be an unmarried adult male”

“for an entity to be a vixen is for it to be a female fox”

“for an entity to be a human being is for it to be a rational animal”

“for an entity to be a water molecule is for it to be an H₂O molecule” and so on
and so forth (Dorr 2016, 42).

You may pick up your favorite examples — *a priori* or *a posteriori*, analytic or synthetic or not clearly either, it does not matter. You get a philosopher’s intuitive grasp of the notion of *generic identity* (even if you had a reductive analysis of it). You conceive of the concept capturing the “is” in your favorite examples. I consider this concept of generic identity *primitive*. It is theorized by Augustin Rayo (2013), Cian Dorr (2016), Fabrice Correia (2017) and Correia & Alexander Skiles (2017). Like the more familiar numerical identity, generic identity is symmetric. Whichever you go in your favorite examples, one *just is* the other. For Dobbin to exemplify warm-bloodedness (*just is* for him to instantiate the kind horse and the kind to be characterized by warm-bloodedness. Equally, for Dobbin to instantiate the kind horse and the kind to be characterized by warm-bloodedness (*just is* for Dobbin to exemplify warm-bloodedness.

³ As a side note, there seems to be actually two types of exemplification relations in Lowe’s formal ontology because exemplification can have two different modal features: necessary and contingent. The quote above that exemplification is “a relation that comes in two different varieties or species” provides textual evidence for this (Lowe 2006, 40).

Notwithstanding this symmetry, it is obviously not the case in Lowe's category system that for Dobbin to instantiate the kind horse is for him to exemplify warm-bloodedness – just like for the kind horse to be characterized by warm-bloodedness is *not* for Dobbin to exemplify warm-bloodedness. These holdings of instantiation and characterization are not individually generically identical with the holding of exemplification between Dobbin and warm-bloodedness. There is an asymmetry between exemplification on the one hand and instantiation and characterization individually on the other. Therefore, that the holding of exemplification is generically identical with the *joint* holding of instantiation and characterization in an order is *non-circularly informative* of exemplification—regardless the symmetry of generic identity. Instantiation and characterization inform exemplification because the holdings of the former are not individually generically identical with the holding of exemplification. It is also a significant point that the joint holding of instantiation and characterization brings in *a third relatum* in comparison with the two relata of exemplification (object and attribute): a kind or mode.

Recall that according to Lowe, instantiation and characterization are unconstituted FORs: their holdings are not constituted by anything. We cannot say that for an entity to instantiate or characterize something is for it to be related in some different manner to that something. The only thing we can truly say is that for an entity to instantiate or characterize something is for it to instantiate or characterize that something. Just like numerical identity, generic identity is reflexive and *no* holding of instantiation or characterization is generically identical with the joint holding of any generically non-identicals. Any holding of instantiation or characterization is *simple*, while each holding of exemplification is *complex*. Therefore no further relatum can be brought into play in the former case.

We may also say that the reflexive generic identity of each holding of instantiation and characterization is *only* circular and uninformative. This is in sharp contrast to the holding of exemplification, which is non-circularly and informatively generically identical with the joint

holding of the simple FORs of instantiation and characterization in an order bringing in a further relatum. It is then reasonable to conclude that the holding of exemplification is *derived* from the holdings of instantiation and characterization when their order is considered. However, no holding of instantiation or characterization derives from the holding of exemplification. There is an order of asymmetry required of derivativeness or non-fundamentality and fundamentality here: *being generically identical with generically non-identicals jointly* and adding further relata vs *negating this*. As a consequence, every holding of exemplification is *non-fundamental*, whereas each holding of instantiation and characterization is *fundamental* in Lowe's formal ontology.

I propose we may generalize this result because as will be seen below, it works equally well in many other formal ontologies. Fundamental FORs are simple: their holding is not generically identical with any generically non-identicals and the holding does not add up any numerically distinct relatum. By contrast, non-fundamental FORs are complex and derived: their holding is non-circularly and informatively generically identical with the joint holding of generically non-identical FORs that brings in additional relata.

