Eliminativism and Evolutionary Debunking

Jeffrey N. Bagwell

University of California Santa Barbara

jbagwell@ucsb.edu

Abstract

Eliminativists sometimes invoke evolutionary debunking arguments against ordinary object beliefs, either to help them establish object skepticism or to soften the appeal of commonsense ontology. I argue that object debunkers face a self-defeat problem: their conclusion undermines the scientific support for one of their premises, because evolutionary biology depends on our object beliefs. Using work on reductionism and multiple realizability from the philosophy of science, I argue that it will not suffice for an eliminativist debunker to simply appeal to some object-free surrogate theory of evolution that results from converting any scientific proposition about some object *K* into a proposition about simples arranged *K*-wise. In the process, I examine some hazards peculiar to eliminative reductions of scientific theories, and propose a trilemma for eliminativists who attempt to recoup generality for ontologically sparse reducing theories by appealing to *pluralities* of simples arranged *K*-wise. The paper is intended to define and develop the object debunker's self-defeat problem for further study, and to clarify some of the ways sparse and abundant ontologies interact with scientific theory.

1. Introduction

Eliminativists sometimes invoke evolutionary debunking arguments against ordinary object beliefs, either to help them establish skepticism about such objects or to break down one's resistance to abandoning common sense ontology.[1] My purpose in this paper is to show that the eliminativist debunker faces a self-defeat problem. Her premises appeal to the theory of evolution by natural selection and her conclusion is skepticism about ordinary objects. However, evolutionary theory is *about* ordinary objects; it systematically appeals to our object beliefs. I argue that simply converting each scientific proposition about some ordinary object *K* into a proposition about *simples arranged K-wise* does not circumvent the problem.

My reasons are as follows. Attempts to recast the propositions of evolutionary theory in terms of simples arranged *K*-wise commit the eliminativist to a problematic form of reductionism about scientific theories. The eliminativist's low-level surrogate theory of evolution is ultimately unable to explain how the human perceptual system evolved because it will lack the needed generality and explanatory power. This undermines the justification for one of the debunker's premises.

Here is a bird's-eye view of the paper. In Section 2, I state and explain an evolutionary debunking argument against ordinary objects. In Section 3, I sketch the self-defeat problem for object debunking arguments by exploring the object dependency of evolutionary theory. In Section 4, I sketch two popular variants of a *K*-wise conversion strategy and evaluate their prospects for running the debunking argument. In Sections 5 and 6, I show that using the *K*-wise conversion strategy commits the debunker to a form of scientific reductionism, and that the

[1] I have in mind Merricks (2001: 72–76) and Benovsky (2015: §2). But see Korman (2019: §2 n7) for a more complete list of those invoking debunking arguments to support various kinds of departures from common sense ontologies.

resulting surrogate, low-level theory will lack generality. In Section 7, I argue that because it lacks generality, the eliminativist's surrogate theory will be limited in its ability to predict or explain relevant phenomena and to utilize existing evidence. In Section 8, I show why attempts to recoup generality in terms of *pluralities* of simples arranged *K*-wise fail.

2. Evolutionary Debunking Arguments and Ordinary Objects

Debunking arguments target certain kinds of beliefs in order to establish some limited form of skepticism. *Evolutionary* debunking arguments rely on the fact that our evolutionary history *predisposes* us to form certain kinds of beliefs—not because these beliefs are true, but simply because they increased our ancestors' reproductive fitness. Learning that you are just hard-wired to believe that *p* under the right conditions, *regardless of whether* p *is true or not*, serves as a defeater for your normal justifications as to why you believe that *p*.

You probably believe that there are visible, medium-sized solid objects all around you because it *seems* as if there are. This *seeming* might be a sufficient normal justification for believing that ordinary objects like trees exist as you go about your day. But once the object debunker convinces you that your reason for believing in trees has nothing to do with whether or not there are trees and everything to do with what was adaptive for your ancestors to believe, this defeats such a normal justification. Your tree beliefs are thereby debunked.[2]

Here is an evolutionary debunking argument against ordinary objects (EDO):

[2] In metaethics, evolutionary debunkers sometimes make the plausible assumption that while moral realism is vulnerable to this kind of skeptical argument, realism about ordinary objects is safe because one can provide an evolutionary vindication for our believing that ordinary objects are real. For instance, Sharon Street (2006:160–61n) notes that facts about salient objects in the environment such as predators, obstacles, or other hazards, could plausibly factor into our best explanations of why we form beliefs about them. Having a capacity to track these object facts would have bestowed a clear adaptive benefit on our ancestors: creatures believing that predators exist and are dangerous would tend to avoid predators and survive to reproduce. Thus, evolution seems to vindicate our object beliefs. For a more detailed counterargument to the supposed evolutionary vindication of object beliefs, see Korman (2019: 342–45).

(EDO1) The best explanation of your ordinary object beliefs is that you only believe there are ordinary objects because you are hard-wired by evolution to believe in them in the presence of matter arranged object-wise—irrespective of whether it's *true* or not that there are ordinary objects.

(EDO2) If EDO1 is true, then you are not justified in retaining your object beliefs.[3]

(EDO3) So, you are not justified in retaining your object beliefs.[4]

EDO1 relies on one plausible interpretation of the evolutionary psychology of human perception. Modern humans believe in the existence of ordinary objects like trees based on their having sensory experiences as of trees existing. These experiences are the result of an evolved perceptual system. According to the debunker, our ancestors' perceptual systems evolved to track *adaptively relevant matter* (e.g., matter arranged food-wise, mate-wise, or predator-wise) well enough to out-compete reproductive rivals; at the same time, they may very well have evolved to have *false* beliefs about ordinary objects. Our predisposition to believe in ordinary objects *need not* be the result of such objects existing in the ancestral environment; rather, they simply need to have conferred a reproductive advantage over rivals who inherited different perceptual predispositions (or to have introduced no substantial reproductive *disadvantage*).

The final clause, "irrespective of whether it's *true* or not that there are ordinary objects," bears some unpacking. The basic idea here is that introducing ordinary object facts *adds nothing* to the above causal explanation; rather, it makes our explanation *less* parsimonious, clear, and

[3] We can assume, if we like, that one must be aware of this defeater to lose any justification one already has for object beliefs. This will not affect my discussion, as my focus is on whether the argument is self-defeating or not.
[4] This argument is loosely adapted from Korman (2019: 340).

illuminating.[5] The parsimony concern may be simply about injecting additional objects and object facts into our ontology when we already have a complete causal explanation on hand. This usually involves the idea that ordinary objects (or facts about composition) are causally inert in themselves, or are mere causal overdeterminers. Positing such an overdetermining cause may itself be objectionably unparsimonious, or it may conflict with the notion that to exist is to have causal powers.[6]

In EDO2 we are assuming that whatever our reasons for believing in ordinary objects in the first place, they only merit *continued* ontological commitment if they are essential to our best explanations of why we believe in them. But if EDO1 is true, our best explanations of why we believe in ordinary objects *don't* make any essential reference to ordinary objects. This is true even if ordinary objects happen to exist. Accordingly, EDO2 captures the fact that EDO1 is a defeater for our normal reasons for believing in ordinary objects.

3. The *Prima Facie* Self-Defeat Problem for EDO

Scientific theories like evolutionary biology systematically appeal to our perceptual beliefs about ordinary objects. If we reject these object beliefs, we jeopardize not only our theories' explanations and laws, but also our empirical evidence and our ability to *rank* theories based on

[5] For a detailed exposition of this take on the debunking argument, developed as a Sharon-Street style Darwinian dilemma for the object realist, see Korman (2019: 342–45). For a very different, earlier take on the causal worry in object debunking arguments, in which the causal connection between a tree and our tree belief is at best a deviant one, see Korman (2014: §5).

[6] On this latter point, see Merricks (2001: 65). For an account of how Merricks' causal overdetermination argument works as a defeater, see Merricks (2003: 738–43). For a more recent version of the overdetermination argument, see Merricks (2017). For an overview of the overdetermination argument and some replies, see Korman (2015: Ch.10)

such evidence.[7, 8] In this section, I will elaborate on each of these points, and show why they collectively spell self-defeat for the object debunker.[9]

I call the self-defeat problem *prima facie* because it will be apparent to anyone from the standpoint of commonsense ontology. However, seasoned eliminativists may already be eager to dispute the claim, armed with strategies to reinterpret or recast scientific propositions to rid them of ordinary object commitments. They and other impatient readers are free to skip ahead to Section 4.

