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ORIGINAL RESEARCH

Hyperintensionality and Ontological Categories

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Abstract
In this paper, I discuss how to distinguish between ontological categories and ordinary categories. Using an argument against van Inwagen's proposed account of what makes a category ontological as a springboard, I argue that if ontological categories are modally robust, then ontological categories need to be understood hyperintensionally. This conclusion opens up a wide range of new ways to define 'ontological category', and I close by briefly outlining one such way in order to illustrate the advantages of embracing hyperintensionality in this debate.

1.

Ontology is often taken to be the domain of inquiry that seeks to identify categories such that those categories provide an exhaustive account of the nature of reality. This notion of categories is found, famously, in Aristotle, but has been developed by many since then.[1] Categories are 'conceived as categories of being, not, in Kantian style, as categories of thought' (Lowe, 2006: 5), and the 'business of ontology [is] to provide answers to the ontological question in terms of a specification of the ontological categories' (van Inwagen, 2014: 185). In this paper, I will assume this approach to ontology, that there are at least some ontological categories qua categories of being, and that those categories we posit within our ontological theorizing are not 'merely' categories of thought or language. This, therefore, commits us to the view that first-

[1] See Aristotle (1963). For more recent discussions of ontological categories, or theories that endorse categorial ontology, see Armstrong (2010), Cumpa (2020), Fisher (2015), Grossman (1983), Haaparanta and Koskinen (2012), Kriegel (2019), Lowe (2006), Nolan (2011), and Thomasson (2018). For applied uses of categorial ontology, see Munn and Smith (2008).

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order categorial ontology is the attempt to specify the correct categorial ontology that reflects the objective structure of reality.[2]

These assumptions granted, one task within categorial ontology is to provide an account of what it is for something to be an *ontological* category: that is, to distinguish between those categories that are 'ontological' and those that are 'ordinary'. For example, to provide an answer to the question of what makes it intuitively the case that the category of 'property' is ontological, but the category of 'tree' only ordinary.

From the outset, it is important to stress that I will assume that categories are 'formal' (or, as van Inwagen calls them 'virtual'; 2014: 197). That is, I take categories to not themselves be further entities. For ease of exposition, I will simply talk of ontological categories, but this should be taken to refer to formal categories, and not to some additional entity that exists in addition to the members of the category. This could, of course, be doubted, but I will simply assume it here, noting that it has significant independent support (see Lowe 2006, Miller 2016).[3]

Despite the importance of ontological categories within philosophical theorizing, there remains relatively little dedicated literature to the topic of what they are, how to understand them, or distinguish them from non-ontological categories. This is not, though, to say that there are not some common ideas within the literature.

A first is that the categories that are ontological are those that are the 'most general'. The thought, made explicit in Norton (1976), is that we can take ontological categories to be those categories that are the 'most general' in the sense of being widely inclusive. 'Object', for example, is an ontological category because it is widely inclusive or general, whilst 'tree' is not and hence is an ordinary category.

There are, though, good arguments against this. Westerhoff (2002, 2005) has argued this proposal fails for at least two reasons. First, some ontological categories are less general than some other ontological categories within certain systems (e.g., the hierarchy of categories outlined in Lowe 2006:8; see also Lowe 1998: 179–181) meaning that this is not a view that is neutral between competing categorial systems. Second, this account leads to what he calls the 'cut-off point problem'. The cut-off point problem holds that this account of what it is to be an ontological category fails to provide a precise account of when a category is sufficiently specific enough to no longer be ontological. That is, how far down the partial ordering of categories we go before the categories are no longer 'ontological'. Generality provides no solution to

[2] Of course, many doubt that such an enterprise as this is possible, or even conceivable. My aim here is not to persuade those people that ontological questions are substantive, or meaningful. My aim is to show that for those that do accept this conception of ontology, certain consequences follow from certain plausible claims about the nature of ontological categories.

[3] This notion of formal ontology has connections to the notion of formal ontology found in Husserl's *Logical Investigations*. More recent developments of Husserl's notion can be found in Smith (1998), Simons (1994), and Smith and Mulligan (1983). The formal nature of categories also accounts for why I favour calling categories 'ontological' or 'ordinary' rather than 'fundamental' or 'non-fundamental' as those latter terms risk implying an ontic status to those entities labelled as fundamental or non-fundamental that I wish to deny to categories.

this problem, and hence cannot provide an account of what it is for a category to be an ontological category.[4]

A second idea, which will be a significant focus for this paper, is that ontological categories are 'modally robust', while ordinary categories are not, where a category is modally robust when it is the case that if that category is ontological, and that category has members, then those members necessarily form or constitute an ontological category (van Inwagen, 2014: 196). The central idea is that ontological categories are not contingently ontological. If a category really is ontological, then in all possible worlds in which that category exists (where a category exists if it has members), then it will be an ontological category in those worlds.[5]

This modal requirement is, though, not so strong that it means that any ontological category must necessarily have members as it might be the case that some ontological category or categories are empty in some (or even all) worlds. Nor is it as strong as the claim that an entity essentially belongs to a category, such that if Socrates exists, then Socrates is essentially an object (though this may be true of some entities). Both of those claims may have their defenders, but both are neither accepted nor rejected here.