I should point out that in contrast to Lowe, my proposal does not involve any commitment to non-modal essentialism—as I have argued elsewhere (Hakkarainen 2018; Keinänen, Keskinen & Hakkarainen 2019). The concept of non-modal essence is not needed for stating the difference between fundamental and non-fundamental FORs. With the concept of generic identity at my disposal, modal notions are sufficient for putting this difference. The holdings of FORs may be heuristically considered boiling down to the mere existence of some entities in metaphysically possible worlds (Hakkarainen 2018). For instance, Dobbin exemplifies warm-bloodedness in each metaphysically possible world where he exists and his white mode characterizes him and instantiates the attribute whiteness in each metaphysically possible world where the mode exists. This provides a further motivation to use generic identity instead of any view of grounding that presupposes non-modal essentialism. Assuming non-modal essentialism in a meta theory of

metaphysics such as the present one would rule out putting metaphysical theories not involving non-modal essentialism in terms of the meta theory.

2.2 *Fundamental vs Non-Fundamental Categories*

Recall that according to Lowe, categorial fundamentality is having membership wholly determined by unconstituted or fundamental FORs and categorial non-fundamentality is having membership determined by constituted or non-fundamental FORs. Now when I have an account of the constitution of FORs in terms of generic identity, I can say tentatively that fundamental categories are those categories whose membership is determined by simple FORs and the membership of non-fundamental categories is determined by derived FORs. The latter FORs derive in the above-described manner from some simple FORs: their holding is non-circularly and informatively generically identical to the joint holding of some simple FORs. Since to stand in a FOR is to have an ontological form, at least in this respect the ontological form of the members of non-fundamental categories also derives from the ontological forms of some numerically distinct entities.⁴

To make this more precise, I need to consider four further issues. (1) It might be possible that a single FOR does the determination like the FOR of instantiation for universals and particulars in the Aristotelian realism. (2) Connected to this, it seems to be an option that simple FORs *partly* determine the membership of non-fundamental categories. Take for instance the numerical identity of the members of non-fundamental categories such as objects in their bundle theories. Numerical identity is a good candidate for a simple FOR and it seems to be at play in the membership-determination of objects in their bundle theories because objects are individuals. (3) The order of

⁴ One can see that I am not committed to the view that there are literally different ways to exist. Each entity exists in the same univocal sense but the FORs in which entities stand vary.

FORs might make a difference here and finally (4), what is the determination I am talking about here?

I can respond to the first three considerations by making small emendations. (1 and 3) The membership of fundamental categories is determined by a simple FOR or FORs jointly *in an order*. For example, according to Aristotelian realism particulars are entities that instantiate rather than are instantiated. (2 and 3) In the case of non-fundamental categories, it is sufficient for making a category non-fundamental that its membership is determined *at least partly* by a derived FOR in an order. This leaves it open that simple FORs may be involved in their membership-determination. By contrast, the membership of fundamental categories has to be determined by simple FORs fully.

On this basis, I can conclude that categorial *fundamentality* is having membership fully determined by a simple FOR or FORs jointly in an order and categorial *non-fundamentality* is having membership at least partly determined by a derived FOR in an order. The members of fundamental categories stand in the same simple FOR or FORs in the same order, and their membership in a fundamental category is nothing more. Take any member of a fundamental category; it is a relatum of the same simple FOR or FORs in the same order as any other member of the category and nothing else *qua* the member of this category. By contrast, take any member of a non-fundamental category; it is a relatum of the same derived FOR or FORs in the same order as any other member of that category. The members of non-fundamental categories stand in the same derived FOR or FORs in the same order. The members of a category share standing in FOR or FORs, which determine that they are members of the same category.

This makes it possible for me to answer the fourth question about determination. Take for instance fundamental categories. The membership of entities in them is nothing more than the standing of these entities in the same simple FOR or FORs in the same order. In other words, for an entity to be a member of a fundamental category is for it to stand in some simple FOR or FORs in an order,

which is exactly in line with the view partly motivating the paper that being a member of a category is an ontological form that is generically identified with standing in a FOR or FORs in an order. Therefore, determination here is also generic identity. So when I speak about membership-determination, it should be understood as a less clumsy way of putting this point.