Let us consider an example of the kind of thing evolutionary theory was developed to explain. Why do certain species of Galapagos finches endemic to a particular island have substantially bigger beaks than those of finches on neighboring islands—beaks that allow them to crack open the thick-shelled seed capsules that happen to drop from trees that flourish on their island in particular? The answer to this will inform broader theoretical questions such as: How do species come to have qualities that make them seem well-suited to their environments? How does speciation occur? What even *is* a species?

Note that when we formulate questions about the concrete *explananda* of evolutionary theory, we must appeal to perceptual beliefs about finches, beaks, islands, and various ordinary objects in a finch's environment such as seeds, shells, and trees. Likewise, our broader theoretical questions about how a species relates to its environment over time appeal to beliefs about *patterns* involving ordinary objects: that there are living organisms of various kinds, that

---

[7] For instance, observations made through a microscope all depend on some theory of how the microscope and its parts—all ordinary objects—work, and why we should trust them.
[8] Williamson (2007: 223–24) mentions several of these worries in considering the promises of reductionism and their consequences for science.
[9] Eliminativists who are instrumentalists about science may be ready to bite the bullet and accept any epistemic consequences of object skepticism. However, if they wish to convince an audience by using the debunking argument, they too need to resolve the self-defeat problem.

organisms bear properties, that some of these properties are adaptive with respect to an environment, and that an organism's environment is made up of all kinds of ordinary objects.[10][11]

The Darwinian *explanantia* that answer these questions similarly depend on ordinary objects. Here is a rough explanation of why the finches on the island evolved bigger beaks. Over time, variation in beak size in the island's finch population gave a reproductive advantage to finches with bigger beaks, because only the finches with bigger beaks were able to eat certain difficult-to-access seeds that are abundant on their island even during times of great scarcity. The trait for bigger beaks was passed on to their offspring, who were more numerous than those of their rivals with smaller beaks. This process repeated over the course of many generations, with the result that all finches on the island now have the trait of bigger beaks.[12] Note that our explanation implicitly appeals to *patterns* exhibited by organisms, such as heredity, phenotypic variation, and differential reproduction.[13] This explanation supports an evolutionary law: given that variation exists regarding a specific trait (here, beak size), if one variant gives individuals possessing it a reproductive advantage because it helps its possessors cope more effectively with selective pressures in the environment (here, the scarcity of food), this variant will become more frequent in succeeding generations, eventually replacing rival variants throughout an entire reproductive population.

---

[10] This presents a problem for eliminativists like van Inwagen (1990), who allow an exception for organisms, but not the ordinary objects that make up their environments. Inanimate objects play important roles as selective pressures on organisms.

[11] Note that even tools and methods that allow us to look beyond ordinary objects (say, into microscopica) depend on object beliefs. How does one know how to use a microscope, or trust its deliverances, if one doesn't believe it exists? Both Merricks (2001:175) and Williamson (2007: 223) raise this point.

[12] This is a greatly simplified account of one set of dynamics drawn from a large and formidably complex ecosystem. Often, this kind of niche specialization is observed between different species of finch on the *same* island during periods of scarcity due to drought and subsequent famine. See Weiner (1994) for an in-depth picture.

[13] Of course, not all organisms are ordinary objects (e.g., bacteria and other microscopica). But if one is ruling out ordinary objects, unless one has an exception for some composite objects like DNA strands, one will have nothing upon which to base generalized properties like heredity.

Let us now turn to the question of evolutionary theory's *justification*. Why is the theory better than its rivals as an explanation of the complexity, diversity, and distribution of life on earth? To do this, we will examine one theoretical virtue natural selection is thought to have in spades: its explanatory power. A theory has greater explanatory power than its rivals when, all things being equal, it leaves fewer aspects of its subject matter a mystery. The following simplified example serves to give a sense of how these comparative explanations depend on data in terms of ordinary objects.

Traditionally, evolution by natural selection has had one main rival: creationism. This is the view that the species we see all around us were individually created for their environments, as opposed to being descended with modification by natural processes from ancestral species over countless generations.[14] We will compare the way each theory handles the following sets of observations: in addition to the finches that developed big beaks, there were finches on different islands with smaller, more delicate beaks that seem well adapted for the diet available in their own environments; and both groups of finches bear striking resemblances to each other and to birds on the nearby mainland of South America.

Creationism would maintain that each species of bird was specially created for its particular island environment. This explains why each finch population is particularly well-suited to its island environment but does not explain their similarity to the mainland finches. However, there is no apparent reason the creator should make these island finch species resemble those on

[14] Though in the minds of most biologists evolutionary theory has no serious rival, there are robust disagreements *within* evolutionary theory about, e.g., the specific mechanisms of adaptive change and the role natural selection plays in combination with other factors. These intra-theoretical disputes depend on data in terms of ordinary objects.

the mainland, who are not particularly well-adapted for any of these island micro-environments. Creationism leaves this striking pattern a mystery.[15]

By contrast, evolutionary theory suggests that the finches on the mainland represent an *ancestral* species that migrated to the islands in the distant past and then diverged into sub-species, as finches on each island adapted to the selective pressures of their new environment but were cut off from interbreeding with the finches on the other islands. These considerations seem to favor the evolutionary explanation, because it can explain the larger set of observations—those about the island birds *and* the mainland birds—better than its rival.

However, if we embrace skepticism about ordinary objects, we cannot cite the presence of a common ancestor as something evolutionary theory explains better than its rivals. Both ancestors and descendants here are birds—ordinary objects—populating an environment filled with ordinary objects. An object skeptic seems to lose any reason to consider evolutionary theory to be the best explanation of its subject matter. In fact, she seems to be in no position to accept evolutionary theory at all: its very subject matter—as well as its laws, explanations, observations, and methods—depend on appeals to perceptual beliefs about ordinary objects; and it must rely on such appeals to display its virtues against *competing* theories. Object skepticism leaves evolutionary theory fundamentally unjustified.[16]

This lack of justification undermines EDO1, since we now have no reason to believe the evolutionary hypothesis that selective pressures shaped the mechanisms in our ancestors' brains

[15] In fact, creationism's explanation fits the observations so loosely it would be compatible with wildly different observations: for instance, if the finches on various islands did not resemble each other—or the finches on the mainland—*at all*, or if our big-beaked finches were identical copies of some species on the opposite side of the globe with a similar micro-environment.

[16] That is, if the theory remains coherent with its very subject matter removed from discussion.

responsible for converting perceived qualities into representations of three-dimensional objects.[17] And this spells self-defeat for the object debunker, because it puts the skeptical conclusion EDO3 at odds with the premise EDO1. We cannot rationally accept an argument wherein the conclusion undermines one of the premises.[18]

In the following sections, I will explore a strategy for converting propositions of evolutionary theory about any ordinary object *K* into those about simples arranged *K*-wise. I will examine how it affects the debunker's appeal to evolutionary science and show why it ultimately cannot save the debunking argument. I hope to convince the reader that the self-defeat problem is not just *prima facie*; rather, it is a deep and persistent problem for the debunker.

4. Running the Debunking Argument without Objects

In this section, I will describe two strategies for an eliminativist who wants to run the debunking argument while avoiding the self-defeat problem. Both involve converting the propositions of evolutionary theory into object-free propositions, and both originated as solutions to the problem of explaining why most people can be reasonable, though they hold many false, object-laden perceptual beliefs. The two strategies are *compatibilism* and *incompatibilism.*[19]

---

[17] Premise EDO1 could still succeed on other grounds, of course, assuming those arguments in support of it do not similarly rely on ordinary objects. However, barring arguments that culture is the sole factor responsible for biasing us toward believing in ordinary objects, evolutionary debunking arguments would lose their distinctive force as arguments for EDO1: they provide positive, empirical evidence that our object beliefs are unrelated to object facts. This crucially distinguishes them from more universal kinds of skepticism (Vavova 2015: 105–6). Cultural debunking arguments also arguably presuppose an evolutionary backstory. To be able to process language and other cultural information was an adaptation that bestowed clear reproductive advantages on our ancestors. But the relationship between Darwinian evolution and exclusively cultural predispositions to believe in ordinary objects is at best complex, indirect, and controversial.

[18] My position in this dilemma is that we should reject EDO1, because we can meet the explanatory challenge by invoking the results of perceptual psychology. Explication of this is outside the scope of this paper.

[19] In my terminology, I follow O'Leary-Hawthorne and Michael (1996), who use 'compatibilism' to describe van Inwagen's paraphrase strategy (see van Inwagen 1990: Chs.10–11; 2014). Korman (2009) develops and utilizes this distinction as a way of contrasting van Inwagen's strategy from the views of incompatibilists like Merricks (2001: Ch.7). My versions of compatibilism and incompatibilism here are loosely based on the views of van Inwagen and Merricks.