Rather, following van Inwagen, modal robustness is only intended to capture the intuition that if a category is ontological, then its members are necessarily members of an ontological category. It is consistent with this claim that some ontological categories could fail to have members, and that some particular entity could have been a member of a different category, but not that an ontological category that has members could fail to be ontological.[6] This means that modal robustness is a claim about categories of entities, not particular entities. It does not mean that some particular property, for example, could have been a substance. The claim is that the category 'substance' might be such that it could have had different members, or even fail to have members, but if it has members and it is an ontological category, then it is necessarily an ontological category. Assuming 'substance' is an ontological category, then in all possible worlds in which it has members, it is an ontological (rather than ordinary) category. And if there is an ontological category of 'necessary existents', then that category will be similarly modally robust, albeit trivially so.[7]

[4] There may be other problems with such an account, such as from Carnap's argument that such widely inclusive categories are meaningless outside of the particular linguistic frameworks that they are posited. I leave this sort of objection to one side here as, if correct, it would have much wider impact on the entire enterprise of categorial ontology.

[5] Note that this rules out the possibility of there being ontological categories that exist but have no members. van Inwagen is committed to denying this possibility, in part due to his acceptance that ontological categories are 'formal' or 'virtual' (2014: 197), something that I assume alongside van Inwagen here.

[6] Compare this also to Allen's recent discussion of the 'necessity claim' where 'if a fundamental ontological category exists, it does so in all possible situations for otherwise it would not be able to fulfil its role - along with whichever other fundamental categories exist - as the ontological basis of everything else' (Allen 2015: 1). This is a stronger modal requirement than modal robustness.

[7] I also leave aside here what notion of necessity is being invoked here, as that too will depend on various first-order ontological claims about the relationship between metaphysical, physical, logical, and other forms of modality. I take the modality invoked here to be the broadest one, whatever that might turn out to be.

Modal robustness is not a *definition* of ontological category. If it were, it would be circular. Rather it is a characteristic of ontological categories that van Inwagen thinks any definition of 'ontological category' must be consistent with (van Inwagen, 2014: 197). My argument below will be that the definition that van Inwagen does provide is inconsistent with this claim.

Largely in this paper I will simply assume that ontological categories are modally robust, but a brief comment is worthwhile. I think the main reason that modal robustness strikes many as plausible is due to the special explanatory role that ontological categories are intended to play within our theorizing. A correct account of ontological categories is meant to explain important metaphysical facts about reality. Modal robustness speaks to this as it makes the statement that ''x' is an ontological category' a significant claim about the members of 'x' irrespective of which possible world we are considering (and hence irrespective of what are the members of 'x').

The aim in this paper is to explore the consequences of modal robustness, and to argue that it illustrates something broader about the notion of an ontological category; namely that 'ontological category' needs to be understood hyperintensionally. To do this, I will begin by discussing modal robustness in the context of a definition of 'ontological category' defended by van Inwagen (section 2). For the dialectic of my paper, it will be useful to see where I think his account goes wrong (sections 3 and 4), in order to then be in a position to argue that if we accept that ontological categories are modally robust, then they are hyperintensional (section 5). In section 6, I outline one way in which we could apply this conclusion by sketching in brief an account of what it is for a category to be an ontological category that makes use of hyperintensional resources. My main conclusion, therefore, will be that if ontological categories are modally robust, then they are hyperintensional. The discussion in section 6 is intended to be illustrative of a myriad of ways in which we might use hyperintensional concepts to define ontological categories and the benefits that such an approach will bring with respect to responding to objections such as Westerhoff's cut-off problem.

2.

van Inwagen has defended a way to determine which categories are ontological, which includes a commitment to the modal robustness of ontological categories. Let us begin by defining some important terms. First, van Inwagen takes a 'natural class' to be some class of entities such that the distinction between members of that class and non-members reflects a real division and that the members exhibit 'sufficient internal unity' (2014: 189). The class of electrons is a natural class as the boundary between electrons and non-electrons is a real division, and the class of electrons exhibits more internal unity than other classes (2014: 190).

Second, a natural class can be 'large', such that:

> x is a large natural class $=_{df}$ x is a natural class whose membership comprises a really significant proportion of the things that there are (2014: 193).

This reflects the idea that ontology rests on the view 'that membership in the natural classes is not restricted to any such minuscule proportion of the things that there are' (2014: 191-2). van Inwagen provides no precise definition of 'a really significant proportion', admitting instead that is an 'idea that it is hard to give any precise sense to', but argues that it is not 'obviously meaningless or entirely vacuous' (2014: 192). Though not a precise definition, van Inwagen does suggest understanding 'a really significant proportion' via the cardinality of the category, using a ratio of the number of entities in each class to try to assess when one class does comprise 'a really significant proportion' relative to another class, including the class of 'everything'. I will adopt this suggestion here when discussing van Inwagen's view.

Third, a natural class can be 'high', such that:

> x is a high natural class $=_{df}$ x is a natural class that is a proper subclass of no natural class (2014: 193).

Putting these notions together, we get that a 'natural class *x* is a *primary* ontological category just in the case that there are large natural classes [and] *x* is a high class' (2014: 194), and 'a natural class *x* is a *secondary* ontological category if there is a primary ontological category *y* such that *y* has large natural proper subclasses [and] *x* is a high subclass of *y*. And so for tertiary ontological category, quaternary ontological category, and so on' (2014: 195).

This account is, according to van Inwagen, consistent with the additional clause that ontological categories are 'modally robust' such that if a category is ontological, then, of necessity, if there are members of that category, then those members form or constitute an ontological category (2014: 196). This allows that we could hold that some entities that form an ontological category exist in one possible world, but do not exist in another. Such a category would still be ontological just so long as that category fulfils the definition above.[8] But, stated in the language of possible worlds, a category cannot be ontological in one possible world, and non-ontological in another.

3.