Hence, categories are pluralities of entities standing in the same FORs in the same order. They do not exist as additional entities to their members. There are members of categories but there are not categories as numerically distinct entities (from the members) of any kind, neither as universals, as sums, as classes, nor as sets. The falling of entities under a category is generically identical to their standing in the same FOR or FORs in the same order. There is no need to assume categories as entities in addition to their members, which is also Simons' view (2012, 131 and 138) and suggested by Lowe, too:

“There are, quite literally, no such things as ontological categories. (That indeed is why, in the tree of categories depicted earlier, it was entirely appropriate to label the nodes by *plural* terms, such as ‘entities’ and ‘kinds’, for these terms do all genuinely refer— plurally—to entities, the first obviously so. In contrast, it would have been misleading to label the nodes by *singular* terms, such as ‘the category of entities’ and ‘the category of kinds’, given that these do not refer to anything at all.)” (2006, 43; cf. 6–7)

3 Argument for My Proposal

I believe the most convincing argument for my proposal is that it works well. Nonetheless, a meta theory does not have to work in the case of any metaphysical theory whatsoever. It is sufficient that the meta theory is able to capture metaphysical theories that are coherent and plausible given our scientific knowledge and formulated clearly enough so that a meta theorist is able to discuss

them. Let me first consider putative *fundamental* categories in light of these considerations.

Obviously, I only can discuss views sufficient to convince the reader of the power of my proposal and not each and every coherent, plausible and clear formal ontology in the literature.

I have already shown that my meta theory can capture the four-fundamental categories in the Neo-Aristotelian ontological square – not only in Lowe but also in Barry Smith’s Neo-Aristotelian category theory (2005, 18). The same point concerns John Heil’s and C.B. Martin’s formal ontologies of *substances and modes*, which represent basically Lowe’s ontological square without universals. In these theories, for an entity to be a member of modes or substances is for it to be a relatum of the simple FOR of modification or characterization in an order (Martin 1980; Heil 2012, 7)

As I argue elsewhere, different *trope theories* share the view that for an entity to be a member of tropes, which form the sole fundamental category in these theories, is for it to be a relatum of the simple FORs of parthood, numerical identity to a certain character and numerical distinctness.⁵ They vary regarding the ontological dependence relations of tropes: in dependence theories (e.g. Simons 1994), tropes bear at least one simple FOR of existential dependence to something, whereas independence theorists such as Campbell (1990, ch. 1) deny that. That tropes are parts distinguishes them from modes that modify or characterize substances rather than be their parts, as was seen above. (Hakkarainen 2018, sec. 3)

Laurie Paul’s “mereological bundle theory” (2017) comes close to trope theories in this respect. She thinks that the only and hence fundamental category is formed by intrinsic characters or qualities that are individual, simple and each of them is a proper part of their fusions (2017, 32–3, 38). Fusions, in turn, are not entities of a different category than qualities although they do exist

⁵ Note that when I discuss mereological notions such as parthood and proper parthood, I consider them as they occur in different formal ontological theories making statements about *entities*. It is a different issue how these notions are put in various mereologies, which are purely formal theories that do not as such make mereological statements about entities. This difference is analogical to the distinction between physics and mathematics.

(Paul 2017, 38). Therefore, I take her view to be a variant of the bundle theory, in which the entities of the only and hence fundamental category are mereologically simple proper parts (numerically) identified with certain characters and numerically distinct from each other. That qualities are “a kind of repeatable universal” seems to be their derivative ontological form rather than something determining their category membership in the fundamental category (Paul 2017, 39). Since Paul (2017, 37) considers proper parthood rather than parthood primitive, her view should be put in terms of my meta theory as follows:

for an entity to be a member of qualities is for it to be a relatum of the simple FORs of proper parthood, numerical identity to a character and distinctness in an order.