In either case, to simplify our discussion let us assume that the debunker is a *nihilist* about composition. Think of this as an extreme kind of eliminativist who rejects composition altogether and believes *all* objects are *mereologically simple* (that is, partless or uncomposed).[20][21] To explain our experiences of a world apparently filled with visible objects, a nihilist holds that simples act together in various ways to cause the *appearance* of ordinary objects and those macroscopic effects we attribute to them.

Compatibilism is the view that there is no real conflict between the beliefs of ordinary non-philosophers (the folk) and those of revisionary ontologists. A compatibilist holds that because the folk are speaking *outside* the ontology room, their sentences should be interpreted differently than those uttered *inside* the ontology room. This is because the ontology room is a different *context of utterance* from the outside world—including the world of scientists. Philosophers involved in academic debate who say, "there is a table" would be expressing a false proposition, while ordinary folk in the course of their normal lives who utter the *same* sentence would be expressing a true proposition—provided they were in the presence of some simples arranged tablewise.

Compatibilists regard folk utterances of "there is a table" as ontologically neutral, uncommitted to the existence of ordinary objects. The truth-conditions of such folk utterances are determined by generating and evaluating a *paraphrase* of the original: "there is a table"

---

[20] Not all nihilists are eliminativists, nor are all eliminativists nihilists. Examples of non-nihilist eliminativists include van Inwagen (1990), who famously makes exceptions for living organisms, and Merricks (2001), who makes exceptions for conscious beings. An example of a non-eliminativist nihilist is Contessa (2014), who defines a kind of nihilism that resists ordinary object eliminativism. In addition, it is possible for a nihilist to hold the odd position that ordinary objects are mereologically simple.

[21] The debunker may try to be neutral about these matters and just point to finch-wise experiences being caused by something in a certain region. But if she accepts the in-principle possibility of giving a complete lower-level causal, scientific account, her options are restricted. The stuff in that region must be either simples, composites, or gunk. And (as will become clear in Section 5) gunk wouldn't support the kind of reductive causal story the eliminativist needs to tell, because in a gunky world causation does not bottom out at some specific level of explanation.

becomes "there are some simples arranged table-wise." This strategy aims to vindicate the reasonableness of folk discourse by capturing what is correct in everyday speech involving ordinary objects.

Incompatibilism is the view that there really is a conflict between folk beliefs and those of revisionary ontologists. An incompatibilist makes no distinction between what is uttered inside or outside the ontology room, holding that both philosophers and the folk are stating a false proposition when they utter "there is a table." The incompatibilist still must explain how most people can believe false things and still be reasonable—and, crucially, what makes false beliefs about tables *more reasonable* than false beliefs about unicorns.

To solve this problem, the incompatibilist adds an epistemic category here: beliefs about things like tables are *false, but nearly as good as true*, while beliefs about unicorns are merely *false*. We can identify beliefs that are nearly as good as true by employing this kind of rule: "Any folk-ontological claim of the form 'F exists' is nearly as good as true if and only if (i) 'F exists' is false and (ii) there are things arranged F-wise" (Merricks 2001: 171–74). Beliefs that are nearly as good as true are still false, but they can serve valuable functions such as warranting other (true) beliefs. Moreover, this distinction allows the incompatibilist to hold that scientists and other ordinary folk are reasonable because their beliefs, though false, have some measure of epistemic virtue.

In their solutions to the problem of reasonableness, both compatibilists and incompatibilists make use of a similar strategy: take any (false) proposition about some ordinary object *K* and convert it into a (true) proposition about *simples arranged K*-wise.[22] The compatibilist uses this as a *truth-maker* for statements about ordinary objects made outside the

[22] See, e.g., Merricks (2001: Ch.1) and van Inwagen (1990: Ch.11) for versions of the *K-wise* strategy.

ontology room. "There is a finch" is true if and only if the ontologically neutral paraphrase "there are simples arranged finch-wise" is true. For the incompatibilist, statements like "There are some simples arranged finch-wise" are *nearly-as-good-as-true-makers.* The nearby metaphysical fact that there are some simples arranged finch-wise makes "There is a finch" nearly as good as true; however, it is not assumed to be a *paraphrase* of the speaker's words (however loose), let alone a truth-maker. "There is a finch" is still false—but it's the *good* kind of false.

In order to run the debunking argument, both compatibilists and incompatibilists need to convert the collection of all propositions necessary for evolutionary theory and its justification into *K*-wise terms.[23] Let us call this collection *E*. Included in *E* are all propositions either (i) composing the theory of evolution (propositions of law, method, and supporting explanatory discourse) or (ii) serving as evidence for that theory (propositions of observation). Recasting the propositions of *E* according to the *K*-wise conversion strategy, we generate a *different* collection of propositions. Let us call this E_{Lite}. An eliminativist doesn't need to be skeptical about the propositions of E_{Lite}, because they are not *about* ordinary objects (or any composite objects). Let's return to our two strategies and see how they fare with E_{Lite} in hand.

Compatibilism faces a dilemma. It holds that *E* is *true* when expounded by scientists, who work outside the ontology room, because when scientists utter sentences that appear to be expressing propositions of *E,* they are really expressing propositions of E_{Lite}. So, the compatibilist has an eliminativist-friendly way of justifying EDO1. However, outside the ontology room *eliminativism* appears to be false because it entails that "There are some finches"

[23] Hereafter I will use 'conversion' instead of 'paraphrase' to describe what the eliminativist is doing, since 'paraphrase' implies the intent is to preserve the meaning of the original statement. This would only apply to the compatibilist strategy.

is false.[24] But we've already established that outside the ontology room this statement is true. So, EDO3 is false. However, back *inside* the ontology room, *E* is still an unjustified theory made up of false propositions about ordinary objects. So, the compatibilist can't successfully run the debunking argument either inside or outside the ontology room.

My view is that the compatibilist is ultimately forced to abandon this distinction, and her view ultimately collapses into *incompatibilism.* First, the ontology room seems to be the appropriate place to run the debunking argument. It seems we are there right now, and anyone hearing EDO seems to be thereby ushered inside. Second, to run EDO *outside* the ontology room, the compatibilist would need some reason to reinterpret eliminativism out there such that it remains true. This move seems completely unmotivated and *ad hoc*.[25] Third, Trenton Merricks (2014) has given solid reasons why it is implausible that we should interpret the folk as making ontologically neutral statements when they make claims stating or presupposing ordinary objects in their ordinary lives, and in general why any revisionary ontologist should reject the compatibilist's distinction.[26] Finally, E_{Lite} cannot be a truth-maker for *E* because it is—as we will see especially in Sections 7 and 8—a *different* theory from *E*. It has different laws, *explananda,* and theoretical virtues. Accordingly, its propositions have *different* truth-conditions from those of *E*, making them unsuitable as truth-making paraphrases.

Incompatibilism, it seems, is the only viable strategy. From the outset, the incompatibilist considers E_{Lite} to be a *separate* theory from *E*, not a mere paraphrase. She uses E_{Lite} to support $EDO1_{Lite}$, the first premise of an object-free version of the debunking argument, which we'll call

[24] By *modus tollens*, if it's false that "There are some finches" is false, then it's false that eliminativism is true.
[25] The distinction as presented in van Inwagen doesn't offer any clues (1990: Chs. 10–11; 2014). If we try to render either eliminativism or EDO in terms of ontologically neutral paraphrase, the results would seem to be incoherent.
[26] Among his reasons are that the ontology room doesn't seem to be a genuine context of utterance, and that the distinction is ultimately hostile to revisionary ontology and indeed to any kind of revisionism.

EDO_{Lite}.[27] She accepts that *E* is false, but believes it is *nearly as good as true*. Apart from its widespread appeals to false beliefs in ordinary objects, *E* has a certain trustworthiness that explains why it is worth invoking in EDO. This trustworthiness depends on there being some corresponding proposition of E_{Lite} about simples arranged *K*-wise for every proposition of *E* about some object *K*. Accordingly, she believes that every scientist who believed he observed a finch (and wasn't deceived, e.g., by perceptual illusion) had perceptions caused by simples arranged finch-wise. She also believes that inferences drawn from such false observational beliefs can confer *some* kind of justification or warrant.[28] E_{Lite} is a kind of *conversion* or *recasting* of the false, object-laden propositions of *E* into propositions that express these closely related truths about simples arranged *K*-wise.

