Debunking Rationalist Defenses of Common-Sense Ontology:
An Empirical Approach

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1. Introduction

Common-sense ontologists hold that there exist the kinds of objects we intuitively take there to be. They hold, for example, that there exist *ordinary objects* like trees, dogs, mountains, and baseballs, but not *strange objects* like trogs (the mereological fusion of a tree and a dog) or merely atoms arranged x-wise (tree-wise, dog-wise, etc.). Some such ontologists employ what might be called *rationalist defenses*, which appeal to the deliverances of common sense in defending common-sense ontologies and in challenging revisionary ontologies. [1] Common-sense ontologies have come under fire from *debunking arguments*. Debunking arguments attempt to show that a set of beliefs (or other intensional mental states, like intuitions) bear no appropriate explanatory connection to what they purport to be about.[2] Thus, it would seem, such beliefs, if true, would only be accidentally so.[3] In other words, debunking arguments attempt to show that the causal origins of a belief or set of beliefs constitute an undermining defeater, and thus deprive the beliefs of epistemic justification.

Debunking arguments that arise in material-object metaphysics often point out that it would be by sheer coincidence if our common-sense conceptual scheme lined up with the actual ontology of the world. For example, Mark Heller holds that "we conceptually divide up the world into objects one way rather than another because doing so will serve our purposes better," and thus

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[1] When I refer to 'common sense', I will mean to refer to the common-sense beliefs and intuitions that accord with our ordinary conception of the world. Some common-sense ontologists would likely prefer to talk about only beliefs, or only intuitions, but I will be concerned with both here.

[2] Debunking arguments—and associated "reliability challenges"—arise in various philosophical domains, targeting beliefs about morality, the existence of God, logic, math and others. For example, see Clarke-Doane (2012), Bedke (2009), Street (2011, 2006), Joyce (2006, 2000), and Harman (1977) on ethics; Mason (2010), Rea (2002), and Plantinga (1994) on religion; Schechter (2013, 2010) on logic; and Clarke-Doane (2012), Field (1989: 25-30), and Benacerraf (1973) on math. See White (2010) for a general discussion of the epistemology of debunking. For discussions of *evolutionary* debunking, see Street (2011, 2006), Kahane (2011), Clarke-Doane (2012), and Vavova (forthcoming). Some of the authors cited here would characterize the issues and arguments somewhat differently, e.g., Schechter conceives of the arguments as "reliability challenges" rather than explanatory challenges.

[3] This is one way of characterizing the nature of a debunking argument, but it is not the only way. Some conceive of debunking arguments in terms of a *sensitivity requirement*, rather than an *explanatory requirement* (e.g., see Clarke-Doane 2012 and Bedke 2009). One might think that such requirements rise or fall together. However, for the purposes of this paper, I will utilize and focus on the *explanatory* version.

there is little chance that the resulting ontology will be the true ontology. … In principle, we could by sheer coincidence arrive at the true ontology. … I will discount the possibility of such a coincidence.[4]

More recently, Sarah-Jane Leslie, though not specifically concerned with material-object metaphysics, puts a general version of the point very nicely:

> There are many explanations of why we may be fundamentally disposed to see the world in a particular way, only one of which is that *metaphysically or scientifically speaking, the world actually is that way*. Another explanation may be that it is simply useful and practical to see the world that way—and this may be so even if it misleads us with respect to the metaphysical and scientific structure of reality. One particular way of carving up the world may be, say, efficient from the information processing point of view, without reflecting much about the fundamental nature of reality.[5]

Such debunking arguments often suggest that it is a biological or cultural accident that we typically believe in the kinds of objects that we do, and that such beliefs are due to biological and cultural contingencies that themselves have nothing to do with what the true ontology is. We can imagine, for instance, that certain facts about how our perceptual systems evolved lead us to perceive certain kinds of properties as belonging to single, unified objects and other kinds of properties as not so unified, but that these perceptual and evolutionary contingencies were not connected to the actual ontological facts, whatever they are. This appeal to biological and cultural factors plays an important role in many debunking arguments, including those in other areas of philosophy,[6] but at least as such appeals arise in material-object metaphysics, they nearly always remain unsubstantiated with little more than, as John Hawthorne calls it, "sociological imagination."[7]