The phrase 'a really significant proportion of the things that there are' will be central to my argument against van Inwagen. I will argue that a consequence of van Inwagen's account of 'ontological category' is that it allows for cases where a category can come to be, or cease to be, ontological, and that this consequence is in direct tension with the modal robustness of ontological categories.[9]

[8] van Inwagen does phrase this slightly differently due to an implicit assumption that a category exists in a world if it has members. His account further also rules out the existence of uninstantiated categories. This aspect, whilst contentious on its own, plays no part in my argument here.

[9] It is open for others to question the claim of modal robustness instead to avoid the problems that I will raise here. However, for the purposes of this paper, I have assumed the modal robustness of ontological categories, and therefore if modal robustness is inconsistent with the proposed definition (as I will argue), then it is the definition that should be rejected.

For reasons to do with the nature of infinities, my argument cannot be illustrated using van Inwagen's own example,[10] but consider a similar ontology to the one discussed by van Inwagen held by some fictional ontologist Bert. Bert holds that there is a large natural class, that of 'property' (the precise nature of such properties will not be relevant). That is, Bert thinks that there are some sufficiently large number of members of this category to satisfy the requirements of 'large', such that the cardinality of the category is non-infinite, but is 'a really significant proportion of the things that there are'. Assume also that Bert thinks that 'property' is not a subclass of some other natural class and, therefore, 'property' is an ontological category under van Inwagen's account as it is a large, high natural class.

Bert also posits a natural class of 'substance' in addition to the category 'property' and posits no other category such that the distinction between substance and property is mutually exclusive and exhaustive. The category of 'substance' is, for Bert, a natural class, as Bert holds that the distinction between member(s) of the class 'substance' and non-members of that class (i.e., members of the class 'property') reflects a real division, and that the members exhibit 'sufficient internal unity'. 'Substance' is *not* a subclass of 'property', but if x exists, then, for Bert, x must be either a property or a substance. This secures that 'substance' is a *high* class.[11]

'Substance' then is a high natural class for Bert. To work out if the category is an ontological category, we need to know if it is large. As noted above, van Inwagen uses ratios to describe examples of when a category should be taken to be large, though he never specifies what the ratio of members of a category to all entities is such that the class comprises 'a really significant proportion of the things that there are'. However, it is reasonable to think that there must be some ratio, A:B, where A is some sufficiently large non-infinite number, and B is a sufficiently small non-zero number, such if there are two categories, x and y, with cardinalities of A and B respectively, that the members of y does not comprise 'a really significant proportion of the things that there are', and hence y is not 'large' and is not an ontological category.[12]

As it happens, Bert holds that there are far fewer members of the category 'substance' than that of 'property', perhaps even only one member. If Bert holds that there is only one substance, and that there is some large non-infinite number of properties, then for some sufficiently large number of properties, the category substance will

[10] van Inwagen's example considers the fictional ontology of Albert in which there are no secondary ontological categories. All of Albert's primary categories have infinitely many members and all the other natural classes he accepts have only finitely many members. Given this, no other natural class fulfills the criterion for being large. Albert's primary categories have no large natural proper subclasses, and so Albert only as primary ontological categories (2014: 195-6).

[11] I leave aside the view that there is a universal class or category, such as that of 'entity', for ease of exposition here. If Bert does think that there is a universal category, then both property and substance will be a subcategory of the universal category, but for reasons that will become clear, it will still be the case that property is an ontological category and substance is not.

[12] To see van Inwagen's commitment to the possibility of such ontologies further, see his example of Alice (2014: 191-2). I leave aside for simplicity talk about what the ratio of properties to substances is for Bert in other possible worlds. We can assume that either the ratio is the same, such that even including all possible worlds the cardinality of the category of substance is still sufficiently low to count as a large natural class; or that Bert is a modal sceptic of a sort that rejects all possible world talk (see van Inwagen 1998 on modal skepticism).

not be 'large' as the members of the category 'substance' do not comprise 'a really significant proportion of the things that there are'. Given this, Bert's ontology could be such that there is one primary ontological category ('property'), and *no* other ontological category, as no other category is 'large'.

Thus far, this is not a problem for van Inwagen's account. Bert believes in an ontology that only contains a single primary ontological category and no secondary ontological categories. Bert's ontology might be one that we would not want to accept, but it is not ruled out by van Inwagen's account of what it is to be an ontological category.

Imagine, though, that Bert also believes that various entities come into and go out of existence. As it happens, Bert thinks that over time, more and more particular substances come to exist. Whatever account is given for how those new substances come to exist, what is important is that, under Bert's view, more substances come to exist such that the ratio between the cardinality of members of the categories 'property' and 'substance' becomes smaller.[13]

In this case, as more and more substances come into existence, there will come a point in which the category of substance will *become* a large natural class. That is, under these circumstances, at some point the category of substance will come to comprise 'a really significant proportion of the things that there are'. At that time, 'substance' will come to be an ontological category as the category will come to be a large natural class.

This, though, is in tension with van Inwagen's claim that ontological categories are modally robust. In Bert's case, that there are substances is not enough to secure that they form or constitute an ontological category. At one time, the category is non-ontological as it is non-large, and later is it ontological as it *becomes* large. Thus, if we apply van Inwagen's proposal to Bert's ontology, it is not the case that if a category has members, then, of necessity, they form or constitute an ontological category. Rather at one time, the category has members, but is not ontological, and later the category becomes ontological.

Importantly, this is not just the point that the 'same' category might be ontological within some theories, and non-ontological in others. Within a single ontological theory – Bert's – there are categories that are at one time non-ontological and later ontological, and this directly rules out modal robustness as it is understood by van Inwagen.

