

The University of Tartu
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**PERCEPTION, ABDUCTIVE METHODOLOGY AND
COMPOSITIONAL UNIVERSALISM**

Master's Thesis in Philosophy

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I have written the Master's Thesis myself, independently. All of the other authors' texts, main viewpoints and all data from other resources have been referred to.

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0. INTRODUCTION¹

Conservative views about composition posit that certain pluralities of objects compose—e.g., atoms compose molecules—and are either negative, or are neutral (by either suspending judgment or just remaining silent) about occurrence of composition for certain other pluralities of objects—e.g., a horse and a man. Conservative theories can differ in detail but they *typically* accept ontological posits of human perception, common sense, and their relatives, and deny—or² just remain neutral about—the occurrence of composition for certain pluralities of objects beyond the grasp of such sources of forming ontological beliefs. In this thesis, I will argue that conservatism—as long as it relies on the perceptual capacities for its ontological posits—is either insufficient or untenable as a theory of material composition. I will further appeal to abductive methodology to argue that if ordinary objects exist, then *universalism* about composition is true: *any* plurality of objects composes an object.

A main theme in this thesis is abductive methodology. The thesis is composed of two parts, each of which is an attempt to defend universalism on abductive grounds, with the second one serving as a respond to the nihilist who refuses to accept a major assumption in the first one. The first part argues for universalism on perceptual grounds. The main assumption of the argument given in part one (henceforth: the *crucial assumption*) is that ordinary objects—objects such as trees, cats and tables—do exist. I will appeal to certain metaphysical treatments of perception to argue for the existence of a myriad of extraordinary objects, similar to the way some conservatives would want to argue from perception to existence of ordinary objects, which in turn suggests that such conservative views are either false or insufficient (depending on whether they deny or just remain silent about existence of extraordinary objects). I then appeal to abductive reasoning to argue that universalism is the best theory of composition that *respects*³ the crucial assumption and ‘explains’ the

¹I dedicate this thesis to my parents. Also, special thanks to Juhani Yli-Vakkuri, Bryan Frances and Alex Davies for teaching me philosophy over my MA studies at the University of Tartu.

²There seems to be no consensus among the conservatives about the ontological status of non-perceivable or non-commonsensical objects. As Fairchild and Hawthorne closely put it for the case of common sense: “[...] it is far from clear whether common sense takes a stand on extraordinary objects. Even granting that common sense does not commit itself to a certain class of extraordinary objects, it remains to be seen whether it is antithetical or merely neutral in regards to the question of their existence. Granted, they do “escape our notice” [quoting (Korman 2015)], at least ordinarily. But why, then, suppose that by the lights of common sense, they seem not to exist?” (Fairchild and Hawthorne 2018:2)

³This is a critical restriction here. As we’ll see in part two of the thesis, there are other theories of composition, such as nihilism, that apparently *can* explain—by appealing to certain paraphrase methods—the apparent existence of ordinary and extraordinary objects that Byrne and I argue for, but they do not respect the crucial assumption, hence I won’t consider them in part one when it comes to abductive comparisons.

abundance of composite objects that is argued for from perceptual experiences, where by ‘explains’ I mean that it entails or predicts their existence, or somehow elucidates their apparent existence.

Part two of the thesis takes into consideration the fact that the compositional nihilist antecedently refuses the crucial assumption by positing that there are *no* composite objects whatsoever, so ordinary objects don’t exist. I will lay out a detailed analysis of different species of nihilism, universalism and their ideological and ontological commitments to abductively argue that, even though nihilism blocks *my* argument for universalism put forward in part one, there are independent abductive reasons to choose universalism over nihilism and some other theories of composition.

Finally, three remarks about the scope of the thesis is in order. First, the conservative views that I am concerned with throughout the first part of the thesis are majorly those which extensively rely on human perception, common sense, and/or cognition to posit the existence of the so-called ordinary objects. But admittedly there are other accounts of composition which lie in between nihilism and universalism, but which are not of the kind of conservatism that I am concerned with in the first part of the thesis (however we will meet some of them in the second part). For example, *organicism* posits the existence of living organisms—such as Donald Trump—but denies the existence of any other composite objects—such as border walls. In the second part of the thesis, however, I will take into account a wider range of conservative views along with nihilism and universalism, for abductive comparisons, including organicism.

Second, the crucial assumption in the first part of the thesis (that ordinary objects exist) is motivated within the lines of an argument that Alex Byrne has recently put forward at (Byrne forthcoming), where he proposes a metaphysical treatment of perception. That said, this does not mean that there can’t be other ways of arguing for the existence of ordinary objects from perception. Indeed, there have been other people⁴ taking different routes to propose such arguments. I will remain open to whether such different arguments from perception for the existence of ordinary objects can also be generalized to argue for the existence of extraordinary objects, and will only pursue my argument parallel to Byrne’s approach.

And finally, my appeal to abductive grounds will only take into account ideological and ontological commitments of the rival theories of composition, and argues that universalism is the best among them. Abductive methodology, however, often *also* takes into account certain other

⁴ For example, (Korman 2015) puts forward an argument for the existence of ordinary objects from “perceptual awareness” along with “apprehension” of certain facts about objects to argue for the existence of ordinary objects.

virtues such as explanatory power of theories—that is, how they do with regards to solving certain puzzles and/or explaining other phenomena and concepts in other areas of philosophy or sciences. This thesis—due to word and focus limits—will remain silent about such aspects of the theories of composition, leaving this issue open to further investigation. That means that the result of this paper, namely that universalism is the best theory of composition, might be subject to revision if other factors such as explanatory power of theories are taken into consideration.

PART ONE: PERCEPTUAL EXPERIENCE, ABDUCTIVE METHODOLOGY, AND UNIVERSALISM

1. FROM PERCEPTUAL EXPERIENCE OF ORDINARY OBJECTS TO EXISTENCE OF EXTRAORDINARY OBJECTS

In this section I will argue that if our perceptual experience of ordinary objects is an indicator of their existence, then the possibility of perceptual experience of the so-called extraordinary objects as single objects is also an indicator of their existence. By an ‘ordinary object’, I mean an object whose existence is approved by our perceptual capacities, and by ‘approved by’, I mean that the normal exercise of our perceptual capacities leads us (or, at least, the non-philosophers among us) to believe that they exist. For example, an orange, Donald Trump, a chair, or any other object that we normally perceive via any of our five senses and consider them as objects are count as ordinary objects. By ‘extraordinary object’, we mean objects that even if they exist, their existence is not approved by our perceptual system. For example, if a horse and a man compose a further object, namely a horseman, then, since a horseman isn’t something that we normally perceive as an object, it counts as an extraordinary object. Below I will first motivate and then assume the crucial assumption: that our perceptual experience of what seem to be ordinary objects *is* an indicator of their existence in the actual world.

One way to motivate the crucial assumption is to argue that we *have to* rely on our perceptual and cognitive apparatus (no matter how limited) in order to acquire knowledge of the material world. As Daniel Korman puts it:

We cannot, as it were, get outside of our skins and check the way our experiences represent the world as being against the way the world in fact is. (Korman 2015:115)

Korman gives a detailed argument that the demand for proof of the reliability of all sources of information leads to unjustifiability of believing in any proposition, hence global skepticism. But the reliance on perceptual and cognitive apparatus *in general*, although inevitable, does not seem to necessarily imply that our ontological beliefs always ought to be veridical. For example, it seems that one could have some *coarse-grained* beliefs about the world that are knowledge (e.g., that either there are dogs or there are things arranged dog-wise or the universe is dog-y, etc.), while not have a *fine-grained* such knowledge which Korman advocates (e.g., that there are dogs), and hence, still not face global skepticism.

Another way to motivate the crucial assumption is by appealing to accounts of perception. Contemporary philosophy of perception tends to widely⁵ entertain some sort of “presentationalism” (Byrne forthcoming) about perception according to which perceptual evidence consist of facts about particular objects, e.g., that *this* table is red, or *that* tomato is wholesome. Those facts contain information about the perceived objects, such as the particular objects themselves—what objects are perceived—their properties, features, how they are arranged in the environment, and that all those properties, aspects and arrangements concern those particular objects that are perceived. As McDowell puts it, those facts are a “tract of the environment” (McDowell 1994:191).

Now, some philosophers of perception have put forward arguments from perception for the existence of ordinary objects. One such recent attempt is proposed by Alex Byrne in (Byrne forthcoming), where he posits a metaphysical treatment of the perceptual experience of ordinary objects to argue for their existence.

The main assumption in Byrne’s argument—“SCENE”—is as follows:

Visual states (successful or illusory) are characterized by a certain sort of proposition, a *scene*, that such and such things are arranged thus and so, which is present to consciousness and determines the way things seem. (Byrne forthcoming:9)

⁵ Very similar thoughts can be found in (Campbell 2002; Fish 2009; McDowell 1994; Schellenberg 2016; Tye 2011). Also see (Byrne forthcoming:5–6) for further references on this.