In reist formal ontologies with objects as the sole category both fundamentally and in general, the membership of this category is determined by the simple FOR of numerical identity. Objects are considered individual entities – whether they are abstract or concrete. If properties are added as another fundamental category, then the simple FOR of instantiation, exemplification, participation, inherence or something like that – depending on the view – needs to be added to the membership-determination of objects and properties. Objects are entities that are the subjects of the same simple FORs of numerical identity and instantiation or something similar. Properties differ from objects since they are the termini of the latter relation.

A problematic case is Armstrong’s famous factualism, according to which states of affairs, that is, facts, which are complex entities, form the sole fundamental category of entities – at least on one reading (Armstrong 1997, 20, 28 and 131). The constituents of facts are thin particulars and (property) universals that form non-fundamental categories since they are considered Lockean partial-consideration abstractions from facts (Armstrong 1997, 20, 29 and 123). Armstrong seems to identify facts with the tokens of instantiations of universals by thin particulars (1997, 118, 127

and 132). As I have argued elsewhere, Armstrong's theory is not clear because the composition of facts is not. The composition is characterized only negatively by Armstrong (1997, sec. 8.2): it is not mereological. (Keinänen, Hakkarainen & Keskinen 2016) Furthermore, composition and fundamentality go into separate directions. So it is hard to tell how the membership of facts is supposed to be determined. Armstrong's followers should first clarify these matters and then we can discuss whether my meta theory is able to capture Armstrong's factualism.

As Lowe points out, the primary example of a *non-fundamental category* is substances in their different realist and nominalist bundles theories.⁶ Let me explain how this works in the trope theory by Markku Keinänen and me: the Strong Nuclear Theory ("SNT", for short).⁷

According to the SNT, every trope is necessarily a *proper part* of a substance: there are no "free-floating tropes". To expound the constitution of the relation of proper parthood between tropes and substances, let me first facilitate the presentation and take the example of an arbitrary minimal substance in the SNT. Such a substance is a simple substance since it does not have parts that are substances; it has only two trope parts, say, a rest mass trope and a charge trope. It is a minimal substance. Let us also assume that the two tropes are mutually strongly rigidly dependent: neither of them can exist without the other.⁸ They are the only tropes and nuclear tropes of the minimal substance. Consequently, also their plurality has to exist given the contingent existence of one of them.

By the Conditioning Principle adapted from Simons (1987, 322), the plurality of these two tropes is not existentially dependent on any other entity than the rest mass trope and the charge trope.

⁶ As was seen above, Paul's mereological bundle theory is an exception; she does not think that the bundles of qualities form entities of a distinct category from qualities. For an argument that she is committed to more than one category, cf. Keinänen & Tahko (2019, 11–3).

⁷ Keinänen 2011; Keinänen & Hakkarainen 2010; 2014; Hakkarainen & Keinänen 2017; Hakkarainen 2018; cf. also Keinänen, Keskinen & Hakkarainen 2019.

⁸ A contingent entity x is strongly rigidly dependent on a contingent entity y if and only if

- (1) it is not metaphysically possible that x exists and y does not exist
- (2) x and y are not numerically identical
- (3) y is not a part of x (cf. Keinänen 2011, 431).

This principle states that necessarily, if plurality x is such that every dependent entity of it (its element) has all the entities on which the entity depends also in x , then x is not dependent on anything else than its elements. In other words, the elements of x satisfy its “existential needs”. Thus, the plurality of the two tropes is a strongly rigidly *independent* entity: it does not depend for its existence on any entity that is wholly distinct from it, that is, that does not share parts with it. The plurality depends for its existence only on the rest mass trope and the charge trope. Since the definition of strong rigid dependence rules out dependence on parts, the plurality satisfies the condition of being a substance in the SNT: it is a strongly rigidly independent entity. Hence, the consequence is that here we have actually an individual.