This problem can be replicated in other ways. Consider Bert's ontological rival Roberta. Roberta believes that the world initially contains the same ratio of properties to substances as Bert. However, in this case, imagine that over time, rather than new substances coming into existence, certain properties cease to exist.[14] With sufficient time, the ratio between the cardinalities of property and substance becomes smaller,

[13] This example applies irrespective of whether we are counting property tokens or property types. How we count properties will depend on various first-order metaphysical views, but a relevant example can be found here whatever position is defended.

[14] This might restrict Roberta such that they must also reject the existence of uninstantiated properties, but there are many that have rejected such a position, including van Inwagen himself (2004), and therefore is not an outlandish restriction to place on Roberta also.

though this time not because new entities exist, but because some entities cease to exist.

Eventually, it might be the case that there exists only a single substance and a single property. In that case, it is plausible to think that the members of the category 'substance' will comprise a really significant proportion of the things that there are, even though they did not before. Assuming that substance is a natural class for Roberta, just as it was for Bert, we have another case where the category of substance was at one time not an ontological category, and then later was.

These are merely two cases that would create versions of this problem. At the very least, we could create 'mirror' versions of these where rather than some category becoming an ontological category, instead a category is initially ontological, and at some point ceases to be ontological (without ceasing to be in the sense of coming to have no members). Any number of troublesome cases can be described where there are categories that always existed coming to be (or ceasing to be) ontological, which is a possibility that should be ruled out by the modally robust nature of ontological categories.

Of course, it might be the case that the world cannot actually be such that it changes in the ways that I have outlined. The problems arise in virtue of positing that entities can come into and go out of existence, and we might think this is independently a false claim. However, the idea that some things are created, and others destroyed over time is not an extreme view. And even if some would deny it, van Inwagen himself does not. van Inwagen denies that tables, chairs, and cars exist, but accepts that living organisms do, and living organisms are (presumably) entities that come into and go out of existence as they are not eternal entities (see van Inwagen 1990). van Inwagen also suggests that mereological sums can change their parts (2014: 237). While my counterexample has not drawn on the notion of mereological sum, it would not be hard to adjust the cases to be one that does, especially that of Roberta's given that Roberta may hold that the single existing substance (object) is a mereological sum.

The point is that the example ontologies that give rise to these problems are not extreme, do not posit any (especially) controversial ontological category, and are not (obviously) internally incoherent. Such ontological views thus serve as a counterexample to van Inwagen's attempt to combine his account of what it is for a category to be an ontological category with the modal robustness of ontological categories. The source of the problem, I will argue in section 5, is the extensional nature of van Inwagen's account of what it is for a category to be an ontological category, and that it is this that leads to the observed tension when combined with the claim that ontological categories should be modally robust. However, before explaining this in more detail, I will respond to a couple of immediate responses to cases similar to Bert and Roberta's.

4.

There are two responses that I will consider in more detail before reflecting on what this discussion indicates about the nature of ontological categories.

First, it might be responded that the notion of 'class' that has been employed is such that a class cannot change its members in the way that I have described. If we

hold this, then there is no sense in which the ontological categories can 'change' in the way that Bert and Roberta suppose as classes are individuated by their members.

However, I do not think this is what van Inwagen intends when he talks of 'classes'. van Inwagen stresses that modal robustness is not intended to be so strong a requirement as to entail that that category *must* have the members that it has. Indeed, van Inwagen is happy to admit that there could be a view that held there is an ontological category 'contingent things'. But this category, by its very nature, at least could have had different members – its members, after all, are contingent.

A second response could be to supplement the counterexample so that it turns out that Bert's category of 'substance' was in fact an ontological category all along. For example, if Bert is an eternalist, then the cardinality of 'substance' would be sufficiently large when considered across all points of time. Or, if Bert was a presentist, he might hold that the category need be large enough in that it either had, has, or will have enough members.[15] Combined with these commitments in the metaphysics of time, we might thus be able to hold that Bert's category of 'substance' was always 'large' and thus always ontological.

The reason that this response will not work is that an account of what makes a category 'ontological' should be (somewhat) neutral between various ontological positions. That is, a metaontological account of the sort that van Inwagen is suggesting should not have major ontological ramifications. However, even a brief consideration of mainstream positions in the metaphysics of time shows us that this is not the case here.[16]

For example, what about those that support a 'growing-block' view of time? This view holds that 'past and present moments and events exist, but future moments and events do not exist' (Miller, 2013: 348). It seems clear that if Bert accepted such a view of time, then they cannot accept 'large' as it stands. If they accepted the growing block view, then it would be the case that as more time-slices exist, what was previously not an ontological category due to not compromising a significant proportion of reality may come to be ontological, and thus still contravene the modal robustness of ontological categories.

Even if some specific ontological view can be made consistent with the definition of 'large', there remains the task of showing how the theory can be made consistent with other metaphysical theories, such as those that posit genuine change, or genuine cases of entities coming into or going out of existence. van Inwagen's account of what it is for a category to be an ontological category, when combined with modal robustness, is in direct tension with these highly intuitively plausible metaphysical theories. van Inwagen himself wants an account with a certain degree of metaontological neutrality, but the problems I have illustrated show that that neutrality would, at best, be severely limited.

[15] The presentist may need to introduce a span operator to count the entities across times in cases where the category is large across time, but not large at any given instant, but we can assume that presentists will be happy with this complication (see Brogaard 2007).

[16] How neutral a metaontological theory should be about first-order issues is a difficult question. However, I will take some degree of first-order neutrality as a broad, defeasible metatheoretical requirement on our metaontological attempts to understand when a category is ontological.