Byrne grants SCENE to argue that the *scenes* in the case of perception of ordinary objects are ‘singular’, or object-dependent propositions⁶, which in turn imply the existence of ordinary objects upon their perception.⁷

Here I will argue that *if* Byrne’s metaphysical treatment of perception is correct, then his argument can be generalized to argue for the existence of a large number of extraordinary objects such as horsemen as well. Following Byrne⁸, here I will simply *assume* the following:

(A) *If an agent A has a perceptual experience of what is perceived as an object o, then the content of A’s perceptual state is a singular proposition P(o) which is present to A’s consciousness.*

I will now argue that horses and humans *do* compose, that is, compositions of horses and men, call them *horsemen*, exist. The argument runs as follows:

Consider the fox-hunting contests that are, or were, common in many countries in the world: human hunters ride horses to track, chase, and kill foxes in certain areas. Let us consider a narrower example of a fox hunting scenario for my purposes. Suppose there is a restricted area somewhere in the UK where hundreds of foxes live. Also, suppose those foxes never see any humans or horses, unless when a human is riding a horse to hunt them.⁹

Now, what are the hunters to the foxes in that region? It seems plausible to think that they do not really distinguish between the humans and the horses that they ride, in the sense of counting them as separate objects, but rather perceive them as single objects with certain appearances and behavioral characteristics. If the community of foxes had a language and enough linguistic

⁶ A singular, or object-dependent proposition is one that is directly about an object, and that as long as it takes a truth value, it entails the existence of the objects that it is about. For example, the sentence ‘Donald Trump is the president of the US.’, whether true or false, entails the existence of Donald Trump. The sentence wouldn’t have taken any truth value, if Trump didn’t exist.

⁷ One might ask whether according to Byrne’s argument, the perceptual experience of a so-called ordinary object *defeasibly* indicates its existence, or it *guarantees* its existence. Byrne doesn’t specify which one he commits to, so throughout the rest of the thesis I will also remain neutral regarding this.

⁸ Note again that there have been other arguments for existence of ordinary objects from perception, but as I have mentioned before, here I will only pursue my argument for the existence of extraordinary objects within the lines of Byrne’s approach, and leave it open whether different arguments from perception for the existence of ordinary objects can similarly be generalizable to argue for the existence of extraordinary objects.

⁹ (Byrne forthcoming) isn’t explicit about whether the metaphysical underlying explanation of human perception depends on brain’s hardwiring, or not. I will assume that it does, so I will assume that the foxes in my thought experiment have been—due to evolutionary reasons—developed some sort of brain and cognitive hardwiring so that they wouldn’t be *able* see a human or a horse on their own, just as we humans have been hardwired so that we cannot detect and distinguish, say, the microscopic structure of objects with bare eyes. If it turns out that hardwiring doesn’t matter in Byrne’s argument, one can simply drop the related assumption about foxes as well.

capabilities, they would probably have called each of those things with general terms such as, say, ‘horseman’, rather than with conjunction of two general terms for two distinguished objects, such as ‘horse and man’.

Now, if Byrne is right about the metaphysics of perceptual experiences, then a fox’s perceptual experience of a horse and a man appearing to it as a single object has a content, and that content is an object-dependent proposition whose existence depends on the existence of what is perceived as an object—here, the horseman—and such an object-dependent proposition is present to the fox’s consciousness when it is perceptually experiencing the horse and the man as an object. So, since in the possible world where the scenario is happening such propositions exist as the content of perceptual experiences of the foxes, then the pair of a horse and a man should compose a single object, the horseman. So the horsemen exist in the possible world in question.

Now, since the single object in that world is composed of two other objects (whose existence as separate objects, however, is unbeknownst to the foxes), we can say that the single object in that possible world is the composition of a human and a horse, under a certain arrangement of them. That is, under certain arrangements, horses and men do compose in some possible world—or, possibly compose.

What this suggests is that a plurality of objects (here, a human and a horse) that—in the lights of certain conservative views on composition—do not actually compose at all, do compose a single object under certain arrangements of its parts—in the lights of the foxes’ perceptual experiences in another possible world. This, of course, does not immediately imply that horses and men *actually* compose, but anyone who accepts, on the grounds just given, the view that under certain arrangements horses and humans possibly compose faces a serious challenge here if they don’t further accept that horses and humans actually compose under the same arrangement. They will have to come up with some explanation of why humans and horses compose in worlds where foxes with a certain kind of cognitive hardwiring exist while they don’t compose in the actual world, where (let us suppose) no such foxes exist. It is hard to see how anything short of a form of idealism according to which things there are depends in part on which things are actually perceived, and I, just as any realist about the world, tend to avoid such idealistic commitments.¹⁰

¹⁰ It’s worth noting that while conservatism might seem to be committed to a kind of idealism about what there is, it’s merely consistent with it; conservatives will presumably agree that not only do certain arrangements of rocks and soil make up mountains, but that it is necessary that such arrangements of rocks and soils make up mountains, and that they do so whether or not there are anyone around to perceive any mountains.

Notice that similar arguments can be given for composition of humans and horses with many different sorts of arrangements than the ones in the fox-hunting scenario. For example, if the humans sit on the horses backwards, the arrangement is different than when they sit on the horses in a normal way, but similar thought experiments can be proposed to argue that the horses and the humans under the new arrangement still actually compose. In general, it is not difficult to propose certain other thought experiments in order to show that contrary to what a conservative view may posit, many other objects do actually compose: e.g., humans and horses; spiders, cups of coffees and pencils; oranges, Donald Trump, and border walls; pistols, flowers, cigarettes, and all trees in a forest; the Eifel tower and all of the visitors around it.

Now I am not going to give a comprehensive list of pluralities of objects that are possibly perceivable as single objects, as I don't know where the boundaries of possible cognition and perception are. But wherever those boundaries might be, admittedly, there also seems to be many pluralities that cannot possibly be perceptually conceived as single objects. For example, the plurality of all atoms in the universe, or all the galaxies with an even number of planets in them, etc. Again, I am not going to give a comprehensive list of pluralities that are impossible to be perceived as single objects, for the same reason that I didn't propose a comprehensive list of the possibly perceivable ones. In short, it is easy to see that even though my arguments so far suggest that there are a lot more composite objects than what humans' perceptual faculties can actually grasp, we still do *not* get universalism. The next section is dedicated to that purpose, but before that, I will respond to two potential objections that may raise immediately against the thought experiment above, and then to give a summary of the argument for the existence of the horsemen.

This first objection is this: "Foxes don't have *conscious* mental state (if they have mental state at all) in order to have a such-and-such proposition present to their "consciousness" when they visually experience the so-called horseman." First of all, it's not quite obvious that no non-human animal has conscious mental state when they perceptually experience their environment. Indeed, there are physiological, neurological and evolutionary accounts of consciousness that support the existence and, further, commonality of conscious experience among non-human animals. As Allen and Trestman put it:

The [arguments in favor of animal consciousness] may also be bolstered by scientific investigations of behavior and the comparative study of brain anatomy and physiology, as well as considerations of evolutionary continuity between species. Neurological similarities between humans and other animals have been taken to suggest commonality of conscious experience; all mammals share the

same basic brain anatomy, and much is shared with vertebrates more generally. Even structurally different brains may be neurodynamically similar in ways that enable inferences about animal consciousness to be drawn. (Allen and Trestman 2017)

But we don't even have to dive into the debates over animal consciousness or cognition here; there is a simpler response to this kind of objection: the fox-hunting scenario can simply be reconstructed to take a human narrative (instead of foxes), and humans *do* have consciousness, and their mental states *do* have contents, after all, and since humans are the main target of Byrne's account of perception, we can just run his arguments directly for similar thought experiments designed for human agents. For instance, suppose, instead of foxes, there is a tribe of humans in Amazon rain forests who have never seen a lion and a cat separately, and only once in a while see them sticking together and riding fiercely toward the tribe to throw candies at them and run away! The same arguments as before can be made, and hence, under certain arrangements, a lion and a cat compose an object (hence lion-cats exist).¹¹

Another objection: "It sounds like cheating to take the visual experience of the so-called horseman as an indicative of its existence as a single object similar to the visual experience of a chair as indicative of its existence as a single object. You are already *assuming* the horse and the man to compose a single object, which in turn makes the corresponding object-dependent proposition (which is the content of the related visual experience) exist. What if there *is* an object-dependent proposition present to the fox's consciousness, but that proposition depends on, say, two objects, namely the horse and the man?"

This objection is not legitimate¹², but even if it was, then I would turn the table to the objector and ask a similar question: what if the content of our visual experience of a so-called chair is a proposition whose existence does *not* depend on a chair, but rather on its legs and its surface, as its alleged parts? And the content of my visual experience of each of those parts depends on the smaller parts that compose those parts, etc.? And I can keep on going down to the level of atoms

¹¹ Peter van Inwagen gives a fable about "bligers" that's very similar in spirit to my horseman and lion-cat scenarios: "A bliger [...] is really six animals. Its 'legs' are four monkey-like creatures, its 'trunk' a sort of sloth, and its 'head' a species of owl. Any six animals of the proper species can combine temporarily to form a bliger [...]. The illusion is amazing. Even a trained zoologist observing a bliger from a distance of ten meters would swear that he was seeing a single, unified animal." (Van Inwagen 1995:104). However, Inwagen, unlike me, doesn't think that that amounts for bligers to exist.

¹² This doesn't seem to be a legitimate objection, however. Singular propositions, as typically understood, are propositions that are directly about, or with respect to, only one object. The proposition that Hesperus is not Neptune is singular w.r.t both Venus (Hesperus) and Neptune, for example.

(which—let us suppose—are the mereological simples¹³ of the material world): what if the content of my visual experience of the so-called chair is just some kind of proposition whose existence depends on the existence of those parts only, and not a chair which is composed of them? As one can see, this route will end up not only in undermining the objector’s assumption of the existence of the chair, but also perhaps in compositional nihilism. I take my response to serve only as a reply to the chair-believer who is a horseman-denier, but I take the objection from nihilism more seriously. The second part of the thesis is dedicated to undermining nihilism (in favor of universalism) based on independent philosophical grounds.