We will now assume that the eliminativist is an *incompatibilist* in the above sense. In the next section, I will explore the eliminativist's scientific commitments in more depth.

5. The Eliminativist *K*-wise Strategy and Scientific Reductionism*

Despite its promise, this *K*-wise conversion strategy leaves us several reasons to be skeptical. The principal problem for an eliminativist surrogate of evolutionary theory is that the propositions of E_{Lite} do not exist. And it's not obvious that we can recast, without epistemic loss, all needed propositions of *E* into propositions that do not express commitments to ordinary objects.[29] For instance, there may be technical problems with the kind of plural reference and quantification needed for a general and systematic *K*-wise conversion strategy.[30] However, in

---

[27] For present purposes, I will assume there is nothing problematic about providing object-free conversions of EDO1, EDO2, and EDO3 (that is, $EDO1_{Lite}$, $EDO2_{Lite}$, and $EDO3_{Lite}$).

[28] Merricks is cagey about how this warranting happens. For instance, it could depend on the relation to the nearly-as-good-as-true belief, or it could depend on the relation to a nearby *truth* about simples (2001: 171–74).

[29] Williamson (2007: 223) briefly raises this worry.

[30] For instance, Uzquiano (2004) argues that in order to demonstrate the plausibility of the needed kind of quantification—a truly *plurally plural* quantification—one needs to supplement it with additional resources that will

this section I will raise a different problem: even if it turns out to be easy to convert propositions of *E* into propositions about simples arranged *K*-wise, the eliminativist is committed to a kind of scientific reductionism that ultimately limits the capabilities of E_{Lite} as a scientific theory.

Take the proposition *that this finch is brown-beaked*. The debunker could convert this into the proposition that *some of these simples arranged finch-wise are arranged brown-beak-wise.* However, to do so expresses not just a metaphysical commitment but also a physical, scientific one: the real objects of scientific study here—the things doing the causal work—are not finches but microscopic objects arranged *finch-wise* and *brown-beak-wise*.

What happens when we take *K*-wise propositions seriously in *physical* terms? If simples are microscopic, partless, causally efficacious objects, they must be among the smallest things scientists currently study (i.e., quarks, leptons), or else they are some as-yet-unidentified things on an even smaller scale. Whatever they turn out to be, simples would seem to belong to quantum physics.

The eliminativist implies that the story of finches can, at least in principle, be replaced by a story about finch-wise things at the level of quantum physics. Moreover, it *should* be told at the quantum level if we are to abandon talk of ordinary objects. Thus, E_{Lite} should ultimately not be composed of propositions about simples arranged *K*-wise, but of propositions that describe quantum particles and their various properties of motion, mass, charge, position, or the like that make up their being arranged *K-wise*. The eliminativist is committed to *some* kind of reductionism in science—presumably to the in-principle possibility of reducing *E* to quantum physics, with E_{Lite} being the reducing theory.

---

ultimately result in costly ontological trade-offs for an eliminativist. Uzquiano speaks of 'paraphrase' because he is criticizing van Inwagen's position (in 1990: Chs. 10–11). Hereafter, I will only speak of *converting* or *recasting* these propositions, as the incompatibilist doesn't claim her *K-wise* propositions are literal interpretations of the source statement.

This is not a typical kind of scientific reductionism, so let us speak of reductionism* (and of reduction*, reducing*, etc.) to describe the eliminativist's commitments. Typically, a reductionist does not regard the reduced, higher-level theory as *false.* But for the eliminativist, *E* is a *false* (but *nearly as good as true*) higher-level theory that is merely a means to the *true* lower-level theory E_{Lite}. Once the reduction* is complete, we should not need or want to appeal to the higher-level theory: we climb down the ladder and kick it away.

Though false, *E* does have some measure of epistemic virtue that motivates the debunker's appealing to it in the first place. Reduction* to E_{Lite} should preserve as much of this virtue as possible. Because *E's* dependence on ordinary object beliefs is systematic, the eliminativist needs for the reduction* to *also* be systematic in nature. This ensures that it is possible to reduce* every proposition of *E* needed to run the debunking argument to some proposition of $E_{Lite.}$ Note that the reduction* of each needed proposition of *E* about some ordinary object *K* also confirms that proposition is indeed nearly as good as true, because it establishes there *is* some nearby truth about quarks arranged *K*-wise.[31]

The standard view of scientific theory reduction involves the idea that one body of scientific knowledge can be reduced to another—specifically, that some theory T_A reduces another theory T_B if T_A logically entails $T_B.$ This is usually understood to require *bridge principles* that establish logical relations between higher-level kinds in T_B with lower-level kinds in T_A. Of special epistemic importance is that the *laws* of the lower-level theory, combined with bridge principles, entail the *laws* of the higher-level theory. This demonstrates that the

[31] Hereafter, for simplicity we will assume that all mereological simples are *quarks*, and that quarks stand in for all elementary particles. This is a convention, like calling mereological simples "atoms." I use it to stress that E_{Lite} is made up of propositions about physical particles—not merely metaphysical posits.

knowledge contained in the higher-level theory's generalizations is contained in the lower level, reducing theory.[32]

The eliminativist denies that any proposition S_{Lite} of E_{Lite} about elementary particles, together with bridge principles, *entails* some proposition S of E about ordinary objects. Claims about ordinary objects—and whatever entails them—are false. Rather, she would need a rule like the following: what S_{Lite} plus bridge principles entails is some proposition S^* that entails that some proposition S of E is *nearly as good as true*. Given this qualification, the eliminativist can relate propositions of E_{Lite} to those of E in a general, systematic manner.[33]

Before moving on, I want to address the objection that E_{Lite} is really an *utterly* independent theory from E, with an entirely independent justification. The thought runs like this: all this talk of *preserving* justification or other epistemic virtues from E is misplaced. After all, the theory is false, and we shouldn't worry about what we're taking away from a theory we ultimately reject anyway.

The reasons to reject this view are simple. If E_{Lite} were an entirely new science, independent from E in every way, it would not yet exist—nor would it be justified. Currently its laws and explanations are unwritten, its hypotheses untested. This would not meet the debunker's needs for running EDO_{Lite}.

The debunker's audience is those who believe the results of E but not (yet) in eliminativism. This audience would not be justified in accepting the pronouncements of an unknown, untested science as support for $EDO1_{Lite}$. Rather than appealing to the results of an

---

[32] See Nagel (1961: Ch.11) for a classic statement of the view, and Brigandt and Love (2017: §3.1) for a useful overview.

[33] The picture looks something like the following. Proposition S_{Lite} is a description of what elementary particles are doing in a particular situation. Combined with bridge principles, S_{Lite} entails proposition S*: *that there are some simples arranged finch-wise* (or perhaps *that there is a plurality of simples arranged finch-wise* or *that there is a finch-wise arrangement of simples*). Proposition S^* entails that proposition S of E—*that there is a finch*—is nearly as good as true.

established science, or some principled modification of it, the eliminativist would be appealing to the in-principle possibility of a from-scratch theory of human evolution in terms of quarks, the possibility that it would say the needed things about human perceptual beliefs in ordinary objects to support EDO1$_{\text{Lite}}$—and the possibility that we should *believe* what it says.

Ultimately, even a completely new theory would be judged by whether and how it tells the *same* story *E* tells so clearly and with such authority. At present, the only way we can get even a rough sense of how such a theory would compare to *E* is to begin with *E* and imagine what it would take to reduce* it to the lowest level in a principled way.

As noted above, E_{Lite} is not a reduction in the conventional sense, but a surrogate theory that replaces *E* by capturing as much content from *E's* propositions as possible in an object-free way. While E_{Lite} doesn't need to have a surrogate claim for *every* proposition of *E*, it does need to be able to reproduce *E*'s explanation of human perceptual beliefs, and to be justified enough for us to believe it over its competitors. This justification comes not from running new experiments but from *taking existing propositions of observation, law, and explanation to have been nearly as good as true*.