5.

Thus far, I have outlined ontologies that contain categories that satisfy van Inwagen's account of what it is for a category to be ontological, but do not uphold the modal robustness of ontological categories, and argued that this is a problem for van Inwagen's account. In this section, I will argue that the reason this account fails is because if we accept modal robustness, then what it is for a category to be ontological needs to be understood through hyperintensional concepts. That is, I will show that the modal robustness of ontological categories cannot be captured in extensional or intensional contexts as they are too coarse-grained, and hence requires the more fine-grained analysis provided by hyperintensions to be adequately captured.

I will take the terms 'extensional', 'intensional', and 'hyperintensional' in line with standard accounts such that 'a position in a sentence is *extensional* when other expressions with the same extension can be substituted into that position *salva veritate*, […] *intensional* just in case expressions that are necessarily co-extensive can be freely substituted without change in the sentence's truth value, [and] *hyperintensional* provided even substitution of necessary co-extensive expressions is not guaranteed to preserve truth-value' (Wildman, 2020; see also Nolan 2014; cf. Correia and Schnieder 2012: 14). The same core idea is defended by Berto and Jago who hold that 'an operator $\mathscr{H}$ is hyperintensional when $\mathscr{H}$A and $\mathscr{H}$B can differ in truth value, even when A and B are necessarily (logically, mathematically, or metaphysically) equivalent' (Berto & Jago, 2019: 161).

The above are statements about language. But, following Nolan (2014: 152), I will assume a link between the language used to characterize some concept, and the concept itself. Thus, a concept is hyperintensional if hyperintensional language is needed to capture it, intensional if intensional but not hyperintensional language is required, and extensional if neither intensional nor hyperintensional language is needed. I will assume this throughout the rest of this paper.

To apply this to a discussion of 'ontological category', we need to first show that van Inwagen's account is extensional. This can be seen from the account relying on the notion of 'large' where some category is large if its members comprise a really significant proportion of the things that there are. The account of what makes a category 'large' is clearly extensional as whether a category is large depends on the extension of the category in question, and if 'x' refers to an ontological category, then the term 'y' can be substituted for 'x' just so long as 'x' and 'y' have the same extension. By understanding 'ontological category' in this way, we are making use of extensional language, and thus ontological categories, so conceived, are extensional.

Recognizing the non-extensionality of ontological categories would be enough to make the argument that we cannot accept van Inwagen's account, as least if we want, as I think we should, to uphold the modal robustness of ontological categories. However, I believe that the point extends further, in that I will argue that we should think that ontological categories are hyperintensional, as even substitution of necessary co-extensive expressions is not guaranteed to preserve truth-value when it comes to proposed ontological categories.

First, let us show that the modal robustness of ontological categories is a non-extensional claim. Modal robustness consists in holding that if x is an ontological category and x has members, then *necessarily* those members form or constitute an ontological category. This is non-extensional as it is not the case that if 'x' and 'y' have the same extension, that 'y' can be substituted into ''x' is an ontological category' without a change in the sentence's truth-value. This is because two distinct ontological theories may posit categories that have the same extension, but where the category is ontological in one theory, but non-ontological in the other.

Examples where a category is ontological in one theory, but non-ontological in another are actually quite hard to find in the literature in part because intuitions amongst metaphysicians about what categories are ontological and non-ontological seem fairly consistent. However, my argument does not need the theories to be defended. It only requires that it is conceivable that distinct ontological theories could posit categories that have the same extension, but where one category is ontological in one theory, but non-ontological in the other. My argument will be that the conceivability of this shows that the position '-is an ontological category' cannot be adequately captured extensionally or intensionally, and requires a hyperintensional treatment, and, applying the assumption above, if we need hyperintensional language to capture the phenomenon, we have can infer that the concept itself is hyperintensional.

Consider, then, a theory that denies any ontological/non-ontological distinction. This theory, T_1 still posits various categories, including a category of 'trees', but holds that all categories are ontological. A second theory, T_2, accepts the ontological/non-ontological distinction, and holds that the category 'tree' is real but non-ontological. It is perfectly possible that the category 'tree' in T_1 and T_2 could have the same extension – that is, both T_1 and T_2 agree about how many and which trees exist.[17]

In this case, whether the category is ontological or non-ontological will depend not on its extension, but on respective position of that category within a broader system of ontological and ordinary categories. Therefore, if we accept the modal robustness requirement, then the notion of an ontological category requires *at least* an intensional treatment, and ontological categories are best taken to be at least intensional.

However, there is reason to think that an intensional treatment is also not enough. This is also because it will only be the case that within some ontological system that, necessarily, x is an ontological category. That is, it is the case that even though category 'x' and category 'y', drawn from a different ontological system, could *necessarily* have the same extension, it is not the case that we can substitute, without a change in truth-value, 'y' into ''x' is an ontological category'.

To continue the example from above, it might be that both T_1 and T_2 hold that the category of 'tree' has its extension necessarily. Both could, for example, hold that what does exist, exists necessarily, and hence that 'tree' could have had no different

[17] Or, put in terms of possible worlds, there could be a world W_1 such that T_1 is true in that world, and a world W_2 such that T_2 is true in that world. The category 'tree' could have the same extension in both W_1 and W_2, but 'tree' is an ontological category in T_1 and non-ontological in T_2.

extension.[18] In such a case, the category of 'tree' cannot be substituted across these theories without a change in the truth value of the proposition <tree is an ontological category>. This shows that in 'Necessarily, 'x' is an ontological category', the position in the sentence 'is an ontological category' cannot be analyzed intensionally. Even though 'x' and 'y' may of necessity have identical extensions, if 'x' and 'y' are posited within different ontological systems, then 'x' may be an ontological category, whilst 'y' may not be. Therefore, the position 'is an ontological category' requires a hyperintensional analysis, and hence that ontological categories are hyperintensional.