Regarding the dyadic relation of proper parthood holding between the arbitrary minimal substance and each of its two mutually rigidly dependent trope parts, the upshot is that the *holding* of this relation from one of the tropes to the substance requires the existence of the other trope. This result generalizes in the SNT. Now, recall that derived FORs require at least one further relatum and their holding consists in the holdings of simple FORs. Thus, proper parthood from any trope to a simple substance is a *derived* FOR (note that it is standard to consider proper parthood irreflexive). Its holding is generically identical to the FORs of strong rigid existential dependence and numerical distinctness holding of tropes in the aforementioned manner. These FORs are simple in the SNT. That a simple substance divides into parts is its non-fundamental ontological form derivative from the holding of simple FORs holding among the parts. For that reason only, substances form a non-fundamental category in the SNT.

It follows that for an entity to be a substance in the SNT is *partly* for it to be a terminus of the derived FOR of proper parthood from a trope. The crucial point here is that one derived FOR in membership-determination is sufficient for the non-fundamentality of a category. Hence, substances form a non-fundamental category in the SNT.

It seems to me that this works in a somewhat similar manner in other plausible nominalist or realist bundle theories that accept substances as a non-fundamental category but reject substances consisting of single tropes or property universals. It is only that the set of simple FORs with which proper parthood is generically identical are different than in the SNT, for instance substituting strong rigid dependence for co-location or compresence (e.g. Williams 2018/1953; Maurin 2011).⁹

The same point concerns perdurants in perdurantism and processes in their four-dimensional accounts. Perdurants and processes under this description are non-fundamental wholes of proper parts: temporal parts. As Lewis famously nails down the core of perdurantism (1986, 202):

“Something *perdures* iff it persists by having different temporal parts, or stages, at different times, though no one part of it is wholly present at more than one time.” According to Lewis, persisting objects are perdurants: wholes of numerically distinct temporal parts. An object does not persist if it does not exist at more than one moment of time. Therefore, any perdurant is composed of at least two temporal parts. Thus, the dyadic FOR of proper parthood from a temporal part to the perdurant can hold only if there is also at least another temporal part. A necessary condition for being a derived FOR that is not a necessary condition of simple FORs is satisfied. Hence, proper parthood in Lewis’ perdurantism is a derived FOR in my terms. I leave it for the perdurantists to fill in the details about its derivation from simple FORs. Since for an entity to be a perdurant is partly for it to be the terminus of the derived FOR of proper parthood from its temporal parts, perdurants form a non-fundamental category in Lewis’ perdurantism – as they are supposed to do. These results concern directly Simons’ and Arp, Smith & Spear’s four-dimensionalist accounts of processes that are occurrents in their view (Simons 2012, 135; Arp, Smith & Spear 2015, 121–2).

⁹ Instead, bundle theories that allow for substances of single tropes or property universals fall outside the scope of my meta theory (e.g. Campbell 1981). According to them, tropes or property universals and substances are not exclusive categories although the former are supposed to be fundamental and the latter non-fundamental. Therefore, these theories do not make a sharp distinction between fundamental and non-fundamental categories, about which my meta theory is.

It is also fairly straightforward to show that my meta theory of non-fundamental categories works in the case of a well-known account of another putative dynamic category. According to Jaegwon Kim's (Kim 1993, ch. 3) property-exemplification view of *events*, events are a non-fundamental category constituted of an object x , a property P and a time t . An event is x 's having P at t . The event of object x 's having property P at time t exists if and only if the object x has P at a given time. Events are numerically identical if and only if they have exactly the same constituents of the same category. When Kim's account is put in terms of my meta theory, we can say that the FOR of constitution holding from an object, a property or a moment of time to an event should be a derived FOR. The decisive point is exactly same as above: the holding of this FOR requires an extra entity (a property, moment or object). The consequence is the wanted one: events form a non-fundamental category because for an entity to be an event is partly for it to be a relatum of the derived FOR of constitution from an object to the event.