The primary goal of this paper is to remedy this by providing empirical substantiation for these debunking arguments by showing that a scientifically grounded debunking explanation exists for what common sense tells us about what objects there are. The empirical evidence I present touches on a number of biological factors, particularly those concerning the nature of the human cognitive-visual system, while cultural factors are bracketed. The empirical evidence I discuss, while not particularly novel, has been largely overlooked within the debates at hand, for which it is quite relevant. Examination of this evidence is important in providing concrete support for the debunking arguments under discussion, since without it, such arguments can only appeal to hypothetical biological and cultural factors that *might* account for our common-sense ontology. But an appeal to merely hypothetical factors in this way likely will not, and likely should not, convince the common-sense ontologist that her ontology is in danger, and will not lend serious force to the

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[4] Heller (1990: 44). For other arguments and considerations in the same general vicinity, see Benovsky (2013: §2), Moyer (2006: 408), Hawthorne (2006: 109), Nolan (2005: 35), Merricks (2001: 72-76), Sider (2001: 156–157), Yablo (1987: 307), van Inwagen (1981: 127), and James (1890: 285).

[5] Leslie (2013: 1); italics original.

[6] E.g., *evolutionary debunking arguments* appeal to evolutionary influences on our beliefs. For example, see Street (2006) and Kahane (2011).

[7] See Hawthorne (2006: 109).

debunking arguments. And so, the debunking arguments stand much to gain from concrete empirical support.

In addition to providing this empirical support, I also argue that once we understand how the evidence supports the debunking arguments, we can see that it likewise undermines rationalist defenses in response to the debunking threat. Such defenses hold that intuition or rational insight is that by which we have come by our common-sense ontology, and that it explains how our common-sense beliefs are appropriately connected to the facts about which objects exist.

The paper will proceed as follows. In Section 2, I discuss the epistemology of debunking arguments as I am conceiving of them here, as well as the rationalist response to the debunking arguments aimed at common-sense ontology. In Section 3, I present and discuss the relevant empirical evidence in support of the debunking arguments. Finally, in Section 4, I consider some objections in response to the debunking threat on behalf of the common-sense ontologist, and argue that none of them succeed.

2. The Epistemology of Debunking

2.1. *The Explanatory Premise*

As mentioned above, debunking arguments are often understood as showing that a set of beliefs or other intensional mental states bear no appropriate explanatory connection to what they purport to be about. And if some beliefs about *p* bear no appropriate explanatory connection to the facts about *p*, then ostensibly, they are undermined or defeated. This explanatory constraint, cast as a premise in a debunking argument aimed at common-sense ontology, can be characterized thusly:

> **Explanatory Premise***:* There is no appropriate, non-deviant explanatory connection between our common-sense beliefs and intuitions about which kinds of objects exist and the facts about which kinds of objects exist.

The *explanatory premise* might be followed by an *epistemic premise*, which says simply: If so, then those common-sense beliefs are unjustified. The conclusion of the debunking argument would then be that our common-sense beliefs about which objects exist are unjustified.[8] Support for the *explanatory premise* would come from the truth of a corollary claim, such as:

> **Off-Track Explanation***:* The best supported explanation of our common-sense beliefs and intuitions about which kinds of objects exist is one according to which they are 'off-track', i.e., they do not track the facts about which objects exist.

The idea behind *off-track explanation* is that our common-sense beliefs and intuitions about which objects exist are ultimately explained by irrelevant influences, that is, influences that are irrelevant to the issue of which objects exist. As a result, those beliefs and intuitions are

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[8] Daniel Z. Korman understands some debunking arguments as one premise arguments, though sometimes he adds an additional, intermediate premise (e.g., see Korman 2014: 3). Guy Kahane (2011: 106) suggests a general, 2-premise schema for debunking arguments, in which there is a "causal premise" and an "epistemic premise." For the purposes of this paper, the exact logical structure of the debunking arguments is not vital.

'off-track' with regards to the facts about which objects there are. The empirical evidence I discuss in this paper is meant to act as support for *off-track explanation,* and thus for the *explanatory premise.* Since it is ultimately support for the *explanatory premise* that I am concerned with, I will henceforth simply refer to it, unless a distinction between the two claims is necessary.

The reference to an "appropriate, non-deviant explanatory connection" in the *explanatory premise* is meant, in part, to account for the fact that the philosophers I am responding to are concerned with a *world-to-mind* connection, where the facts explain our beliefs, rather than a *mind-to-world* connection, where our beliefs explain the facts, e.g., as in conventionalism about ontology. It is also meant to account for the possibility that there is a miraculous or merely accidental connection between our beliefs and the facts. So the important idea associated with an "appropriate" connection here is (a) that the facts about which objects exist explain our beliefs and intuitions about which objects exist,[9] and (b) that they do so in a non-miraculous and non-accidental manner. With respect to (a), I will assume that explanation is importantly related to causation, and so for the facts to explain our beliefs, those beliefs must be caused by the facts.[10] One might object here that facts cannot cause anything, since facts are simply true propositions, and propositions are non-causal. This may be right, but what I will mean by 'facts' in this paper is simply 'worldly states-of-affairs' rather than true propositions. It is the contention of the debunking arguments under discussion here that there is no such appropriate explanatory connection that meets conditions (a) and (b), and this is largely, if not only, because the contingent biological and cultural factors that explain our common-sense ontology are irrelevant to or disconnected from whatever the true ontology is.