Does this mean that there could be two distinct ontological systems (and the categories within them) that are necessarily coextensive? This depends on whether the categories within those systems are also the same with respect to the ontological/non-ontological distinction. That is, imagine two ontological systems O_1 and O_2 that are, by stipulation, distinct. In the worlds in which O_1 and O_2 are true, there exists the same entities, and O_1 and O_2 posit the same categories. Two categories, C_1 and C_2, would therefore be necessarily coextensive. On both extensional and intensional accounts, there is nothing that allows us to say that O_1 and O_2 are distinct ontological systems. However, if we consider 'ontological category' to be a hyperintensional term we can show how O_1 and O_2 could be distinct systems.

A hyperintensional concept is one that makes a distinction between necessarily equivalent contents. Following others in the literature on hyperintensionality, I will discuss this proposal by making use of *impossible* worlds. Using impossible worlds, we can distinguish between necessary truths: 'Each distinct necessary truth will correspond to a distinct set containing all possible worlds and some impossible worlds' (Berto & Nolan, 2019). Hyperintensionality, and impossible worlds, have been put to a number of metaphysical uses in recent years.[19] My proposal is that we can also use them to distinguish between necessarily coextensive categories.

Continuing with O_1 and O_2, and C_1 and C_2, let us assume that C_1 is ontological in O_1 while C_2 is non-ontological in T_2. But, as above, C_1 and C_2 might be necessarily coextensive. In such a case, the distinction between the respective ontological systems, O_1 and O_2, is too fine-grained to be captured adequately by either an extensional or intensional account. On such accounts, we cannot distinguish between O_1 and O_2 because both theories posit the same entities as existing and the same categories in all possible worlds. Hence, we cannot explain why some category could be ontological in one and non-ontological in the other.

But, if we accept the idea that the position 'is an ontological category' needs a *hyperintensional* analysis, then we are not limited to only the possible worlds to distinguish O_1 and O_2. We can also consider impossible worlds where O_1 and O_2 come apart. This is because there will be some impossible world where O_1 and O_2 do posit the existence of different entities, and hence C_1 and C_2 are distinct categories. That is, there will be some impossible world where C_1 and C_2 have different members. Nec-

[18] Or, stated in terms of possible worlds, W_1 and W_2 could both be worlds where all entities that exist, exist necessarily and hence the category 'tree' in both worlds necessarily has the same extension.

[19] For example, amongst others, impossible worlds have been used to understand material constitution (Salmon 1984); properties (Nolan 2013); metaphysical explanation (Kment 2014); and essence (Brogaard & Salerno 2013).

essarily coextensive categories within distinct ontological systems can thus be distinguished by considering possible *and* impossible worlds. This supports the suggestion that the position 'is an ontological category' requires a hyperintensional analysis, and hence that ontological categories are hyperintensional.

That hyperintensions include impossible worlds is also important for allowing me to respond to one common worry at this stage. The objection goes that my argument that ontological categories are hyperintensional only works if we are pluralists about ontology because hyperintensionality concerns substitution within true statements and (typically) ontologists hold that their favored ontology is *necessarily* true. This would mean that it does not matter that we cannot substitute across T_1 and T_2 because only one of them could express true claims in the first place.

However, by including impossible worlds we can see where this objection goes wrong. Let us now say that both T_1 and T_2 are false. That is, that they do not accurately describe the ontological categories that exist in the actual world. Let us also hold that they are *necessarily* false in that they do not describe any possible world too. Instead, T_3 is the correct ontological theory, and it is true in all possible worlds. This, I take it, is the view of ontological non-pluralists. Within this framework, and making use of impossible worlds, we can show that the non-pluralist can accept the hyperintensionality of ontological categories.

Let 'e' be some category within T_1 and T_2, two theories that are now (by stipulation) necessarily false, in the sense of being false in all possible worlds. However, even if false in all possible worlds, T_1 and T_2 are true in some impossible worlds. That is, there are some impossible worlds, W_1 and W_2, such that T_1 is true in W_1 and T_2 is true in W_2. It is also the case that the sentence 'e is an ontological category' is true W_1, but not in W_2 in which e is an ordinary category. We can then easily arrive at the same conclusion as before.

From our prior stipulation, within T_1 and T_2, entities are necessarily existent, and e could have had no different extension. This means that there is a change in the truth value of the proposition<e is an ontological category>between W_1 and W_2 as it is true in W_1 but false in W_2. Thus, despite having the same extension in W_1 and W_2, the proposition<e is an ontological category>requires a hyperintensional treatment even in cases where theories are necessarily false. This satisfies the non-pluralists who holds that W_1 and W_2 are impossible worlds and that T_1 and T_2 are necessarily false theories.

This consequence should, I think, be surprising for broader reasons. Even if it is the case that in the actual world and all possible worlds only a single ontological theory is true, there are impossible worlds in which other ontological theories are true. And although those worlds are impossible and ontology is, I take it, primarily concerned with working out which categories have members in the actual world, examining impossible categories – including potentially categories that only have members in impossible worlds – will sometimes help us arrive at a view on which categories have members in the actual world.