To conclude this section, here is the perceptual argument for the existence of horsemen in a nutshell:

Assume **(A)**: *if an agent A has a perceptual experience of what is perceived as an object o , then the content of A ’s perceptual state is a singular proposition $P(o)$ which is present to A ’s consciousness.* Now, according to the fox-hunting-like scenarios, **(B)**: *the agent A could have perceived a horse and a man under a certain arrangement as an object.* Now, by **(A)** and **(B)**, we have **(C)**: *there is a possible world at which A has a perceptual experience of a so-called horseman, and the content of that perceptual experience is a proposition that exists only if the so-called horseman exists as an object in that possible world.* Therefore, **(D)**: *there is a possible world at which the horseman exists as an object, under a certain arrangement of the horse and the man.* Now, as I mentioned before, it would be difficult to hold a non-idealistic outlook about the world and yet deny that under a certain arrangement of its members, if a plurality of objects *possibly* composes an object, it would *actually* do so. So I take it for granted that **(E)**: *any plurality of objects that possibly composes under some arrangement of its members, actually composes under the same arrangement of the members in the actual world.*¹⁴ So, by **(D)** and **(E)**, we can say that **(F)**: *the horseman that could possibly be perceived by agent A , actually exists under the relevant arrangement of the horse and the man.* Now, since—even though unbeknownst to the agent—the alleged object, i.e., the horseman, contains the horse and the man as parts (which are distributed in the space under a certain arrangement), that implies that **(G)**: *the horse and the man actually compose.*

¹³ A mereological simple is an object that doesn’t have proper parts.

¹⁴ Formally put, this says: $\forall xx \forall a \left(\Diamond \exists x \text{ COMP}(xx, x, a) \rightarrow (Arr(xx, a) \rightarrow \exists x \text{ COMP}(xx, x, a)) \right)$, rather than the stronger claim $\forall xx \forall a \left(\Diamond \exists x \text{ COMP}(xx, x, a) \rightarrow \exists x \text{ COMP}(xx, x, a) \right)$, where a is an arrangement of the members of the plurality xx , $\text{COMP}(xx, x, a)$ is read as ‘the plurality xx , under the arrangement a , composes x , and $Arr(xx, a)$ means that the members of the plurality xx are arranged a -wise.

2. FROM THE EXISTENCE OF EXTRAORDINARY OBJECTS TO UNIVERSALISM

Now, we have a set of data stating that all those pluralities of objects that are possibly perceivable as objects actually compose, and we want to find a theory that best explains the data. So far I have been arguing that the negative existential claims that certain perceptually motivated conservative theories embrace are false. So perceptually motivated conservative theories, in general, cannot be good fits to our data, because they either embrace such negative posits (hence inconsistent with the extraordinary objects that have just been argued for) or remains silent about their truth (hence consistent with, yet insufficient for explaining the posited extraordinary objects). Another option is to restrict our ontological posits to the boundaries of possible cognition: for any plurality of objects xx , the members of xx compose if and only if it is possible for some cognitive system to perceive them as a composite object. This kind of theory sounds like the minimal account composition that homogeneously explains the existence of the myriad number of extraordinary objects that the fox-hunting-like thought experiments suggest. Granted, however, this will commit us again to some sort of *idealism* about the external world, according to which, what exists is what is *possibly* perceivable. Now, although this kind of idealism is stronger than the one that we previously encountered (according to which, what exists is what is *actually* perceivable)—I, again, as much as any other realist, wish to avoid it.

Now, given that conservatism is undermined, idealism is unwanted, and universalism is the simplest¹⁵ and strongest theory available that respects the crucial assumption that ordinary objects exist, then abductive reasoning automatically selects universalism as the theory that best explains the existence of all of those countless-many composite objects that can possibly be perceived.

Finally, and before I finish part one of the thesis, one comparative note is in order. My route to universalism does not suffer from the epistemic instability that certain other universalist strategies suffer from. For example, (Hawthorne 2006a; Sider 2001) had formerly advocated permissivist views about composition by endorsing the assumption that humans' perceptually and cognitively motivated affirmative ontological beliefs are veridical, and then, concluding that there must be all sorts of composite objects in order for those beliefs not to be accompanied by some magical luck associated with humans' grasp of the fabric of reality. One can give this a safety-

¹⁵ There are other permissivist theories that might—under certain readings—be proper candidates as well. For example, the *doctrine of plenitude* can equally do the job, but it is more complex than universalism.

theoretic tone and advocate universalism by pointing out that if there aren't all those composite objects that universalism posits, then our ontological beliefs about composition would be too *unsafe* to amount to knowledge. That is, there must always be enough targets to hit in order for our ontological beliefs to be safe enough to amount to knowledge, and hence, for the crucial assumption to hold.

But as the recent reflections on this strategy suggest, populating the world in order to justify the presumed accuracy of our ontological beliefs is very *ad hoc*, and generally unacceptable. To give an example along the lines of those suggested by (Fairchild and Hawthorne 2018; Korman 2015), suppose you point to a bird in the sky and ask your friend which continents have that species of bird, and she replies 'Europe and North America'. However, she later admits that she named two continents at random, but the belief you formed on the basis of trusting her was true, because unbeknownst to her, (let us assume) the bird species in question is found on every continent. The fact that the bird species is found on every continent makes her answer and your belief 'safe' in some sense, but not in the right sense to secure knowledge. Some of the relevantly similar cases include cases—which are counterfactually distant yet 'close' in the epistemic sense—in which the distribution of birds across continents is very different and her answer is false. Just as populating all the continents with birds is not sufficient for knowledge in this case, populating the world with all sorts of composite objects does not seem to be sufficient for knowledge in the case of our ontological beliefs, because it seems that even though your belief is true, you easily could have formed a false belief in that situation, due to the randomness of the response, and the relevant proneness to error is an indicative of lack of knowledge.

My argument, on the other hand, although similarly assumes that our perceptual experiences of ordinary objects (and so the affirmative ontological beliefs about them) are veridical, it *also* appeals to certain metaphysical accounts of perception to argue that the same holds for non-human animals' perceptual experiences, or alternatively, any other possible human perceptual experience of the so-called extraordinary objects. This, I argued, gets us very close to universalism. *Then*, I appeal to abductive reasoning to argue that universalism is the simplest and strongest theory of composition that respects the crucial assumption and best explains the existence of the myriad of objects that are possible objects of perception. In short, my argument does not—due to fear of miracles or an unsafe environment for knowledge formation—justify universalism in an *ad hoc* way.

PART TWO: A NIHILIST OBJECTION, AN ABDUCTIVE RESPONSE

3. BACKGROUND

As the reader remembers from part one, the crucial assumption stated that the perceptual experience of ordinary objects is an indicator of their existence, and I appealed to certain metaphysical accounts of perception, plus abductive methodology, to argue that this leads us towards universalism. But the nihilist antecedently refuses to accept the crucial assumption. In the lights of nihilism there are no composite objects, *whatsoever*, so there can't be any ordinary objects and/or veridical perceptual experience of them. In this part of the thesis I will argue that even though the nihilist can block *my* argument for universalism, an independent, detailed analysis of nihilism shows that it is *still* abductively inferior to universalism, hence universalism is still to be preferred to nihilism, as a theory of material composition.

In the kind of abductive comparison that I will be making, I will only consider theoretical simplicity, which is usually measured by comparing ideological and ontological commitments of the theories in question. It's widely held that simplicity or parsimony is a criterion of theory choice, especially in metaphysics (see section 8 for more on this). A theory's *ideology* consists of the irreducible/undefined logical or extralogical notions that it appeals to in order to express its propositions, whereas its ontology consists of the objects that need to exist in order for those propositions to be true. Admittedly, however, a more comprehensive abductive comparison between theories usually also take into consideration other deciding factors such as *explanatory power*—whether the theory in question can explain certain puzzles or paradoxes in other areas in philosophy and/or sciences. But in the last section, my abductive comparison will only take into account the theoretical simplicity, disregarding of other deciding factors such as explanatory power. The main reason is the focus and the length limits of the thesis, but also it's very common¹⁶ to argue for and against certain theories of material composition such as nihilism based only on simplicity grounds.

The typical nihilist strategy for rejecting the occurrence of composition is to withdraw the predicate for parthood (i.e., '... is part of') from the fundamental language of ontology. Therefore, this nihilist approach endangers *all* theories that endorse occurrence of composition in some

¹⁶ Among others, (Bennett 2009a; Brenner 2015a; Sider 2013; Tallant 2014; Uzquiano 2004) have taken this approach to argue for or against compositional nihilism.

cases—be it conservatism, organicism, universalism, or any other theory of composition that posits material composite objects of some sort in its ontology.

A primary attraction¹⁷ of nihilism is admittedly its *ideological and ontological parsimony*: by eliminating the talk of parthood, and consequently the composite objects from the world, the nihilist offers a simpler outlook of the material world, compared to those which believe in composition. Nihilism, however, immediately faces an incredulous stare: all of the talk of composites will have to be declared as either falsehood or truth-value-less, which not only targets the ordinary, common-sense talk of tables and chairs, but may also endangers the credibility of all of our non-subatomic sciences: all of their affirmative propositions that concern composite objects are either falsehoods or lack truth-values. By an ‘affirmative proposition’ I mean a proposition that states or entails occurrence of composition. For example, ‘molecules are composed of atoms’, or ‘the table over there is black’ (assuming that the table is a composite object).