Returning to fundamental categories, my meta theory can capture substance metaphysics of the Spinozist sort such as Jonathan Schaffer's priority monism (2009, 378–9; 2010a; 2010b). In this kind of theories, like in any formal ontology involving substances as a fundamental category, the membership of substances should be determined by a set of simple FORs with their orders. The difference of this type of substance monism from fundamental substance pluralism such as Neo-Aristotelianism or monadology – when one counts by the tokens of substances –, is that there is only one substance. Still that substance should be a relatum of a set of simple FORs in an order. I leave it for these theories to specify these FORs and their order since as it is well known, views on substances vary significantly. I make an exception in the case of Schaffer's theory as it is detailed enough to be discussed.

Schaffer's priority monism provides the clearest present-day example of substance monism. According to Schaffer, there are entities of both "fundamental" and "derivative" or non-fundamental categories. There is only one entity in the only fundamental category, namely,

substances. A non-fundamental category is *partialia* that are parts of the substance (Schaffer 2009, 379; 2010b, 47).¹⁰ More precisely, *partialia* are proper parts of the substance (Schaffer 2010a, 347; 2010b, 42). There has to be more than one of them, given there is one, and these proper parts are mereologically disjoint (2010a, 356). Thus, a *partiale* cannot bear proper parthood to the substance without there being other proper parts. The existence of the other proper parts is a necessary condition for the holding of proper parthood between a *partiale* and the substance, which makes proper parthood a derived FOR in Schaffer's priority monism – like in the SNT. Since proper parthood, in contrast to parthood, is irreflexive, a distinguishing feature of *partialia* from substances is that the former rather than the latter are subjects of the FOR of proper parthood (the substance is its terminus). Furthermore, to be a *partiale* is to be a proper part. Therefore, a derived FOR at least partly determines the membership of *partialia*. Hence, *partialia* form a derivative category in priority monism just like Schaffer says.

By contrast, Schaffer thinks that proper parthood does not do any work in the membership determination of substances. Substances are ontologically independent entities that are part of the actual material cosmos (2010a, 344; 2010b; 38, 65). Since parthood is reflexive, it is possible that there is only one substance identified with the actual material cosmos – and this is indeed what Schaffer proposes (*ibid.*). So in his view, for an entity to be a member of the only fundamental category of substances is for it to bear the simple reflexive FOR of parthood to the actual material cosmos and not to be a subject of the derived irreflexive FOR of proper parthood and hence ontological dependence to any concrete entity. The substance is the sole member of the fundamental category of substances.

According to the process ontology of Johanna Seibt (2005, 20–3), “general processes” form the only fundamental category. This is in sharp contrast with processes being a non-fundamental

¹⁰ I set aside substrata and modes since Schaffer says too little about them to be certain of his exact view of them (cf. 2009, 379).

category of four-dimensional entities dividing into temporal parts. In her view, each general process is an individual identified with a generic “activity” such as skiing, bubbling or falling of snow. It seems then that I can put Seibt’s view as follows: for entity to be a general process is for it to be numerically identical with a generic activity and nothing more (cf. identification of stuffs). Numerical identity is presumably a simple FOR here. Therefore, general processes form a fundamental category in Seibt’s view – as they are supposed to do.

4 Conclusion

I began the paper by arguing that according to Lowe, categorial fundamentality is having membership wholly determined by unconstituted or fundamental FORs. By contrast, categorial non-fundamentality is having membership determined by constituted or non-fundamental FORs. By the notion of generic identity, I could give an account of unconstituted and constituted FORs, which Lowe leave a mystery. Constituted or derived FORs are such that their holding is generically identical with generically non-identicals jointly, which is denied in the case of unconstituted or simple FORs. The distinction between fundamental and non-fundamental categories is elaborated accordingly. The members of fundamental categories stand in the same simple FOR or FORs in the same order, and their membership in a fundamental category is nothing more. For the members of non-fundamental categories, it is sufficient and necessary that one of these FORs is derived from the holding of some simple FORs. Finally, I showed that this proposal works nicely in many formal ontologies.

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