This argument has been motivated by commitments concerning the nature of ontological categories such as their modal robustness, and my claim is strictly limited to being one about ontological categories. However, and interestingly, this conclusion does seem to lend further support to recent work by Kristie Miller who argues

that we need to make use of hyperintensions to adequately understand metaphysical equivalence such that 'sentences s and s* are strongly hyperintensionally equivalent iff the set of possible and impossible worlds that is the extension of s, is identical to the set of possible and impossible worlds that is the extension of s*' (2017: 783). If Miller is right about metaphysical equivalence, then it makes sense that a discussion of ontological categories requires us to consider hyperintensions also.

Applying Miller's claims to my focus here, we get that ontological theories, taken as theories about which categories exist, are metaphysically equivalent only if the set of possible and impossible worlds that is the extension of T_1, is identical to the set of possible and impossible worlds that is the extension of T_2. If understanding metaphysical equivalence requires hyperintensions, then this further supports my claim that we must interpret propositions like <e is an ontological category>hyperintensionally, and consider the truth value of such claims within a theory across possible and impossible worlds.

6.

To summarize the argument so far, I have argued that the distinction between competing (non-merely terminologically variant) ontological systems is too fine-grained to be captured adequately by either an extensional or intensional account of what it is for a category to be ontological, and the possibility of distinct ontological systems that are necessarily coextensive supports the hyperintensionality of 'ontological category'.

I have argued that if modal robustness is accepted, then ontological categories require a hyperintensional treatment. One way to resist this conclusion is to reject the modal robustness of ontological categories. I have not provided a detailed argument in favor of this feature of ontological categories here, but it is worth noting that van Inwagen (and I) are not alone in thinking that if ''x' is an ontological category' is true, and x has some members, then it should be the case that 'x' is necessarily an ontological category. Such a claim is widely held, and is needed if categorial ontology is to be taken to be a domain that seeks to secure necessary truths about the nature or structure of reality. Defenders of, say, a two-category substance-property ontology hold that if the theory is true then it should be necessarily true. The same goes for the proposed one-category ontologies, four-category ontologies, and any other proposed categorial ontology. If we give up the modal robustness of ontological categories, then the resultant view of what ontology is concerned with will be dramatically different from the way it has been taken to be by most, if not all, of the major proponents of particular categorial systems. Perhaps this reinterpretation of the subject matter of categorial ontology is required, but I leave discussion of alternative conceptions of ontology to another time.

Modal robustness, though, is not by itself an account of what it is for a category to be ontological. Ontological categories may be modally robust, but we still require an account of what it is to be an ontological category, ideally one that *accounts for* or *explains* their modal robustness. If, as I have argued, we need hyperintensional resources to account for modal robustness, it makes sense to begin any new attempt to provide a definition of ontological category that accounts for their modal robust-

ness by looking at already existing hyperintensional concepts. I do this in what remains. More specifically, I will appeal to the different forms of dependence that have been posited by various authors. My hope is that even if readers disagree with the specific hyperintensional concept of dependence I employ here, this will serve as an indication of the broader methodological claim that making use of hyperintensional concepts allows for novel account of account of what it is for a category to be ontological.

An assumption I made earlier is worth repeating here before I propose a more positive view. Following others (e.g., Nolan 2014; Wildman, 2020), I have assumed a link between the language used to capture a phenomenon or concept, and the phenomenon or concept itself. Thus, a concept is hyperintensional if hyperintensional language is needed to capture it, intensional if intensional but not hyperintensional language is required, and extensional if neither intensional nor hyperintensional language is needed. My argument has been that hyperintensional resources are needed to capture 'ontological category'. It what remains I sketch a more specific view, making use of a particular hyperintensional notion.

There are various hyperintensional concepts that could be appealed to, but I will focus on dependence.[20] Dependence has long been a central notion in much of our metaphysical theorizing as a way to account for how one entity might depend for its existence upon another in some deep metaphysical or ontological way, rather than, for example, in some causal way. Dependence has also been widely argued to come in many different forms – being more of a family of relations that resemble each other, with entities standing in different more fine-grained dependence relations to various other entities (Lowe, 2006).

Dependence relations have also been already suggested as providing a way to distinguish between ontological categories. Lowe holds that 'ontological categories are themselves identifiable in terms of the characteristic existence- and identity-conditions of their members' (2004; see also Lowe 1998: Chap. 8). Lowe also discusses at length the dependency relations that hold between members of distinct ontological categories (e.g., Lowe 1998: Chap. 6). The view I will propose is therefore quite close to Lowe's in some ways, but it will be explicitly hyperintensional.

Focusing on just two versions of dependence, we can distinguish between existential dependence wherein:

> Existential Dependence: x depends for its existence upon y $=_{df}$ Necessarily, x exists only if y exists.

and essential dependence wherein:

> Essential Dependence: x depends for its existence upon y $=_{df}$ It is part of the essence of x that x exists only if y exists (Tahko & Lowe, 2015).

[20] See, amongst others, Correia (2005; 2008), Koslicki (2012; 2013), Lowe (1998), and Tahko & Lowe (2015) for more detailed discussions of dependence.

Those familiar with the discussion about ontological dependence will recognize that the first is a version of a modal analysis of dependence. The second is non-modal which is often argued for on the recognition that at least some cases of dependence must be understood hyperintensionally as we can recognize dependence relations between necessary coexistents (Fine, 1995).