Nihilists therefore have often listened to Quine’s influential advice on balancing our daily-life talk of objects with our ontological doubts, and have championed certain methods of paraphrase for the talk of composites in terms of the talk of simples, perhaps to avoid such unpleasant consequences. For example, the nihilist would typically say that there are no tables, *but*, roughly put, there are some of table-wise arrangements of simples that do not compose anything whatsoever; they are just swarms of small particles under certain arrangements which exhibit certain collective properties, so that they appear to us as composites.

But different people¹⁸ have argued that nihilism—as soon as equipped with a method of paraphrase—starts to lose its primary simplicity over further ideological or ontological complexity: the theory becomes more complex than certain other theories of composition that employ a predicate for parthood. In the rest of this paper, I will attempt a detailed argument along these lines. But before doing so, let us consider an objection to the whole project.

One may object: “What if nihilists could somehow explain the falsehood of affirmative beliefs about composition without appealing to methods of paraphrase?” My response would be: they might be able to do so, but what’s important is that so far, it is the standard practice of nihilism

¹⁷ Other people have revealed other attractions about nihilism, such as its explanatory power in solving certain puzzles and paradoxes such as the Special Composition Question (Van Inwagen 1995), The Problem of Many (Unger 1980), Theoretical Unification (Brenner 2015b), etc., but I will not be concerned with them throughout this thesis.

¹⁸ For example, (Bennett 2009a; Elder 2011; Tallant 2014; Unger 2014; Uzquiano 2004). For a defense against such criticisms see (Brenner 2015a).

to *do* employ methods of paraphrase, and there's simply no serious nihilist account out there which doesn't. As Karen Bennet puts it:

Importantly, *this is the only kind of nihilist on the table*. [...] As it happens, all actual nihilists are of this kind. But if there were any nihilists who just sort of smiled and said that nothing remotely in the *ballpark* of talk about composites was true, they would not be in play in this paper. (Bennett 2009b:60)

Finally, and in the interest of a more precise analysis of the subject matter, from now on I will distinguish different versions of nihilism and universalism: 'Strong Nihilism' posits that no objects other than simples exists, *whatsoever*, whereas 'Weak Nihilism' states that there are objects other than simples, but they are *not composites*; rather, they are *complexes*—which are sets of simples—and which are not¹⁹ composites, but nevertheless are non-simple, collective entities. On the other hand, 'Strong Universalism' posits that every plurality of objects *composes* an object²⁰, whereas 'Weak Universalism' states that any plurality of objects amounts to an object which is *not composite* but a complex object, and by 'amounts to' I mean set-membership; that is, a plurality of objects amounts to a complex object if and only if the members of the plurality are elements of the set in question.²¹

¹⁹ At the first glance, it might seem that the difference between composite and complex objects is a verbal one, as the predicate for set membership may seem to play equal role as for the predicate for parthood. But this is incorrect. For starters, one can give examples in which the difference is obvious. For one, take this: I was a member of the logic group at Tehran Polytechnic, but I wasn't part of the logic group there. Or: The American people are part of the English speaking people, but they are not a member of the (set of) English speaking people. Another difference: we can often decompose a whole into parts in different ways, but we can't decompose a set into its elements in more than one way. As Michele Potter puts it: "The fusion of the cards in a pack is made up out of just those cards [i.e., the cards are part of the pack], but they cannot be said to be its members, since it is also made up out of the four suits [i.e., the suits are parts of the pack, in a different decomposition of the very same pack.]" (Potter 2005:22) So, the set of cards is different than the set of suits, even though the pack is nothing over and above its cards, and also nothing over and above its suits – and yet those parts compose the same pack. Furthermore, set-membership is a *necessary* matter, whereas parthood is not. For example, it's impossible for the number 1 not to be a member of the set of natural numbers (or alternatively, the set of natural numbers without 1 is just a different set). But parthood can be contingent. For example your broken lamp is part of your house, but your house remains a house even without that broken lamp.

²⁰ Note that Strong Universalism is exactly what I have formerly been calling "Universalism".

²¹ Note that the focus of this thesis is on material objects, and presumably the amount of matter/energy in the entire universe is (finite, but at any rate) not too big not to fit in a set. So one cannot simply consider the definition of weak universalism as futile by pointing to the fact not every plurality of things amounts to a set (e.g., the plurality of all sets doesn't form a set, pace to Russell's paradox), and ask "how do we know that for any plurality of material objects there can (in principle) be a set containing them as its members?"

4. ON METHODS OF PARAPHRASE FOR NIHILISM

As I mentioned earlier, the traditional way that nihilists paraphrase the talk of ordinary objects is in terms of arrangement of simples. For example, the sentence ‘there is a table here’ is paraphrased away as ‘there are some simples here arranged table-wise’, or Van Inwagen’s classic example “some chairs are heavier than some tables” is suggested to be paraphrased as “There are *xs* that are arranged chairwise and there are *ys* that are arranged tablewise and the *xs* are heavier than the *ys*.” (Van Inwagen 1995:109), where the arrangement in question is a plural predicate. Now, a crucial question is: what is the logical structure of the paraphrased statements themselves? For example, what is the logical structure of Inwagen’s paraphrased sentence? Two dominant methods of paraphrase have been proposed in the literature. One is in terms of *sets* (Sider 2013; Uzquiano 2004), and the other one in terms of *plural quantification* (Brenner 2015a; Uzquiano 2004; Van Inwagen 1995).

On the first reading, the paraphrase will look like ‘there is a *set* of simples arranged chair-wise so that the weight of its elements is more than the weight of some *set* of simples arranged table-wise’. On the second reading, the sentence would be read as ‘there is a *plurality* of simples arranged chair-wise weigh more than some *plurality* of simples arranged table-wise’, in which—due to the standard orthodoxy²² about plural logic—there is no commitment to abstract objects like sets, but only pluralities of objects that don’t constitute any collective entity in any metaphysical sense—even though they might do so in a linguistic sense.

Now, a challenge to the nihilist methods of paraphrase appears. As (Uzquiano 2004) observes, *singular* quantification over composites can be paraphrased in terms of plural quantification over simples, but what about *plural* quantification over composites? Consider Uzquiano’s favorite sentence “some bricks are touching each-other” (Uzquiano 2004:435). There is a plural predicate—‘touching each other’—in this sentence that can only be instantiated *collectively* by composites. But the nihilist denies the existence of composites and paraphrases their talk in terms of pluralities or sets of simples under certain arrangements. To overcome this difficulty, Uzquiano offers two strategies to the nihilist: either to use *plurally plural quantification* over simples, or, to appeal to monadic second-order logic enriched with *plural properties*.

Over the next few sections I will open this issue further. As the reader will see, some of what comes below has already been addressed in the literature, but I—in the interest of a more

²² This aspect of plural logic is often known as its “ontological innocence”.

honest and comprehensive analysis—will either revise or add up to them. For example, in section 5 I introduce the set-theoretic method of paraphrase for the nihilist, which, as we will see, has already been suggested in the literature, but I will further argue that it needs to be revised in order to capture certain characteristics of composite objects (section 5.1) and that one who subscribes to weak nihilism will be naturally led to endorsing weak universalism (section 5.2). Similarly for section 6: even though the idea of appealing to plurally plural logic (section 6.1) and plural properties (section 6.2) have already been suggested, I will contribute to the discussion by revealing some implicit ideological commitments of the latter, which has not been done prior to this thesis. Section 7 is entirely original, and section 8, where the abductive comparison happens, is also original, both because of the diversity of the accounts of composition that it considers and also because now the new revisions play essential role in the final judgments about the simplicity of theories.

5. SET-THEORETIC METHOD OF PARAPHRASE

As we have already seen, the idea of a set-theoretic paraphrase method is to express the talk of composites in terms of sets of simples with certain arrangements. A table, for example, is identified with the set of its constituting simples. (Sider 2013) calls for a set-theoretic paraphrase method when addressing a possible nihilist-friendly foundation for fundamental theories of physics, as a project which is broader in extent than just the elimination of parthood predicate in the ordinary talk of material objects. On the other hand, (Uzquiano 2004) proposes the set-theoretic paraphrase as one way to interpret monadic second-order logic which is—due to (Boolos 1984)—in turn inter-definable with plural quantification, and which promises a way of paraphrasing the talk of composites somehow in terms of simples: in terms of sets of them, or sets of sets of them. As (Sider 2013:8) mentions, a set-theoretic method of paraphrase leads to “softening” nihilism: *composite* objects do not exist, but collective objects of some sort—*complexes*, which are sets of simples—do exist, after all. Notice that Sider’s “soft” nihilism coincides the “weak nihilism” in my terminology.

Before moving on to the method of paraphrase based on plural quantification, one proviso about the set-theoretic method of paraphrase is in order. (Uzquiano, 2004) argues that in some cases, the nihilist would have to adopt plural quantification *besides* the machinery of set theory. For instance, the sentence ‘some bricks are touching each other’ is best paraphrased with plural quantification over composites and the plural predicate ‘...are touching each other’ as follows:

Some composites, the xxs , are such that (i) for every y , if y is one of the xxs , then y is a brick, and (ii) the xxs are touching each other. (Uzquiano 2004:435)

Where the first existential quantifier ranges over *composites*, which are themselves pluralities of simples with certain arrangements. Now, to translate this in terms of sets, Uzquiano proposes the following paraphrase:

Some sets of simples, the ss s, are such that (i) for every set s , if s is one of the ss s, then the members of s are arranged brickwise, and (ii) the ss s are touching one another. (Uzquiano 2004:445)

Note that this paraphrased sentence evidently still employs the resources of plural logic. Now, I will propose another paraphrase for someone who sincerely dislikes plural quantification, only in terms of quantification over sets. Such a paraphrase would look like this:

There is a set of sets, X , of simples so that (i) for any set S of simples, if S is in X , then the members of S are arranged brick-wise, and (ii) the members of X are touching each other.