6. Reductionism* and the Generality of E_{Lite}

The eliminativist's reductionism* is a substantial commitment that is independent from the commitments of evolutionary biology as a special science, and there are initial reasons to think it is a liability. The first and most obvious criticism of reduction* is that a scientific reduction* from evolutionary biology to quantum physics simply has not been done. Without the propositions of E_{Lite}, it is unclear what is to take the place of *E* in the debunker's argument.[34]

[34] Conventional reductions in the field of biology have been piecemeal, focused more on achieving a causal explanation of some part of the higher-level theory. Such reductions are not assumed to replace or eliminate the

Moreover, we have reasons to believe that E_{Lite} will never materialize. For instance, there are problems even partially accomplishing a reduction within biology itself. It is controversial whether classical, Mendelian genetics can be reduced to microbiology in the sense of theory reduction outlined above (see Hull 1972 and Kimbrough 1978). If there is substantial difficulty reducing one *subfield* of biology to another, it's an open question whether in some kind of grand unifying reduction of all the relevant fields of evolutionary biology to the smallest scale of quantum physics these difficulties might be greatly multiplied.[35]

However, my focus will not be on the lack of availability of the propositions resulting from reduction* to E_{Lite}, but on their undesirability. One major principled criticism that has been leveled against scientific reductionism is that higher-level kinds are often *multiply realizable* at the lower levels. For instance, a single phenotype in classical genetics is often realizable by multiple molecular mechanisms (see Hull 1972: §3). In such cases, a bridge principle relating a phenotype (P) of classical genetics to its molecular description in terms of microbiology (M) will be disjunctive on the side of the *reducing* theory:

$$\forall x\,(Px \leftrightarrow (M_1x \vee M_2x \vee M_3x \vee \ldots \vee M_nx))$$

This disjunctiveness becomes important when one tries to reduce the *kinds* of the higher-level theory to the *kinds* of the reducing theory. Unless the reducing theory captures the kinds of the higher-level theory in an orderly fashion, it cannot capture the full generality of the *laws* of the reduced theory. However, as Fodor and others have argued, the multiple realizability of higher-level features makes this kind of *type-type reduction* impossible. These "laws" will seem

---

higher-level theory. For an overview of this kind of partial, explanatory reduction in contrast to the full-fledged theory reduction to which the eliminativist is committed, see Brigandt and Love (2017: §3.2); for a survey of the kind of methodological assumptions at work in these partial reductions, see Kaiser (2011).

[35] For instance, it's *prima facie* unclear whether it's possible to reduce classical genetics to quantum physics without first *passing through* the level of microbiology and dealing with the aforementioned difficulties.

more like gerrymandered collections, not sufficiently general to do the work of real scientific laws.[36]

To give an informal example, let's say we want to reduce the very high-level law of evolutionary biology expressed by *All species have a means of reproduction* to the lower-level theory of zoology.[37] Here *species* is multiply realized by *humans* and *corals*, and *have a means of reproduction* is multiply realized by *reproduce sexually* and *reproduce by budding*. While *Humans reproduce sexually* and *Corals reproduce by budding* express (lower-level) laws that are instances of the law expressed by *All species have a means of reproduction*, we would not say of the following sentence that it expresses a general law: *all things that are humans or corals are things that reproduce sexually or reproduce by budding*.

That the lower-level kinds do not correspond neatly to the higher-level kinds means that there is a good reason to believe we will not be able to reduce the laws of the higher-level

---

[36] Say we have some law of the higher-level theory that relates two kinds Q and R, such that $\forall x(Qx \rightarrow Rx)$. Q is realized on the lower level by the kinds $S1$, $S2$, … Sn, such that the bridge principle contains a disjunction:

$$\forall x(Qx \leftrightarrow (S1x \vee S2x \vee S3x \vee \ldots \vee Snx))$$

Let's also assume that the higher-level kind R is realized on the lower level by $T1$, $T2$,…Tn, such that it results in the bridge principle:

$$\forall x(Rx \leftrightarrow (T1x \vee T2x \vee T3x \vee \ldots \vee Tnx))$$

On the lower level, these realizations are related to each other in smaller laws that are instances of $\forall x(Qx \rightarrow Rx)$, such as:

$$\forall x(S2x \rightarrow T3x), \forall x(S3x \rightarrow T1x), \forall x(S6x \rightarrow T2x)\ldots$$

But when these are joined to replicate the form of the law $\forall x(Qx \rightarrow Rx)$, the resulting proposition is radically disjunctive in a way that prevents it from being a unified law:

$$\forall x((S1x \vee S2x \vee S3x \vee\ldots \vee Snx) \rightarrow (T1x \vee T2x \vee T3x \vee \ldots \vee Tnx))$$

The argument was raised by Fodor (1974), and developed and defended in varying forms in, e.g., Gillett (2003), Aizawa (2008), and Aizawa and Gillett (2011). The formalizations are adapted from Brigandt and Love (2017: §4.2). For a dissenting view, as well as a useful summary of the multiple realizability literature, see Polger and Shapiro (2016).

[37] I won't argue for a definite position on what counts as higher-level or lower-level theories. It is plausible that zoology is lower level than evolutionary biology because the former makes up a *part* of the subject matter of the latter but is subject to its general laws.

sciences in terms of the lower-level ones. We can achieve *some* kind of reduction according to the above method, but the result will not be unified laws at the lower level (Brigandt & Love 2017: §4.2; Fodor 1974: §3).

For the debunker, this means even if it is possible to recast enough propositions of *E* into E_{Lite} to support $EDO1_{Lite}$ in the debunking argument, the resulting laws of E_{Lite} will lack the *generality* of the laws of *E*. They will not even look to us like laws, being massively disjunctive. This by itself is a substantial loss in theoretical virtue.

The eliminativist may object that we don't *need* smooth, unified lower-level reductions* of higher-level theories. E_{Lite} has other qualities that still make it preferable to *E*. If so, then it is no strike against E_{Lite} that it doesn't match up neatly with the kinds of the higher-level theory: these are exactly the things about which the debunking argument urges skepticism!

The eliminativist may claim that E_{Lite} is superior to *E* because it is not *false*.[38] This would certainly be part of the story for someone already convinced of eliminativism's truth before hearing EDO_{Lite}. However, because *E*'s falsity follows from EDO3, it would be question-begging to invoke this as a reason to prefer E_{Lite}—whose purpose is to *establish* EDO3. In the absence of *independent* arguments against ordinary objects, the rest of us can safely suspend judgment on whether E_{Lite} really does possess this particular virtue.

She might also appeal to the fact that lower-level theories display *different* virtues than higher-level theories. Lower-level theories can bring out interesting and important differences between things that appear similar at a higher level; their forte is depth, detail, and precision. Exceptions in the laws of *E*, for instance, often must be explained at a lower theoretical level. Surely these distinctive lower-level virtues count in favor of E_{Lite} (Sober 1999: 560–62).

[38] Strictly speaking, propositions of *E* may be false in places and lack a truth-value in others, depending on one's view of how false presuppositions affect the truth-value of statements that depend on them.

However, *E* also has access to these lower-level virtues. As *E* retains commitments to composite objects, so it retains the ability to appeal to many different levels of explanation as needed. *E* can explain patterns in entire populations of organisms over time and can relate these to microscopic changes happening in the DNA of individual members. It can take advantage of *localized* reductive explanations without giving up access to higher-level kinds. However, because E_{Lite} eliminates higher-level kinds as a matter of principle, it loses access to such multi-level explanations.

Even if E_{Lite} lacks generality without any clear compensating benefits, we must ask ourselves: does the loss of generality prevent E_{Lite} from supporting the debunker's argument in the needed way? In the next section, I will argue that it does.

7. Would E_{Lite} do the Work Needed by EDO$_{Lite}$?

The eliminativist may contend that E_{Lite}*'s* messy, gerrymandered laws and explanations would still *do the same work* as *E* in the ways that are needed for the debunking argument. Here are three things that E_{Lite} needs to be able to do, in its own low-level terms. First, E_{Lite} must be able to explain and predict the same range of phenomena as *E within evolutionary biology* by subsuming the relevant quark situations under appropriate laws; second, in order to be justified E_{Lite} must be able to utilize the existing experimental results supporting *E*; and third, it must be able to capture the content of tracking statements of *E,* whose truth depends on identity over time between higher-level entities. I will argue that E_{Lite} cannot accomplish these things.