In addition to accepting this distinction between forms of dependence, we might think that a category is to be defined through the relations that that category stands in with respect to other categories, including, but not necessarily limited to, the dependence relations that they bear to other categories. That is, a category is defined through the relations, including dependence relations, that members of that category bear to members of other categories (if categories are 'formal'), or that the categories themselves bear to other categories (if categories are additional elements of being) (Hakkarainen, 2022).[21]

Suppose that we accept both these claims about dependence and the nature of categories. Both are controversial, but if we do accept them, then I argue that we can distinguish between ontological and ordinary categories by holding that a category is *ordinary* if its definition requires only existential dependence relations, whilst a category is *ontological* if its definition also requires essential dependence relations.[22] Again, it is not central to my main aim in this paper that this dependence account is successful. The main aim is to argue that we need to use hyperintensional concepts to understand what it is for a category to be ontological if we want to be able to account for the modal robustness of ontological categories. But, to show that hyperintensional concepts can do this, at least in principle, let us further sketch a dependence view to see how it works.

Consider again the categories of substance and tree. Taking the category of tree first, trees seem to bear various dependence relations to other entities including soil, water, acorns, pollinators, gardens, etc. Indeed, it seems reasonable to think that prima facie trees would not exist were it not for at least some of those other entities. Trees might not have existed were it not for nutrients found in soil for example. Trees might therefore existentially depend on soil. Even if that biological claim is false, this would suggest that the definition of the category tree may require grasping the existential dependence relations that trees bear to members of those other categories.

Does the category 'tree' stand in *essential* dependence relations to other categories? Here it is less clear, but it is at least plausible that it does not. That is, prima facie it is not part of the *essence* of trees that they could only exist if soil does. It might be that trees might not have been able to grow without soil, but it does not seem inconceivable that a tree could exist in a possible world where there is no soil. Extending this, we might arrive at the view that it is a prima facie defendable position that the definition of the category 'tree' does not require essential dependence relations.

[21] The claim that categories are to be defined through the relations that they bear to other categories could be accepted without thinking that those relations are dependence relations. It seems plausible that what a category is bears a strong connection to what other categories it depends on (see Lowe 2006), and for this reason, and simplicity of exposition, I ignore other relations for now.

[22] I say 'also' here as it might be that the definition of a particular ontological category requires us to specify both the existential dependence relations and hyperintensional essential dependence relations that it bears to other categories.

In contrast, it has long been argued that what it is for some thing to be a substance is for that substance to instantiate properties. If correct, this would mean that the definition of the category 'substance' includes some essential dependence relation that holds between members of the category 'substance' and members of the category 'property'. The definition may require existential dependence relations too, but the crucial aspect is that under this conception of substance, those existential dependence relations would not be enough to define the category fully.

What we therefore have is a sketch of an argument that the categories 'substance' and 'tree' are different in terms of what dependence relations are required in order to account for each of them. Relying on these distinct sorts of dependence, we can account for the ordinary/ontological category distinction: a category is ontological if the full definition of that category requires specifying the (hyperintensional) essential dependence relations that the category bears to other categories; and a category is ordinary if the full definition of that category requires only specifying the existential dependence relations that the category bears to other categories. Embracing hyperintensionality therefore plays a key role in providing a workable definition of ontological category.

There are two further features of this account worth noting. First, Westerhoff's cut-off problem does not arise. The cut-off problem posed a challenge to any account to explain how to distinguish between ontological and ordinary categories. However, the distinct notions of dependence provide a clear principled distinction between ordinary and ontological categories, and one that is grounded in the nature of the categories themselves rather than due to the way that we categorize entities. A category could be maximally general, but if the full definition of that category does not require specifying the hyperintensional essential dependence relations that the category bears to other categories, then it is not an ontological category. Ontological categories are intrinsically different from ordinary categories, and this difference is not grounded in how general the category is.

Second, the distinction between ontological and ordinary categories understood in terms of the essential and existential dependence might shed further light on other ongoing debates. For example, is the category 'human' ontological or ordinary? Under the current working proposal, to answer this question will require us to work out if the full definition of 'human' requires essential dependence relations, or only requires existential dependence relations. Depending on our view about what makes something a member of the category 'human' we will therefore get different answers as to whether the category is ontological or ordinary. We should not expect an account of what makes a category ontological or ordinary to provide answers to questions of whether any particular category is ontological or ordinary. But the framework outlined here does provide a way to (at least in principle) answer such questions, and, in some cases, we will be better placed to understand and assess different views on the basis of whether they propose that the category in question is ontological or ordinary.

7.

There are, naturally, problems that could be raised against the specifics of the claims that I have made in this paper. It has been suggested to me that trees might be essen-

tially dependent on certain other entities, making the category 'tree' ontological after all. If that is true, and we want to maintain that the category tree is ordinary, then that might be an argument against using dependence relations (or for the need for a new definition of trees).

It might also be possible to object to the way that I have defined dependence. Perhaps dependence relations are not metaphysically primitive, but actually founded upon other more basic ontological relations. Perhaps there is actually only one category and hence categories cannot be defined through relations to other categories.

However, the discussion of a dependence account of what it is to be an ontological category is intended to only be illustrative of the wider point: that hyperintensional resources are needed to provide an account of what it is that makes a category ontological, and that hyperintensional resources can provide a way to distinguish between ontological and ordinary categories. This paper is not argument in favour of a 'dependence' account. There are a myriad of other concepts that have been argued to be hyperintensional that we might consider to account for the distinction (e.g., essence, metaphysical explanation, grounding) each of which might deserve their own investigation.

My conclusion is solely that if we accept modal robustness, then hyperintensionality needs to figure in a definition of an ontological category. Categorial ontology should follow the wider trend in metaphysics to embrace the hyperintensional revolution. Exploring the wealth of possible hyperintensional concepts that could be used for this purpose goes beyond the scope of this single paper, but this has the potential to be a highly fruitful line of research to explore in the future.

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Competing interests

Nothing to declare.

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