So, a set-theoretic method of paraphrase can either be purely set-theoretic plus a higher order (here, monadic third-order) singular quantification, or, a mix of set theory and first order singular quantification. To conclude: one who appeals to set theory as (part of) the paraphrase method either will have to use it along with plural logic, or with monadic third-order logic.

5.1. REVISED SET-THEORETIC METHOD OF PARAPHRASE

Now, I will argue that as long as predicates of the form ‘...are arranged F -wise’ are demanded as part of the nihilist’s paraphrase method, the set-theoretic paraphrase in its simplest form is inadequate for regimenting the talk of composites. For starters, notice that although it is plausible to think that the nihilist wouldn’t want to consider an arrangement of simples as chair-wise if that arrangement is radically different than a chair-wise-looking one, (e.g., if the members of the plurality have a knife-wise arrangement) still, she would want to call it a chair if, for example, some few electrons are gone, or some few protons are added to the arrangement. This means that as long as

the nihilist employs the notion of ‘arrangement’ in her paraphrase method, she has to also allow for some *tolerance* in the arrangements, because that’s how the ordinary talk of composite objects works and it should be reflected in the paraphrased talk of composites as well, otherwise the translation wouldn’t fully capture the talk of composites.

A composite object, therefore, cannot be identified with *the* set of its constituting elements (i.e., a *fixed* set), because the arrangements are usually tolerant to small changes, but sets are not: removing even one element from a set destroys it. For example, the set of natural numbers without 1 is just another set. The solution is simple, however: one can posit that *at each time* and *each possible world*, the table is identical to its constituting simples that are arranged *F*-wise at that time and that possible world. Let S be the union of all sets of simples each of which exists at some time and some possible world. Under the revised set-theoretic paraphrase method, then, the table is identified with a function of the form:

$$f: T \times W \rightarrow \wp(S),$$

Which assigns to each tempro-modal pair a subset of S —an element from the power set $\wp(S)$ of S —which satisfies the property of having *table-wise arranged* elements in that time and that possible world. This function allows for the required tolerance of arrangements of simples. Let’s call such a function a *tempro-modal profile*. The nihilist’s revised set-theoretic paraphrase method now posits that each object is identical to some tempro-modal profile.²³

Notice that the ontology of the revised set-theoretic paraphrase is the same as the original one, *plus* time and possible worlds.

In the end, note that weak universalism faces a similar ‘tolerance’ problem, and accordingly, they will also need to revise their paraphrase method by appealing to possible worlds and time to capture the tolerance that the talk of composites allows for.

5.2. FROM WEAK NIHILISM TO WEAK UNIVERSALISM

So far we have seen how the talk of composites can be paraphrased in terms of sets of simples. The set-theoretic paraphrase, as the Background section suggests, can be used by both the weak nihilist

²³ Notice that my revised paraphrase method for nihilism in terms of tempro-modal profiles, although look like (Hawthorne 2006b)’s “modal occupation profiles”, does not necessarily end up with the doctrine of plenitude (as opposed to Hawthorne’s): the revised set-theoretic paraphrase method posits that *for every object there is such a profile*, whereas the doctrine of plenitude posits that *for each profile there is such an object*, which is not necessarily the same as the former claim.

and the weak universalist. Remember that weak nihilism stated that there are no composites, but there *are* sets of simples—complexes—under certain arrangements, whereas weak universalism stated that for *any* plurality of objects, there is a complex object. These two views are however consistent. They would be inconsistent only if the weak nihilist denies the existence of complexes for certain pluralities, while admitting them for certain other pluralities. But that's not part of the definition of 'weak nihilism' as I have introduced it. In this subsection, I will argue that appeal to standard set theory will lead the weak nihilist to endorsing weak universalism, and that if a weak nihilist refuses to do so, she will end up with some sort of obscure, weak set theory that in turn will render weak nihilism as uninteresting. The argument is very straightforward and runs as follows:

If, say, an orange is a set of simples arranged orange-wise, and Donald Trump is a set of simples arranged Trump-wise, why not thinking of the set containing the simples arranged orange-wise *and* those arranged Trump-wise, *together* as a an object under a certain arrangement of its simples (say, orange-Trump-wise)? More generally, if the weak nihilist believes that the set S_1 of simples arranged F-wise and the set S_2 of simples arranged G-wise as complex objects in her ontology, why wouldn't she do the same for the set S of simples under whatever the arrangement of those simples is (say, F-G-wise)? By merely enriching the language that already includes general terms such as 'orange' or 'table'—which are typically applied to ordinary objects—to include general terms of the form 'orange-table' (or any other form as wished), one can easily extend weak nihilism to weak universalism. And once the weak nihilist added to terms in to the language and realized that she's a weak universalist, it would seem that she can just rid of the new terms and remain a weak universalist; after all, the terms don't have any important job to do (except somehow being useful to describe the structure of certain objects in terms of simples) and it seems plausible to assume that once we decide to un-name things, or to stop using any terms to refer to them, they don't fade away from existence. In other words, if the weak nihilist has to convert to a weak universalist, she doesn't need to deal with arrangement predicates anymore, as—by definition—the weak universalist doesn't do so.

Note that if the weak nihilist ever decided to block certain objects of weak universalism (e.g., orange-Trump), she needs to come up with some explanation on why some simples form sets but some others do not. Standard set theory not only doesn't support such discriminations against set formation, but it also posits that the *union* of any given pair of sets is a set (Axiom of Union). So, owing to the Axiom of Union, the union $S := S_1 \cup S_2$ of the sets S_1 and S_2 of simples is also a set. Therefore, the weak nihilist will have to either refuse to accept the Axiom of Union,

or restrict it in some way to reach her desired result. But the former strategy damagingly weakens the resulting set theory (hence the mathematics based on it), and the latter faces the question of *how* to even start restricting the axiom for accommodating to the ontological prejudices of the nihilist; is it that a plurality of simples amounts to a set whenever there *seems*—based on grounds such as perception, common sense, etc.—that there is an object (hence committing to some sort of idealism—see part one of the thesis)? What are the grounds upon which the nihilist would want to draw such distinctions between existing and non-existing complex objects? Whatever grounds they are, *even if* the nihilist manages to implement them, they complicate the ideological commitments of the nihilism, and further, again, weaken and obscure away set theory for not much motivating reasons (accommodating the talk of composites versus a huge chunk of mathematics and other sciences and/or philosophical theories based on the standard set theory with its full capacity). At any rate, this seems like an unworthy gamble for the weak nihilist, and I take it that the wiser option for the weak nihilist would be just to confess to her fault, surrender to the weak universalist, and hope for forgiveness! Note that the same kind of argument can be given to argue that the revised weak nihilism (which appeals to possible worlds and time) will naturally grow into the revised weak universalism.

To conclude, I argued that by assuming weak nihilism and the standard set theory (that allows for union of any number of sets to be a set, regardless of what their elements are), it seems that weak nihilism naturally grows into weak universalism.

6. PLURAL QUANTIFICATIONAL PARAPHRASE

As I mentioned earlier, some people such as Van Inwagen propose a paraphrase of the talk of composites in terms of quantification over *pluralities of simples*, rather than sets of them. This—due to the alleged ontological innocence of plural quantification—has the advantage of avoiding commitment to collective entities like sets. In the framework of plural logic, ‘some chairs are heavy’ would be translated to ‘some plurality of simples which are arranged chair-wise, are heavy’. But this paraphrase method, although can capture *singular* quantification over composites in terms of plural quantification over simples, cannot capture *plural* quantification over composites in the same way: that’s “used up”, as Uzquiano puts it. Consider again the brick example: ‘some bricks are touching each other’. Earlier, I discussed the kind of paraphrase that uses plural quantification and set theory simultaneously, and revealed the ideological and ontological posits of that approach. Now, we want

to have a systematic method of regimentation of the talk of composites in terms of the talk of simples, somehow using only the resources of plural quantification. Over the next two subsections, I will address two options that (Uzquiano 2004) suggests for this, namely *plurally plural quantification*, and, monadic second-order logic enriched with *plural properties*.

6.1. PLURALLY PLURAL QUANTIFICATION AND PARAPHRASE

Consider again the sentence ‘some bricks are touching each other’. We are supposed to give a paraphrase of the quantification and predication on composites in terms of simples. (Uzquiano 2004) suggests using plurally plural quantification over simples for this purpose. Our example will be then regimented as follows, under such a method:

Some simplest, the *xxxxs*, are such that (i) for any simples, the *xxs*, and for any simples, the *yys*, if the *xxs* are among the *xxxxs* and the *xxs* communicate with the *yys*, then the *xxs* are different from the *yys* and the *yys* are among the *xxxxs*.(Uzquiano 2004:438)

Henceforth, I will address the kind of nihilism based on this sort of paraphrase method as *Plurally Plural Nihilism*, which is a species of strong nihilism.

6.2. PLURAL PROPERTIES AND PARAPHRASE

As (Boolos 1984) has famously observed, the theories of plural first-order quantification (PFQ) and monadic second-order quantification (MSQ) are inter-definable. That is, one can translate any statement from each of these to an equivalent statement from the other one. The believer of composition can appeal to this observation and paraphrase away plural quantification over composites in terms of monadic second-order quantification over composites.