The notion of the explanatory connection between the facts and our beliefs being 'non-deviant' (or deviant, as the case may be) has to do with the nature of the causal chains connecting them. Suppose we encounter some worldly state-of-affairs S, and various perceptual and cognitive mechanisms go to work in order to produce a perceptual experience of S. But suppose that whether we end up with an experience as of a *tree* or as of a *trog*, or as of merely *atoms arranged tree-wise*, is ultimately determined by biological and cultural contingencies, such as the nature of our perceptual systems or cultural practices, and not by whether there is *in fact* a tree or a trog. Suppose then that, on the basis of this experience, we form the belief that there is a tree in front of us. The suggestion is that, even if this belief were true, it would not ultimately be explained by the presence of the tree, but by other factors. This would be a *deviant causal chain*: the facts about what objects exist, whatever they are, are not connected up with, and thus do not explain, our beliefs in the right way.[11]

Consider another, simpler example of a deviant causal chain: imagine that person *P* has a neurological condition that makes the world appear green-tinted to her. But imagine

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[9] Korman refers to this, where the facts about some subject matter explain our beliefs about that subject matter, as an "alethic explanation." See Korman (2014: 2-3) for his discussion.

[10] This, I think, is a reasonable presupposition. Causal-mechanistic accounts of explanation are quite popular (see, for example, Woodward 2003 and Salmon 1998). In any event, it is beyond the scope of this paper to argue directly for a causal account of explanation.

[11] See Korman (2014: 12-13) for a helpful discussion of deviant causation. I pull from his own discussion here.

that *P*, for whatever reason, is unaware of this condition. *P* accordingly forms various beliefs that the world is green (and not merely that the world *seems* green, since that would be a somewhat different matter). This, again, is deviant causation: *P*'s beliefs about the color of the things in the world are not caused by the facts about the color (e.g., the reflective properties) of the things in the world, but by another, unrelated factor: her condition. As a result, *P*'s beliefs that the world is green are not explained, at least not in the right way, by the facts about the colors in the world. And this would be the case even if *P* were to look at something that actually *was* green, like grass, and form the true belief that it was green. The belief would still be explained not by the greenness of the grass, but by *P's* condition. Debunking arguments aimed at common-sense ontology often hold that the causal chains that account for our common-sense beliefs about which objects exist are deviant in this way—namely, they are caused and explained by essentially irrelevant factors.

It is rather intuitive to think of the relevant explanatory connection in terms of whether our beliefs and intuitions are *reliable indicators* of the facts or not, in the way that a properly functioning thermometer is a reliable indicator of the temperature. And the notion of reliable indicatorship is not necessarily unimportant for debunking arguments; it is sensible to think that if our beliefs and intuitions about subject matter x are not reliable indicators of the facts about subject matter x, then those beliefs and intuitions are epistemically deficient. But the notion of reliable indicatorship can't, I think, do the debunking job on its own. This is for a few reasons. The first is that explanatory connectedness and reliable indicatorship can come apart: x can be a reliable indicator of y but not necessarily explain y, and vice versa.[12] Another reason similar to the first is that, at least in principle, something might be a reliable indicator of something else in a miraculous fashion (consider BonJour's well-known Norman the clairvoyant case), where there is no mechanism to support an explanatory connection.[13] But perhaps the most important reason is because the issue at hand isn't merely whether or not our common-sense beliefs and intuitions are reliable indicators of the facts about what objects exist, but also whether we should think that they are appropriately related to those facts such that they might be reliable indicators of them *to begin with*. The debunking arguments I seek to support hold that they *are not* so related, again, primarily because they hold that epistemically irrelevant biological and cultural contingencies are responsible for our common-sense ontology, not the actual ontological facts, whatever they are.