The first problem E_{Lite} faces is that its laws don't cover the same phenomena as those of *E.* The laws of E_{Lite} lack generality because they do not appeal to higher-level kinds like composite objects. Restricted to this low level, E_{Lite}*'s* laws are necessarily incredibly particularized. Where *E* puts statements of law or observation in terms of increasingly complex

kinds to express explanations, E_{Lite} must put them in terms of increasingly complex *propositions* about *one* kind (quarks).[39, 40] To capture even part of the content of a law (or law-like generalization) of biology such as "All organisms inherit traits from their parents," E_{Lite} must disjunctively list the situations involving quarks that would realize the *atomic* kinds in order to list the situations that would make up the *molecular* kinds, etc., that would ultimately realize the kind *organism*.[41]

Because they are list-like disjunctions of the known realizations of higher-level kinds, propositions of law in E_{Lite} only cover a finite range of phenomena. By contrast, the laws of *E* quantify over general, higher-level terms, giving them a tremendous advantage: they are *open-ended*. The proposition *that all P's are Q's* (where *P* is a higher-level kind) applies to *all* things that are *P*. It makes no difference whether they have been identified or discovered yet. Perhaps some things will become *P's* in the future; our law about *P's* would cover them, too. Perhaps we haven't discovered some *P's* and never will; our law says those are also *Q's*. However, substituting for the kind *P* a *list* of things and saying these are *Q's* is a very limiting strategy.[42] Without reference to *P* as a *kind* of thing, we must just keep adding things to a list and hope we've got them all. Even assuming we're equipped with a complete list of all the known

---

[39] Or one *set* of kinds—it's possible that simples are a diverse group with different properties.
[40] It also makes increasingly weak disjunctive statements as we go up the chain, as opposed to increasingly strong statements of increasing generality.
[41] Quarks have properties like spin, mass, charge, and position. We are to use these properties to express how individual quarks are arranged atom-wise. There are plausibly many, many ways individual quarks can be arranged atom-wise. Even if this can be specified as a mere description of spatial relationships this law will have to account for the varying structures of 118 kinds of atoms—each a different way of being arranged atom-wise. Through complex predicates, our law will specify—and this is just to establish the reference of its subject term—all the ways quarks can be arranged (in concert with other quarks) in ways that count as being arranged atom-wise. The disjointness and overall complexity of the subject terms in statements of E_{Lite} must only be compounded when the eliminativist needs to capture the content of statements of E about putative molecular kinds, so that E_{Lite} can capture the observations and laws of conventional biochemistry. In theory, we can follow this process and build E_{Lite} conversions of more and more complex putative scientific kinds, gradually fleshing out quark-level realizations of genes, cells, organs, animals, ecosystems, and environments.
[42] In the case of E_{Lite}, we would know they also have properties identified by a list of the lower-level realizations of some putative higher-level kind *Q*.

realizations of *P*, our law would still not cover *novel* cases of *P*'s we might encounter in the future. It seems that, except perhaps with some artificially restricted domain, a law made up of lists of *any* length would not adequately capture the propositional content of a law *that All P's are Q's*.

What happens when practitioners using such disjunctive laws encounter some novel phenomenon that formerly would have been included under the kind '*P*'? They must *add* a disjunct somewhere in the appropriate law. This reveals a further oddity of such laws: whereas laws in terms of higher-level kinds can absorb new empirical data without changing, laws in terms of lower-level lists must change constantly to retain their predictive and explanatory power. Thus, no *single* lower-level law, not even the most up to date one, does the same work as the higher-level law it reduces.[43, 44]

In the case of E_{Lite}, we might expect this incomplete capturing of the content of higher-level laws to be compounded by the many levels of reduction* necessary to move from human perceptual psychology all the way down to quantum physics. The upshot is that E_{Lite} is crippled in its ability to explain or predict novel cases explained or predicted by *E*. The results could be catastrophic for EDO_{Lite}. For instance, is *the target audience for* EDO_{Lite} covered by these laws,

---

[43] Clearly, higher-level theories and their laws also need to be revised in light of novel data. But they are insulated from the kind of persistent reformulation described above by subsuming a wide range of potential data under general kinds. New data add supporting detail to the theoretical explanations supporting higher-level laws; but the laws themselves are stable over time, except in the rare cases where a specially designed experiment produces confuting evidence.

[44] Consider a law L_1, which covers several low-level realizations of both *P* and *Q*:

$$\boldsymbol{L_1}\text{: } \forall x((P_1x \vee P_2x \vee P_3x) \rightarrow (Q_1x \vee Q_2x \vee Q_3x))$$

Scientists later discover some new things that would have been considered realizations of the putative kinds *P* and *Q*, such that they produce a new law L_2:

$$\boldsymbol{L_2}\text{: } \forall x((P_1x \vee P_2x \vee P_3x \vee P_4x) \rightarrow (Q_1x \vee Q_2x \vee Q_3x \vee Q_4x))$$

The law L_1 does not cover P_4 or predicate Q_4 of any *P*s. Practitioners can keep producing new laws that include new realizations, but this generates a series of different laws, and no *single* law—not even the most inclusive, up-to-date version—does the work of the law *that all P's are Q's*.

assuming their quantum structure is not already spelled out in the laws' particulars? Are *our ordinary object beliefs* covered by the laws? If not, then why should we listen? It's possible to answer these questions favorably for E_{Lite}; however, to do so the eliminativist must find a way to recover some generality in a way that's motivated within E_{Lite} itself and that doesn't rely on illicit appeals to the higher-level kinds it rejects.

The second problem for E_{Lite} concerns the nature of the existing experimental evidence for E.[45] Unfortunately, all the experiments conducted and observations made to test E—from sciences ranging from zoology to microbiology—were not designed to measure the behavior of quarks. In fact, every experimental finding regarding E has been *radically* imprecise as to what the quarks were doing in the situation. Assuming that we already have some serviceable low-level law in terms of quarks, we would not know if some particular experiment supporting E confirmed or confuted it, or whether it represents some new quark-situation that needs to be added to our law for it to remain complete and current. Thus, in the absence of any recourse to generalities—even in terms of quark-wise things—E_{Lite}*'s* relation to the experimental evidence is unclear, as is its justification.

Finally, E_{Lite} has a problem expressing *identities over time* between higher-level entities covered by E. Of course, the eliminativist doesn't *believe in* these higher-level entities. But it remains a problem: for instance, the eliminativist needs to be able to express (in low-level terms) why the *identical* human organism who just had some visual experiences caused by quarks arranged object-wise now believes there is an object in front of him. This in turn depends on a story about why, of each member of a crucial set of ancestors, the *identical* ancestor that had a

[45] Conversely, the few experiments that have dealt directly with observing quarks have had the purpose of relating them to other subatomic particles to determine their nature and properties. These experiments were not done for the specific purpose of testing E, and the light they shed on E's justification is correspondingly dim.

certain perceptual trait also had higher reproductive fitness than its rivals. Perhaps many details are dispensable for the purposes of EDO_{Lite}, but some low-level version of this central story is *not*. Likewise, the broad evolutionary picture that supports and justifies this story—from many subfields of biology—involves *tracking* individual organisms through their development, mating, and adaptive relationship with their environments. Without some way of appealing to identities between members of higher-level categories, E_{Lite} simply lacks the vocabulary to express this crucial explanation of our object beliefs. In E_{Lite}, the only thing capable of being identical to itself is a quark.

In the next section, I examine a promising strategy for solving all three of these problems by appealing to *pluralities* of quarks arranged *K*-wise, and to kinds built up in those terms.

8. Pluralities of Quarks Arranged *K*-wise, Arrangements *K*-wise, and Shmidentity

The eliminativist may raise the following objection. Surely, we—and field biologists—can say *something* about the quark-situation just based on what we can observe with our own eyes. What's causing the finch-wise experience I'm currently having? A *plurality* of quarks arranged finch-wise. I can make observations about the identical plurality over time, tracking it through changes. Similarly, I can convert propositions of observation from conventional experiments made about finches into propositions in terms of *pluralities* of quarks arranged finch-wise. These observations and experiments can then support E_{Lite} in roughly the same way they supported *E*. In addition, we can subsume all the low-level particulars about how quarks are arranged finch-wise under the *kind* "pluralities arranged finch-wise." We can also generalize to *kinds of kinds* of pluralities, and so on, using these to formulate object-free propositions of law and explanation at whatever level we please. Soon, E_{Lite} is a theory as robustly general as *E*—open-ended and

covering all phenomena relevant to EDO_{Lite}. This seems to take care of the problems with lack of generality outlined in Section 7.

For this strategy to work, the propositions of E_{Lite}, in terms of pluralities of simples arranged *K*-wise, must capture the content of propositions about *individual* objects of the kind *K* in *E*. Only then can E_{Lite} generalize about kinds of pluralities, kinds of kinds of pluralities, and so on in a way that matches the attributions in *E* in the ways needed to support EDO_{Lite}. A proposition of E_{Lite} captures the content of a proposition of *E* if and only if it's true to attribute things to the plurality (or kind of plurality, etc.) of simples arranged *K*-wise in the proposition of E_{Lite} that are attributed to the object (or kind of object, etc.) *K* in the proposition of *E.* In other words, pluralities arranged finch-wise need to behave exactly like (putative) finches.