But the nihilist denies the existence of composites, and understand them in terms of either pluralities or sets of simples under certain arrangements. So they—if interested in paraphrase methods in terms of monadic second-order logic—have to accommodate the monadic second-order logic to somehow deal with pluralities of simples, or sets of them.

The standard way to interpret statements of monadic second-order logic is in terms of quantification over *properties* of individuals. For example, ‘ $X(x)$ ’ is read as ‘ x instantiates the *property* X ’. So the sentence ‘some bricks are touching each other’ can be expressed with monadic second-

order logic as follows:

For some [*singular* property] X , (i) there is some x such that Xx , (ii) for any x , if Xx , then x is a brick, and (iii) *Touching-Each-Other*(X). (Uzquiano 2004:441)

Now a similar strategy can be employed as a paraphrase method for the nihilist, except that in addition to plural quantification over simples understood as singular quantification over singular properties of simples, one should also regiment plural quantification over *composites* somehow in terms of some sort of properties of simple. What kind of properties are we looking for? (Uzquiano 2004) suggests the nihilist to use *plural properties* (i.e., properties that are instantiated by pluralities of individuals simultaneously, rather than individuals one by one), in addition to singular properties. Therefore, under this strategy, the sentence ‘some bricks are touching each other’ is paraphrased away as follows:

For some *plural* property of simples \mathbb{X} , (i) there are some simples, the xxs , such that \mathbb{X} applies to the xxs , (ii) for any simples, the xxs , if X applies to the xxs , then the xxs are arranged brick-wise, and (iii) \mathbb{X} exemplifies the property *touching-each-other*. (Uzquiano 2004)²⁴

Now, let us see what logical resources does the nihilist who appeals to plural properties for the sake of paraphrase needs. First off, notice that as (Boolos 1984) has observed, in order for plural quantification to gain the full expressivity of monadic second-order logic (equivalently, in order for a translation function to transfer the full expressivity of MSQ to PFQ—see below), requires a *comprehension principle* for singular properties, which runs parallel to the comprehension principle for the monadic second-order logic²⁵: for any given singular predicate φ , we have:

$$(CP) \quad \exists u \varphi(u) \rightarrow \exists xx \forall u (u <_1 xx \leftrightarrow \varphi(u)).$$

Where φ a variable for a singular predicate is, xx is a plural variable, $<_1$ is the predicate ‘... is one of’. Note that xx should not occur free at $\varphi(u)$. In English it says: if a singular predicate φ is instantiated, then there is a plurality xx so that to be one of them is equivalent to instantiate the predicate φ .

²⁴ (Uzquiano 2004) only uses ‘ X ’ to represent plural properties. I represent them by ‘ \mathbb{X} ’ to distinguish them from singular properties which are already represented by ‘ X ’.

²⁵ $\exists X \forall u (X(u) \leftrightarrow \varphi(u))$, for any formula φ such that X doesn’t occur free at φ .

But now the nihilist seems to be going *beyond* monadic second-order logic: a new kind of variables and predicates are added to the syntax of the language of MSQ: plural variables, and predicates that take those variables as arguments. Let us call the new logic MSQ*. It's easy to observe that MSQ* is strictly more expressive than MSQ and correspondingly, there is more into it than what is already translatable to PFQ. For example, let X stand for the plural property ‘... is infinite in number’. It seems that the well-formed sentence $\exists xxX(xx)$ in the language of MSQ* (read: “there is a plurality of individuals that is infinite in number”) does *not* have any equivalent in the language of MSQ: no finite sentence that contains singular predicates and individuals (i.e., the only resources of MSQ) corresponds to that sentence. On the other hand, every fact which is expressible in the language of MSQ is obviously expressible in MSQ*, as the latter is a natural generalization of the former. Now, suppose that we want to translate MSQ* in terms of plural quantification, similar to Boolos’s translation of MSQ in terms of PFQ. What kind of resources would the nihilist need to add to PFQ? Note that in the case of Boolos’s translation, the translation function $Tr': \mathcal{L}_{MSO} \rightarrow \mathcal{L}_{PFL}$ from the language of MSQ to the language of PFQ has the following properties:

$$\begin{aligned} Tr'(X(x)) &= x < xx, \\ Tr'(\exists X. \phi) &= \exists xx. Tr'(\phi) \vee Tr'(\phi^*). \end{aligned}$$

Where X stands for a singular property, and ϕ^* is the result of substituting $x \neq x$ for all occurrences of $X(x)$, which is supposed to cover the cases where nothing instantiates the property X . Now, let us call the appropriate extension of PFQ that MSQ* is translatable into, PFQ*. Now, demanding a translation function $Tr'': \mathcal{L}_{MSQ^*} \rightarrow \mathcal{L}_{PFQ^*}$ from the language of MSQ* to the language of PFQ* automatically leads to certain expectations from PFQ*, parallel to the case of the MSQ-PFQ translation:

$$\begin{aligned} Tr''(X(xx)) &= xx <_2 xxxx, \\ Tr''(\exists X. \phi) &= \exists xxxx. Tr''(\phi) \vee Tr''(\phi^*). \end{aligned}$$

Where X stands for a plural property, and $xxxx$ is a plurality of pluralities. That is, to have a proper translation from MSQ* to PFQ*, *pluralities of pluralities* must be taken into account. Therefore, PFQ* must *minimally* contain the resources of plurally plural quantification. Also, in order for the

translation function Tr'' to transfer the full expressivity of MSQ^* to PFQ^* , a plurally plural comprehension principle is needed²⁶: for a given plural property ϕ ,

$$(PCP) \quad \exists uu \phi(uu) \rightarrow \exists xxxx \forall uu (uu <_2 xxxx \leftrightarrow \phi(uu)).^{27}$$

In English, this says: if a plural property ϕ is instantiated, then there is a plurality of pluralities $xxxx$ so that to be a plurality among them is equivalent to instantiate the plural property ϕ .

In short, if the nihilist enriches the language of monadic second-order logic by employing plural variables and properties, then the resulting logic will be inter-definable with plurally plural logic. So, in terms of ideological commitments, this paraphrase method will be as complex as plurally plural logic (henceforth, I will address this sort of strong nihilism as the *plural property nihilism*).

Too much for ideological commitments. What are the ontological commitments of plural-property nihilism? (Uzquiano 2004) best describes this. For starters, note that in order for the quantification over properties to achieve the full effect of the monadic second-order quantification, we have to assume that for any individuals x_1, x_2, \dots, x_n , there is a property that *only* those x_i s have it, and no other object. Similarly for plural properties: for any pluralities xx_1, xx_2, \dots, xx_n , there is a *plural* property that *only* those pluralities have. So, just in terms of numbers, this means that the number of properties (singular or plural), are way more than the number of composites that a conservative, or even a universalist about composition believes there are. After all, for any simples x_1 to x_n , there is a singular property that is only instantiated by them, and for any pluralities xx_1 to xx_n , there is a plural property that only applies to them. So overall, a myriad of properties—singular or plural—must exist in order for this paraphrase to work out, which puts the “nihilist”—one who used to proudly advocate the ontological parsimony of nihilism—in an awkward position compared to the believer of composition. But things get even more awkward when we start asking what those properties are. There doesn’t seem to be much literature on metaphysical nature of plural properties and how they are related to the singular ones. (Uzquiano 2004), following (Hossack 2000) and, offers a reading of plural properties according to which they are *plural universals*

²⁶ (Uzquiano, 2004 - footnote 16) also predicts, although cautiously, a need for plurally plural quantification in order to invoke a comprehension principle for plural properties.

²⁷ This comprehension principle for the plurally plural logic presumably runs parallel to a hidden corresponding comprehension principle in the language of MSQ^* , of the following form: $\exists X \forall uu (X(uu) \leftrightarrow \phi(uu))$, for any formula ϕ such that X doesn’t occur free at ϕ .

being instantiated collectively by simples to produce plural states of affairs. Whatever that might mean, even if that clears up our doubts about the nature of plural universals, the claims that they have to exist in reality in such a great abundance, and further that certain higher-order universals (such as the one associated to the property *touching-each-other*) have to exist and be instantiated with them, all *just* for the nihilist to be able to justify the apparent talk of composites in terms of simples, sounds like a quite doubtful and unmotivated metaphysical position. As Uzquiano puts it:

The worry, in short, is that it is unclear that such a staggering ontology of plural and higher-order universals is independently motivated, and, in the absence of such independent motivation, it would certainly be disappointing if the nihilist and semi-nihilist had to resort to them in order to mitigate the counterintuitiveness of their position. (Uzquiano 2004:442)

But there is another prominent way to interpret second-order variables: in terms of *sets*, where ‘ $X(x)$ ’ is read as ‘ x is a member of the *set* X ’. That way, plural properties of simples will be understood as sets of simples, and properties that take them as variables as sets of sets, etc. In our case, the nihilist can paraphrase away plural quantification over simples in terms of second-order quantification over *sets* of simples, and similarly, plural quantification over composites will be second-order quantification over sets of composites. But in section 5 I argued that since the nihilist denies the existence of composites, this will cost her in using *monadic third-order quantification over sets of sets of simples*. That is, if the nihilist wishes to avoid the plural-property paraphrase method and its awkward and unmotivated ontology, she can alternatively appeal to the set-theoretic semantics of monadic third-order logic as a framework for paraphrasing the talk of composites in terms of simples. But I have already addressed the set-theoretic paraphrase method and its prospects in section 5, so I’ll finish this section here.