A final clarification regarding the *explanatory premise*. There is, according to one line of thought, an important ambiguity in the question "which objects exist?" And so there is a potential ambiguity regarding the nature of the explanatory connection at issue in the *explanatory premise*. On one understanding, "which objects exist?" is what Carnap called an "internal question," namely, one that can only be understood and answered relative to the rules of some or another linguistic framework.[14] For example, consider Amie Thomasson's (2007) view that it is an analytic truth that 'atoms arranged x-wise compose an x.' On this view, the question "which objects exist?" is an internal question, since one ostensibly need

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[12] Thanks to an anonymous referee for raising this point.
[13] See BonJour (1980).
[14] See Carnap (1950).

only appeal to the rules or axioms of the relevant linguistic framework to see that x's exist. On another understanding, "which objects exist?" is what Carnap called an "external question," namely, is there some 'objective' sense in which some objects exist and others do not—do some objects exist *simpliciter*? This question is not a question about the rules of a particular linguistic or conceptual framework, but is a question about 'the world', so to speak. I am here concerned with the question in the external sense. So the *explanatory premise* is not concerned with the connection between our common-sense beliefs about which objects exist and the rules of, say, the 'ordinary language' linguistic framework, but between those beliefs and what the non-linguistic, objective world is like.[15]

2.2. Rationalist Defenses of Common-Sense Ontology

Now to discuss the primary target of the debunking arguments to be given support here. One view regarding the nature of our evidence for a common-sense ontology places heavy emphasis on our common-sense intuitions and/or beliefs about which kinds of objects exist, and treats those intuitions and beliefs as evidence for an ontology that is more or less in line with them. Daniel Z. Korman (2008, 2009, 2010, 2014, forthcoming), for example, employs a rationalist, particularist approach that is based around the use of intuitive judgments about ontological and mereological problem-cases to defend what he calls "conservatism." He holds there to be a serious "challenge from folk belief" (and folk intuition) against eliminativism.[16] Similarly, he takes the conflict between universalism and the intuitions of both folk and philosophers to constitute a serious challenge to the former.[17] Ned Markosian (1998, 2008, 2014) similarly defends a common-sense ontology with explicit appeals to common-sense intuitions as evidence for his position, and as things that ought to be respected by any acceptable account. In Markosian (2014), he defends what he calls the *Spatial Approach to Mereology*, and notes that each of the leading views on the market about how to answer the *Special Composition Question*—the question of under what conditions do some *x*s compose a *y?*—"has wildly counterintuitive consequences" (pg. 4).[18] In defending his own view, he claims that it "has a great deal of intuitive appeal," "is well-supported by commonsense intuitions," and "is in fact more strongly supported by such intuitions than is any other view on the mereology of physical objects" (pg. 6). Markosian takes common-sense intuitions to weigh in favor of an account of mereology that is consistent with them, and thus holds that they bear serious evidential weight when it comes to questions about what objects there are.

These views of Korman and Markosian are representative of what I am calling 'rationalist defenses' of common-sense ontology. The rationalist position, as I am conceiving of it here, is characterized by the view that common-sense beliefs and intuitions, or 'intuitive

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[15] Thanks to a referee for suggesting this discussion of Carnap's distinction.
[16] See §5 in Korman (2009) for a discussion of the relevance of intuition in particular.
[17] Specifically, see pages 321, 323, and 327-329 in Korman (2008) for his discussions of the relevance of intuitions to the challenge for universalism.
[18] The same citation (Markosian 2014) applies for all quotes in this paragraph. Page numbers are in reference to the penultimate online version of the paper.

judgments', are especially relevant to the ontological issue of which kinds of objects exist.[19] It is these kinds of views in particular, I believe, that are especially susceptible to the debunking arguments I will provide support for here. However, such arguments are typically not restricted to only 'rationalist' views, but are generally taken by those who employ them to cut against all, or at least most, defenses of common-sense ontology.[20] I believe this understanding of the scope of the debunking arguments is correct, but I will not argue for it here.[21]

The rationalist view regarding the importance of intuitive evidence for common-sense ontology also represents a potential response to the debunking threat associated with the *explanatory premise*. Korman (2014) has recently suggested a version of this response to debunking arguments against common-sense ontology. In the course of discussing debunking arguments against perceptual beliefs in ordinary objects, he notes that he believes that the rationalist response to the debunking threat—whereby we intellectually apprehend facts about composition through intuition or rational insight—is the correct one, though he does not go on to develop or defend it at great length there.[22] A more in-depth articulation and defense of the rationalist response to the debunking threat is developed in Korman (forthcoming; ch. 7, sections 5 & 6). The idea behind the rationalist response is that intuition, or "apprehension" as Korman calls it, provides the appropriate, non-deviant explanatory connection between our beliefs about which objects exist and the facts about which objects exist that the *explanatory premise* denies the existence of. It is this kind of rationalist response to the debunking threat in particular that I will argue is undermined—namely, is made superfluous—by the empirical evidence offered in support of the *explanatory premise*.