This demand for content capturing is not arbitrary: remember that the close correspondence between the content of propositions of E_{Lite} about simples arranged *K*-wise and that of propositions of *E* about some object *K* both explains the trustworthiness of *E* and allows E_{Lite} to share in *E's* epistemic virtues and justification.[46] The content of any proposition of *E* that fails to have a corresponding proposition in E_{Lite}—as well as its justifying, explanatory, or predictive value—would be lost to E_{Lite}, and so would the content of any propositions dependent upon it. If large classes of important propositions of *E* were in-principle uncapturable for $E_{Lite,}$ the results would be catastrophic for EDO_{Lite}.

I argue that proponents of E_{Lite} face a trilemma here. If they simply recast propositions of *E* in terms of pluralities arranged *K*-wise, the resulting surrogate propositions inevitably fail to capture any content that involves composite objects such as finches persisting over time. Alternately, they can supplement propositions in terms of pluralities arranged *K*-wise with a new

[46] Cf. Section 4 on incompatibilism and the end of Section 5 on the dependence of E_{Lite} on *E*.

metaphysical relation (I'll call it 'shmidentity') that obtains for pluralities arranged *K*-wise over time, allowing such propositions to capture the content related to object persistence, but at the cost of introducing a strange and unparsimonious metaphysical relation into all corners of the science; lastly, proponents of E_{Lite} can say that *arrangements K*-wise are what persist over time in its converted scientific propositions, but this introduces new entities into their ontology that have the earmarks of composite objects.

Eliminativists pursuing the strategy of generalizing in terms of pluralities arranged *K*-wise must reckon with the fact that pluralities of quarks arranged finch-wise have different persistence conditions than do (putative) finches. At time t_1, some plurality P_1 includes all and only the quarks arranged finch-wise during some scientific observation of an individual finch *F*. But change one quark and a plurality of quarks is no longer the *same* plurality. Organisms like finches are constantly changing on the microscopic level, metabolizing food into tissues and passing the rest as waste, sloughing off feathers and dead skin, sustaining small injuries, or simply growing and aging. At t_2, milliseconds later, two things have happened: first, P_1 is no longer arranged finch-wise, as some of the quarks in this plurality have passed out of finch-wise arrangement; second, the quarks of some *different* plurality P_2 are all and only the quarks populating *F*. In fact, during any observation of a single finch *F* over times $t_1 \ldots t_n$, scientists are observing a *succession* of pluralities of quarks arranged finch-wise, $P_1 \ldots P_n$.[47, 48]

Ultimately, no single plurality of quarks does the causal work of any individual finch *F,* because none remains arranged finch-wise long enough. Rather, a shifting group of quarks is involved in the causal work of a finch over time, with new sub-groups of simples being shuttled

[47] I use 'populate' or 'belong to' as an ontologically neutral way of specifying which quarks are arranged *K-wise* in any particular arrangement *K-wise* at the time in question.
[48] For economy, I will hereafter just write 'finch' or 'organism' in this section. But the reader should hear 'putative' in front of any term that presupposes commitments to ordinary objects.

in and out every millisecond. This means the proposition *that the finch that laid this clutch of eggs is the same finch that did not reproduce last year* is not captured by any corresponding proposition about identical pluralities arranged finch-wise. Even if the proposition is true—that is, if identity holds between a finch and itself—it is false when converted into a proposition about two pluralities arranged finch-wise.

The eliminativist could respond by introducing a new relation that applies to pluralities over time, such that a set of pluralities $P_1 \ldots P_n$ are 'shmidentical' at times $t_1 \ldots t_n$ as long as the quarks were replaced in a suitably gradual manner at each stage.[49] Even if P_n comprised an *entirely* different set of quarks at times t_1 and t_n, it could still qualify as the shmidentical plurality to P_1 if it met the condition for gradual replacement. This would seem to circumvent the problem with the above proposition about the egg-laying finch. However, these conditions are too loose. Over enough time *any* two pluralities would be shmidentical, such as a finch and the tree in which it makes its nest. Nor is it sufficient to tie shmidentity over time to *being arranged K*-wise consistently over time. For instance, a plurality of quarks arranged finch-wise might belong at t_1 to a mother about to lay a clutch of eggs and at t_n be distributed between her and her three chicks; this would not allow E_{Lite} to capture, for example, propositions exclusively about the mother during $t_1 \ldots t_n$. Nor would this strategy forbid our propositions from tracking random or uninteresting pluralities of finch-wise quarks from $t_1 \ldots t_n$, such as part of a beak or talon. We need shmidentity to apply exclusively to successions of pluralities arranged *K*-wise that are made up of all and only those quarks that populate *a K*-wise *arrangement* corresponding to a particular (putative) finch over time. So, ultimately shmidentity conditions must piggyback on our *identity* conditions for finches.

[49] See, e.g., Contessa (2014: 213–14) for a version of this strategy defending a somewhat different position.

However, note that the eliminativist has introduced a strange and unparsimonious new metaphysical relation that has to be built into E_{Lite} at every level.[50] Shmidentity holds between two *K*-wise pluralities over time whenever *identity* would hold between two composite objects of the kind *K*. This is a problematic reliance on counterpossible facts. It's true that counterpossibles occur in scientific theories quite regularly. For instance, they feature in the antecedents of counterfactual conditionals whose purpose is to explain why some actual property of something is doing what it really is doing in contrast to an another (impossible) situation that would yield a different outcome (Tan 2019). However, these are localized, limited explanations. Shmidentity is a widespread relation that features crucially in the positive propositions of law, observation, and explanation of the theory, and it can *only* obtain between nonexistent objects. This is a *radically* different kind and level of dependence on counterpossibles from what is normally encountered in the sciences. The counterpossible facts about identity conditions between nonexistent objects would seem to be fundamental, and as numerous as there are kinds of nonexistent composite objects—hence the loss of parsimony.[51, 52]

The third strategy for an eliminativist is the simplest: jettison the notion of shmidentity and claim that *arrangements K*-wise are things that can persist over time separately from any particular quarks or pluralities of quarks. An arrangement finch-wise needs has the same properties as finches do in *E*, including persisting under whatever conditions a finch would in *E*.

---

[50] Another oddity is that shmidentity seems to depend on clear and definite identity conditions in a way that ordinary science does not. *E* proceeds unimpeded despite such identity conditions never having been specified clearly or in detail, but the very definition of shmidentity presupposes the existence of those conditions.

[51] These facts cannot be reduced, e.g., to more fundamental facts about nonexistent objects, for there are no such facts. I'm assuming here that the eliminativist would not want to say counterpossible facts about nonexistent objects are reducible to facts about impossible worlds.

[52] The contrast between the usual kinds of occurrences of counterpossibles in scientific theory and the shmidentity relation can be illustrated by comparing two cases. In the first case, explaining entropy by appealing the counterfactual: if a machine were indeed a perpetual motion machine, it would never need an infusion of energy from the outside. (This explains why *real* machines need energy to run.) In the second case, taking some property that *only* perpetual motion machines have, and attributing it to *real* groups of machines described by one's theory.

We assume here that an arrangement has a fluctuating population of quarks and pluralities of quarks but is arranged in the right way over time to sustain these higher-level properties.

But notice that the eliminativist's ontology now looks very much as it would if it included composite objects. An arrangement is not a quark, nor is it any particular plurality of quarks. But it exists and bears attributes referenced by the propositions of law in E_{Lite}—including causal powers—that no quark or plurality of quarks could bear. Arrangements finch-wise are new entities that behave very much like composite objects. Perhaps they are finches?

Ultimately, the eliminativist seems unable to recoup generality in terms of kinds built from pluralities of quarks arranged *K*-wise without incurring great costs in the process. This implies that E_{Lite} will indeed be made up of incredibly complex, particularized propositions about quarks, and will be subject to the limitations I outlined in Sections 6 and 7. These are fatal liabilities for the view, indicating that E_{Lite} is inadequate to run the debunking argument.

This mismatch between *E* and E_{Lite} has another unattractive consequence for the eliminativist. Because a vast range of crucial propositions of *E* cannot in principle have a corresponding *K*-wise situation to be captured by a proposition of E_{Lite}, they are not *false but nearly as good as true.* Rather, they and the substantial chunk of evolutionary biology that depends on them are simply *false*—as false as the belief that unicorns are right now trotting across the rainbow.

9. Conclusion

If my argument has been successful, I have shown four things:

1.*That there is a self-defeat problem facing the evolutionary debunker of ordinary objects.* Evolutionary theory and its body of evidence depend on ordinary objects, and debunkers will need to reckon with this problem. I am not optimistic about the prospects for an eliminativist

solution. I believe this argument generalizes even to more nuanced kinds of eliminativism that establish exceptions for certain kinds of objects, such as organisms or conscious beings. Evolutionary theory seems to require ordinary objects on a very wide scale to tell its story; the inanimate, unconscious objects making up organisms' environments are an indispensable part of that story.