7. PRESERVING MEREOLOGICAL STRUCTURE

In section 6.1 I discussed the minimal logical resources that the plurally plural nihilist has to use to paraphrase singular and plural quantification over composites somehow in terms of only simples and plural quantification. So far, however, we have been only considering composite object without their mereological *structure*. The examples that we were primarily interested in were of the form ‘there is a table’ or ‘some bricks are touching each other’. But the believer of composition can *also*

talk about the mereological structure of composites, along with the composites themselves. To give an example within the lines of (Bennett 2009b), note that someone who believes in composites is allowed to state familiar claims such as ‘an organ is composed of cells, each of which is composed of organelle, each of which are composed of molecules, each of which are in turn composed of atoms’.

Now, for the nihilist—who denies that there are any atoms or molecules or cells, etc.—one natural question is raised: how can they reflect these mereological *structures* in their paraphrase? As Bennett observes, the nihilist needs to come up with paraphrases of the following form, to capture the mereological structure embedded in the sentence above: “[...] ((((((there are simples arranged atomwise) arranged moleculewise) arranged organellewise) arranged cellwise) arranged organwise))” (Bennett, 2009, p. 60)

But what is the logic that underlies sentences that contain such structured arrangement predicates? It seems that the nihilist will have to the resources appeal to higher-order plural quantificational to accommodate these. For example, the Berennet’s sentence will have to be re-written as follows:

- (I) *There is a 5th-order plurality xxxxxxxxxxxs of simples which is arranged organwise, and every 4th-order plurality xxxxxxxxxxxs of simples that is one of the pluralities in xxxxxxxxxxxs is arranged cellwise, and every 3rd-order plurality xxxxxxxs that is one of pluralities in xxxxxxxxxxxs is arranged organellewise, and every 2nd-order plurality xxxxxs of simples that is one of xxxxxxxs is arranged moleculewise, and every plurality xx of simples that is one of the pluralities in xxxxxs is arranged atomwise.*

As one can see, such a paraphrase—in order to capture the compositional structure—needs to appeal to the resources of 5th-order plural logic. It’s easy to come up with even more complicated compositional structures so that the nihilist will have to need to employ predicates and plural quantifications of even higher to reflect the compositional structure in their translations. In short, the nihilist who only wants to stick to simples in her ontology will have to subscribe to *full higher-order plural quantification*—that allows for plural quantification of any finite order—in order to be able to reflect the arbitrary mereological complexity of composite objects that the composition-

believer could simply just talk about by using a single predicate for parthood, plus perhaps first-order plural quantification.

Notice that this complexity issue is not only what the plurally plural nihilist faces, but also what many conservative theories of composition that deny some of the posits of universalism yet paraphrase the talk of the denied objects only in terms of simples will have to face. They need to employ full higher-order plural quantification to be able to reflect mereological structures of different complexities in their paraphrase method.

Take for example *organicism*, put forward by (Van Inwagen 1995). In the lights of this view, only living organisms are composite objects, and all artifacts, dead organisms, etc. are just pluralities of simples with certain arrangements. In general, organicism and nihilism share almost all the same thoughts about composition and paraphrase, except when it comes to living things; the organicist considers them as existing composite objects whereas the nihilist denies their existence.

But why does the organicist need the full higher-order plural quantification for her paraphrase strategy? Admittedly, the example from (Bennett 2009b) given above doesn't well reveal this fact, because to the organicist, organelle, cells and organs are all alive. But consider a very complex artifact, perhaps a space shuttle. A space shuttle is made up of thousands of pieces of different size, starting from screws and nuts to all sorts of pieces that, when put together in the right way, will—according to someone who believes in composition for certain artifacts—compose the space shuttle. Now suppose that a NASA engineer is giving a presentation about the compositional structure of the space shuttle, and Peter van Inwagen is among the audience for some reason. Since admittedly a space shuttle is not a living organism, then if Inwagen wants to paraphrase the speech of the engineer in terms of simples, he will face the same problem as the plurally plural nihilist faced: he will need to employ plural logic and arrangement predicates of god-knows-what-order. In general, the organicist, in order to be able to reflect the mereological structure (of arbitrary complexity) of artifacts in his paraphrase methods, needs to employ full higher-order plural logic.

Note that it is easy to come up with similar sentences that reveal mereological structure to argue to any conservative view that denies the existence certain composite objects and appeals to paraphrase methods to regiment the talk of those whose existence are denied only in terms of simples, will have to appeal to full-higher order plural logic.

Finally, notice that capturing mereological structure does not make a problem for those who, besides simples, posit some sort of collective entities for any plurality of simples, so that those

collective entities somehow contain those simples. The collective entities that we have encountered were sets, plural properties, and composites, and the theories of composition corresponding to them—weak universalism, plural-property nihilism, and strong universalism, correspondingly—all associated one such entity to any plurality of simples. In general, in a paraphrase of sentences containing mereological structure in terms of arrangement, the collective entities can function as a place-holder and makes us needles of using structured arrangement predicates and higher-order plural quantifications. For instance, the universalist, if asked to use arrangement predicates, can simply read Brennet’s sentence as follows, instead of **(I)**:

An organ is (the composition of) a plurality of organelle arranged organ-wise, and each of its organelle is (the composition of) a plurality of molecules arranged organelle wise, and each of those molecules is (the composition of) a plurality of atoms arranged molecule-wise.

So, the strong universalist doesn’t have to commit to higher-order plural predicates and quantifiers, because to them, in order to compose, say, F, it seems to be enough to be arranged F-wise, and they can use the *same* parthood predicate for any stage of the mereological structure. Similar story holds for other collective entities and their corresponding theories of composition.

8. ABDUCTIVE METHODOLOGY AND THEORY CHOICE

The summary of all the ideological and ontological posits of the three major methods of paraphrase that I have discussed is summarized in the following table. But first let us also check the ontological and ideological commitments of the two variants of universalism. By definition, strong universalism posits that for any plurality of simples there is a composite object, and weak universalism posits sets of simples (instead of composites) for each plurality of simples. The former has therefore has ontological commitments to composites (besides simples), whereas the latter has ontological commitments to sets (besides simples). Strong universalism needs plural logic and a predicate for parthood. Weak universalism, on the other hand, needs a predicate for set-membership, and—in order to accommodate the talk of pluralities of complexes—either plural logic or monadic third-order logic.

Framework		Position	Ideology	Ontology
<i>Mereology</i>		Strong Universalism	First-order plural logic, and a parthood predicate	Simples, Composites
		Organicism and any conservatism that appeals to paraphrase methods to paraphrase the denied objects only in terms of simples	First-order plural logic, full higher-order plural logic, and a parthood predicate	
<i>Set Theory</i>		Weak Nihilism/Universalism (revised versions)	First-order plural logic and a set-membership predicate OR, Monadic third-order logic and a set-membership predicate	Simples, sets, possible worlds, time
<i>Theory of Plural quantification</i>	<i>Plural Logic</i>	Plural Property Nihilism	First- and second-order plural logic	A staggering number of plural properties/universals of at least first- and second-order
	<i>Plurally Plural Logic</i>	Plurally Plural Nihilism	First-order plural quantification, Full higher-order plural quantification	Simples

It's widely held that *simplicity* or *parsimony* is a criterion of theory choice, especially in metaphysics. For example, (Brenner 2017) argues that if theoretical simplicity (including ideological or ontological simplicity) is a criterion of theory choice in science, it is a criterion of theory choice in metaphysics, because as he argues, there is no fundamental difference between science and metaphysics that justifies such a criterion for science, but not for metaphysics. This attitude towards philosophy is also in accordance to Timothy Williamson's *non-exceptionalist* program in philosophy (Williamson 2007), according to which philosophy is located in a continuum of other sciences such as mathematics and natural sciences, and they share many aspects, such as certain kinds of methodology. (Brenner 2017) surveys some prominent theories of metaphysics are favored to their rivals based on simplicity. For example, David Lewis in (Lewis 1986) defends his modal realism based on *ideological simplicity*. Similarly, (Sider 2013) defends compositional nihilism mainly based on its *ideological simplicity*: he thinks by removing the predicate for parthood, the ideology and ontology become simpler and hence, the theory is more likely to be true (and if my thoughts in this thesis are on the right track, he is wrong!) He states that the argument from ideological simplicity presupposes an epistemic principle: "ideologically simpler theories are more likely to be true." (Sider, 2013, p. 3). Also: "The epistemic principle is most naturally paired with a metaphysical realism about ideology. Ideologically simpler theories aren't just more convenient for us. The worlds that they purport to describe are objectively simpler, contain less structure. Ideology is a worldly matter, not about ideas at all." (T. Sider, 2013, p. 4). Finally, other thing equal, it is plausibly held that a theory with a more parsimonious ontology (i.e., with fewer kinds of objects) is to be preferred to others.

Granting these methodological considerations, certain theories from the above table will instantly lose to strong universalism over ideological simplicity. For example, plurally plural nihilism, organicism and other conservatives who employ paraphrase methods for paraphrasing the talk of denied objects only in terms of simples, all have more complicated ideology than strong universalism (full higher-order plural logic—first, second, third, fourth, and n th-order plural logic, for any finite number n —versus first-order plural logic plus a parthood predicate).

In section 5.2 we observed that weak nihilism naturally leads to weak universalism. Now, to compare weak and strong universalism, note again that the former's ideology consists of first-order plural logic and a parthood predicate, whereas the latter commits to either first-order plural logic and a set-membership predicate, or third-order singular logic plus set-membership predicate. But admittedly, it's not so obvious which one among these is a "simpler". We don't have a catalogue

on simplicity of theories to tell us whether, say, plural logic plus a parthood predicate is simpler than plural logic plus a set-membership predicate. On the other hand, they seem to be at the same level of simplicity: a set-membership predicate for a parthood predicate.

One might object: “But set membership predicate is needed elsewhere, anyway. For example, a big chunk of mathematics relies on that, so there will be no shame for the nihilist to also commit to it. In a sense, it is more fundamental than the parthood relation.” First of all, as I have explicitly mentioned before, in this thesis I’m not much concerned with factors such as higher explanatory power, or fundamentality of concepts, when comparing theories. But even if we let that kind of objection to arise, it’s not clear whether set-membership relation is more fundamental than parthood relation. For example, (Lewis 1991) proposes an alternative to \in -based set theory itself by using plural logic and parthood relation, and similarly, (Hamkins and Kikuchi 2016) have shown certain mereological formulations of set theory are as equally expressive as the \in -based set theory. I won’t pursue this issue further; the point is to make the objector not to be very quick when it comes to the fundamentality of set-membership predicate.

So it doesn’t seem we can proceed much with regards the ideological comparisons between weak and strong universalism, and further that they seem to be at the same level of complexity. What about ontology? Strong universalism needs to only posit material simples and composites, but as we observed in section 5.1, for the weak nihilists/universalists to capture the “tolerance” of composite objects to small changes, they need to appeal, besides simples, to sets, possible worlds and time. So, both the kind and the number of objects that the weak nihilist/universalist needs is more than the ones of the strong universalist, so the latter seems to enjoy a more parsimonious ontology than the former. I take it that this works overall in favor of strong universalism.

What about plural-property nihilism? Again it doesn’t seem quite clear whether first- and second-order plural logic is less parsimonious than first-order plural logic plus parthood predicate. We just don’t have any clear-cut criteria of simplicity to compare such cases where one predicate is traded with one kind of quantification. But ontologically speaking, as we observed at the end of section 6.2, plural-property nihilism posits a staggering ontology of obscure plural properties, which not only puts the nihilist in an awkward position (selling composites in the hope of a more parsimonious ontology, yet ending up with even more entities of a different sort—abstract rather than concrete—and obscure in nature), as (Uzquiano 2004) mentions, if we understand (plural) properties and (plural) universals, it would be quite doubtful whether universals of *such* plentitude and diversity should indeed exist in reality, just for the nihilist to be able to eliminate and paraphrase

the talk of composites. In short, an ontology that contains material simples and composites is more parsimonious and less obscure than the underdeveloped ontology of plural-property nihilist. I take this as a sign that strong universalism is overall more parsimonious than plural-property nihilism.

Now, given the previous lines, it turns out that strong universalism is more parsimonious than the rival theories of composition that we have considered, hence should be chosen as the best theory of composition.

Before finishing the thesis, one last remark is in order: the abductive comparisons that are made here *only* take into account ideological and ontological parsimony. If one considers other theoretical virtues such as explanatory power, fundamentality, or whatever, then the final conclusion might be entirely different. For example, it might turn out that weak universalism can solve more puzzles and paradoxes in other areas of philosophy, or that its ontological commitments are needed *anyway*, in certain other areas of science. In that case, weak universalism should be preferred to strong universalism. I leave such possibilities open to further investigations.

9. CONCLUSION

In the first part of the thesis I argued that if our perceptual experience of ordinary objects is an indicator of their existence, then so is perceptual experience of extraordinary objects an indicator of their existence. I appealed to a recent metaphysical account of perception that argues for the crucial assumption that ordinary objects exist, and proposed certain thought-experiments that render such possibilities, in order to argue for the existence of extraordinary object. I argued that this gets us very close to universalism, but admittedly, it doesn't quite get us there: some pluralities of objects—e.g., the plurality of galaxies with even number of planets—don't seem to be even possibly perceivable as a single object. I then argued that—on the pain of committing to certain species of idealism—abductive reasoning selects universalism as the best theory of composition that respects the crucial assumption and further explains away the existence of the myriad of ordinary and extraordinary objects that has been argued for. It is left as an open question whether other arguments from perception for the existence of ordinary objects can be generalized to argue for the existence of extraordinary objects, similar to the case of Byrne's line of argument.

In the second part of the thesis I raised a nihilist objection to the crucial assumption of the argument in the first part, which blocked my argument for universalism. I laid out a detailed analysis of different formulations of nihilism and universalism, and argued that among them, (strong)

universalism—which posits a composite object for every plurality of objects—has either the simplest ideology or ontology compared to the rival theories of composition. That suggests that—if we ignore other deciding factors such as explanatory power—universalism is abductively the best theory of composition among the ones considered here. It is left as an open question whether considering other deciding factors will change the result of the abductive comparisons.

ABSTRACT

In this thesis I will argue for compositional universalism, according to which, any plurality of objects composes an object. In the first part of the thesis I will argue that if ordinary objects—the ones that are typically perceived by humans’ perceptual system as objects—exist, then so do extraordinary objects. I appeal to certain metaphysical accounts of perception to argue for a great number of extraordinary objects in a similar way that some conservatives about composition would argue for ordinary objects, which in turn suggests that such conservative views are either false or insufficient. I then use abductive methodology to argue that universalism is the best theory that respects the assumption of existence of ordinary objects, and further explains the existence of the ordinary and extraordinary objects which are argued for. The second part takes into consideration the fact the compositional nihilist, who denies occurrence of composition, refuses to accept the assumption that ordinary objects exist, hence blocks my argument for universalism. I lay out a detailed analysis of ideological and ontological commitments of different species of nihilism and universalism about composition, and argue on abductive grounds that universalism is the simplest theory of composition among many of them.

REFERENCES

- Allen, Colin and Michael Trestman. 2017. “Animal Consciousness.” in *The Stanford Encyclopedia of Philosophy*, edited by E. N. Zalta. Metaphysics Research Lab, Stanford University.
- Bennett, Karen. 2009a. “Composition, Colocation, and Metaontology.” *Metametaphysics: New Essays on the Foundations of Ontology* 38–76.
- Bennett, Karen. 2009b. “Composition, Colocation, and Metaontology.” *Metametaphysics* 38.
- Boolos, George. 1984. “To Be Is to Be a Value of a Variable (or to Be Some Values of Some Variables).” *The Journal of Philosophy* 81(8):430–449.

- Brenner, Andrew. 2015a. "Mereological Nihilism and the Special Arrangement Question." *Synthese* 192(5):1295–1314.
- Brenner, Andrew. 2015b. "Mereological Nihilism and Theoretical Unification."
- Brenner, Andrew. 2017. "Simplicity as a Criterion of Theory Choice in Metaphysics." *Philosophical Studies* 174(11):2687–2707.
- Byrne, Alex. forthcoming. "Perception and Ordinary Objects." in *The Nature of Ordinary Objects*, edited by J. Cumpa and B. Brewer.
- Campbell, John. 2002. "Reference and Consciousness."
- Elder, Crawford L. 2011. *Familiar Objects and Their Shadows*. Cambridge University Press.
- Fairchild, Maegan and John Hawthorne. 2018. "Against Conservatism in Metaphysics." *Royal Institute of Philosophy Supplements* 82:45–75.
- Fish, William. 2009. *Perception, Hallucination, and Illusion*. OUP USA.
- Hamkins, Joel David and Makoto Kikuchi. 2016. "Set-Theoretic Mereology." *ArXiv Preprint ArXiv:1601.06593*.
- Hawthorne, John. 2006a. *Metaphysical Essays*. Oxford; New York: Clarendon.
- Hawthorne, John. 2006b. "Plenitude, Convention, and Ontology."
- Hossack, Keith. 2000. "Plurals and Complexes." *The British Journal for the Philosophy of Science* 51(3):411–443.
- Korman, Daniel Z. 2015. *Objects: Nothing out of the Ordinary*. First edition. Oxford, United Kingdom; New York, NY: Oxford University Press.
- Lewis, David. 1986. *On the Plurality of Worlds*. Vol. 322. Oxford.
- Lewis, David. 1991. "Parts of Classes."
- McDowell, John. 1994. "The Content of Perceptual Experience." *The Philosophical Quarterly* (1950-) 44(175):190–205.
- Potter, Michael D. 2005. *Set Theory and Its Philosophy: A Critical Introduction*. Repr. Oxford: Oxford Univ. Press.
- Schellenberg, Susanna. 2016. "Perceptual Particularity." *Philosophy and Phenomenological Research* 93(1):25–54.
- Sider, Theodore. 2001. *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: New York: Clarendon Press; Oxford University Press.
- Sider, Theodore. 2013. "Against Parthood." *Oxford Studies in Metaphysics* 8:237–293.
- Tallant, Jonathan. 2014. "Against Mereological Nihilism." *Synthese* 191(7):1511–1527.

- Tye, Michael. 2011. *Consciousness Revisited: Materialism without Phenomenal Concepts*. Mit Press.
- Unger, Peter. 1980. "The Problem of the Many." *Midwest Studies in Philosophy* 5(1):411–468.
- Unger, Peter. 2014. *Empty Ideas: A Critique of Analytic Philosophy*. Oxford University Press.
- Uzquiano, Gabriel. 2004. "Plurals and Simples." *The Monist* 87(3):429–451.
- Van Inwagen, Peter. 1995. *Material Beings*. First printing, Cornell paperbacks. Ithaca London: Cornell University Press.
- Williamson, Timothy. 2007. *The Philosophy of Philosophy*. Malden, MA: Blackwell Pub.

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