2. *That eliminativists who utilize* K-*wise conversion strategies, believe in a complete low-level causal story of the world, and appeal to the results of the special sciences commit themselves to some form of scientific reductionism.* The alternative is to appeal to a completely unknown, untested theory. This applies to eliminativists who run EDO_{Lite} but are, for example, instrumentalists about science and claim only to be pointing out a conflict between conventional scientific realism and beliefs about ordinary objects. Without such a reduction, the scientific realist has no grounds for accepting the argument. Eliminativists who run debunking arguments against other kinds of beliefs (e.g., moral or aesthetic) face no self-defeat problem, but must reckon with the tension between their ontologies and the claims of evolutionary biology.

3. *That to recast any propositions of* E *referencing ordinary objects of some kind* K as *propositions about* pluralities *of quarks arranged* K-*wise in* E_{Lite} *is problematic.* To capture the needed content of the propositions of *E*, the proponent of E_{Lite} must find a way out of my trilemma as presented in Section 8.

4. *That a theory* E_{Lite} *resulting from a systematic, eliminative reduction* of* E *would have insufficient justification and explanatory power to support the debunking argument.* As a theory on the level of quarks without recourse to generality in terms of *pluralities* of quarks—let alone any higher kinds—E_{Lite} must have laws that are incredibly particularized. Thus, it sacrifices not only necessary breadth and power in the form of general laws and explanations, but a critical

range of observations as well. As a result, it cannot express relevant evolutionary explanations in support of EDO_{Lite}, and its justification is in serious jeopardy.

My essay has said little about permissivists, but they sometimes use debunking arguments to establish that there is no reason to believe that *only* ordinary objects exist. Given all the ways the universe *could* be carved up into objects, if our object beliefs happen to be true and all and only the ordinary ones exist, this could only be the result of incredible luck. Addressing this kind of debunking argument will have to wait for a future work, but much of what I've said here will apply to permissivists who accept Composition as Identity or some weaker whole-part reductionism; when appealing to *E*, they will have to deal with some of the same problems I've described here for the eliminativist debunker.[53]

Acknowledgments

I owe special thanks to Daniel Z. Korman for holding the seminar on debunking arguments that produced the great grandparent of the present paper, and for giving very generous and helpful comments on several drafts. I am also grateful for the keen eyes and helpful comments of Thomas Barrett, Christopher Britton, Kyle Dickey, Kevin Falvey, Jason Hanschmann, Colton Heiberg, David King, Blake Kyler, Dan Korman, Alex LeBrun, Teresa Robertson, Daniel Story, Sam Zahn, and the members of a conference audience at Johns Hopkins. Finally, I want to thank two anonymous referees for their very generous and constructive comments.

References

Aizawa, Kenneth, (2008). Neuroscience and Multiple Realization: A Reply to Bechtel and Mundale. *Synthese*, *167*(3), 495–510.

[53] See Korman (2015: Ch.7) for a useful overview of various versions of the debunking arguments, as well as Kovacs (2019) and Barker (2019) for recent, related discussions of commitments among revisionary ontologists.

Aizawa, Kenneth and Carl Gillett (2011). The Autonomy of Psychology in the Age of Neuroscience. In P.M. Illari, F. Russo, and J. Williamson (Eds.), *Causality in the Sciences* (203–23). Oxford University Press.

Barker, Jonathan, (2019). Debunking Arguments and Metaphysical Laws. *Philosophical Studies*, *177*(7), 1829–55.

Benovsky, Jiri (2015). From Experience to Metaphysics: On Experience-Based Intuitions and their Role in Metaphysics. *Noûs, 49*(4), 684–97.

Brigandt, Ingo and Alan Love (2017). Reductionism in Biology. In Edward N. Zalta (Ed.), *The Stanford Encyclopedia of Philosoph*y (Spring 2017 Edition). Retrieved from https://plato.stanford.edu/archives/spr2017/entries/reduction-biology/

Contessa, Gabriele (2014). One's A Crowd: Mereological Eliminativism Without Ordinary-Object Eliminativism. *Analytic Philosophy*, *55*(2), 199–221.

Fodor, Jerry A. (1974). Special Sciences (Or: The Disunity of Science as a Working Hypothesis). *Synthese*, *28*(2), 97–115.

Gillett, Carl (2003). The Metaphysics of Realization, Multiple Realization, and the Special Sciences. *Journal of Philosophy*, *100*(1), 591–603.

Hawthorne, Jonathan (2004). Identity. In D. Zimmerman and M. Loux (Eds.), *Oxford Companion to Metaphysics* (99–130). Oxford University Press, 99–130.

Hull, David (1972). Reductionism in Genetics—Biology or Philosophy? *Philosophy of Science*, *39*(4), 491–99.

Kaiser, Marie I. (2011). The Limits of Reductionism in the Life Sciences. *History and Philosophy of the Life Sciences*, *33*(4), 453–76.

Kimbrough, Steven O. (1978). On the Reduction of Genetics to Molecular Biology. *Philosophy of Science*, *46*(3), 389–406.

Korman, Daniel Z. (2009). Eliminativism and the Challenge from Folk Belief. *Noûs, 43*(2), 242–64.

Korman, Daniel Z. (2014). Debunking Perceptual Beliefs about Ordinary Objects. *Philosophers' Imprint, 14*(13), 1–21.

Korman, Daniel Z. (2015). *Objects: Nothing Out of the Ordinary.* Oxford University Press.

Korman, Daniel Z. (2016). Ordinary Objects. In Edward N. Zalta (Ed.) *The Stanford Encyclopedia of Philosophy* (Spring 2016 Edition). Retrieved from https://plato.stanford.edu/archives/spr2016/entries/ordinary-objects/

Korman, Daniel Z. (2019). Debunking Arguments in Metaethics and Metaphysics. In A Goldman and Brian McLaughlin (Eds.), *Metaphysics and Cognitive Science* (1–34). Oxford University Press.

Kovacs, David M. (2019). How to be an Uncompromising Revisionary Ontologist. *Synthese* (2019). Advance online publication. https://doi.org/10.1007/s11229-019-02196-8

Merricks, Trenton (2001). *Objects and Persons.* Oxford University Press.

Merricks, Trenton (2003). Review: Replies. *Philosophy and Phenomenological Research*, *67*(3), 727–44.

Merricks, Trenton (2014). Comments on Van Inwagen's 'Inside and Outside the Ontology Room'. Unpublished comments from the California Metaphysics Conference at the University of Southern California.

Merricks, Trenton (2017). Do Ordinary Objects Exist? No. In E. Barnes (Ed.), *Current Controversies in Metaphysics* (135–48). Routledge.

Nagel, Ernest (1961). *The Structure of Science: Problems in the Logic of Scientific Explanation*. Harcourt, Brace & World.

O'Leary-Hawthorne, John and Michaelis Michael (1996). Compatibilist Semantics in Metaphysics: A Case Study. *Australasian Journal of Philosophy, 74*(1), 117–34.

Polger, Thomas W. and Lawrence A. Shapiro (2016). *The Multiple Realization Book.* Oxford University Press.

Putnam, Hilary (1975). Philosophy and Our Mental Life. In H. Putnam (Ed.), *Philosophical Papers* (291–303). Cambridge University Press.

Sober, Elliott (1999). The Multiple Realizability Argument against Reductionism. *Philosophy of Science, 66*(4), 542–64.

Street, Sharon (2006). A Darwinian Dilemma for Realist Theories of Value. *Philosophical Studies, 127*(1), 109–66.

Tan, Peter (2019). Counterpossible Non-Vacuity in Scientific Practice. *Journal of Philosophy, 116*(1), 32–60.

Uzquiano, Gabriel (2004). Plurals and Simples. *The Monist*, 87(3), 429-451.

van Inwagen, Peter (1990). *Material Beings*. Cornell University Press.

van Inwagen, Peter (2014). Introduction: Inside and Outside the Ontology Room. In *Existence: Essays in Ontology* (1–14). Cambridge University Press.

Vavova, Katia (2015). Evolutionary Debunking of Moral Realism. *Philosophy Compass, 10*(2), 104–16.

Williamson, Timothy (2007). *The Philosophy of Philosophy.* Blackwell.

Weiner, Jonathan (1994). *The Beak of the Finch.* Vintage Books.