3. Empirical Evidence in Support of the Explanatory Premise

I will now present and discuss empirical evidence in support of the *explanatory premise*. I will do so in a largely non-technical manner, since the nitty-gritty details are not vital for the ultimately philosophical point of the debunking arguments at issue. I will first be concerned with how the nature of the human visual system affects our perceptual experiences and the kinds of representations of the external world that our brains are able to construct. The point in considering the following empirical evidence is to suggest that there is an explanation of our perceptual experiences and common-sense beliefs about which kinds of objects exist, and that that explanation has nothing to do with the rational

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[19] While Korman self-identifies as a 'rationalist', I do not know if Markosian would accept the label. However, he openly holds the view that common-sense intuition is relevant to determining an acceptable answer to the Special Composition Question, which qualifies him as a 'rationalist' for the purposes of this paper. Of course, the rationalist/empiricist divide is classically determined by views about the possibility of synthetic *a priori* intuitive knowledge, where rationalists hold that such knowledge is indeed possible. But this is not the sense of 'rationalist' I will intend here.

[20] However, it is important to note that such debunking arguments *are* typically aimed at realist common-sense ontologies, rather than, say, conventionalist views. The same goes for the argument in this paper: it is intended to challenge realists, since conventionalists have a relatively easy way out. See, for example, Sidelle (1989).

[21] For other defenders of versions of common-sense or 'folk' ontology who take common-sense or intuitions to be relevant to ontological questions in one way or another, see Elder (2011, 2004), Koslicki (2008), Kelly (2008), Thomasson (2007), and Hirsch (2005, 2002).

[22] For his brief discussion of the rationalist response, see Korman (2014: 18).

apprehension of objective facts about mereological composition. Indeed, according to the explanation suggested by the debunking arguments I seek to provide support for, our common-sense ontological scheme is likely entirely disconnected from the true ontological facts, whatever they may be.

3.1. The Inverse Optics Problem, Capacity Limits, and Visual Heuristics

The first important thing to consider is what is known in the cognitive science of vision as the *inverse optics problem*.[23] This problem arises from the fact that the brain must reconstruct and represent the 3D world from 2D images projected onto the retina. However, any 2D image underconstrains the 3D interpretation of it; an infinite number of 3D environments could lie behind any 2D image. As a result, the inverse optics problem is ultimately unsolvable, because information is lost in projection from the 3D world to the 2D image. This, consequently, is why we are subject to systematic visual illusions. The problem, along with many others in cognition, also arises from the fact that human perception and cognition is characterized by sharp and ubiquitous capacity limits: we can only process (e.g., see, hear, etc.) so much at one time.[24] Our processing capacity limitations are a manifestation of the fact that our brains evolved to solve certain problems—presumably those most important to survival—in a near optimal fashion at the expense of others.[25]

Given our sharp capacity limits, and the fact that the brain is almost constantly trying to solve an unsolvable task, the visual system employs *heuristics*, which are effectively educated guesses based on the imperfect and incomplete information available. One of the most basic and general of these heuristics is the *Non-accidentalness assumption* or *the Generic Viewpoint assumption*. This heuristic, employed by the visual system in constructing 3D interpretations of 2D images, basically assumes that every image feature comes from a world that is more likely to produce it rather that its being an accident of viewpoint.[26] These heuristics get things right much of the time, but are subject to biases and illusions, given the ill-posed nature of the inverse optics problem. The important point is that, at its most fundamental level, human vision is based on heuristics, and so the fact that the world seems a certain way to us in visual perception is often based on the nature of our own visual system, doing the best it can, and not on how the world actually is. Though, to be clear, the mere fact that the human visual system employs heuristics does not automatically imply that the visual system is unreliable, largely inaccurate, or intrinsically prone to error. The point I wish to emphasize is just that visual perception is not a matter of direct, unmediated contact with the structure of reality, and that the visual system (as well as other cognitive systems) is often just as concerned with efficiency, biological viability, and *practical* reliability as it is with representational accuracy and epistemic reliability (see the passage from Leslie above).

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[23] See Marr (1982) for one of the seminal discussions of the cognitive science of vision.

[24] This, for example, is why even if mereological universalism were true, and any two or more non-overlapping *x*s composed a further *y*, we would still not be able to cognitively represent that state of affairs, because there would be too many relations in the environment to represent at any given time.

[25] For discussions of cognitive capacity limits, see Buschman et al. (2011), Marois & Ivanoff (2005), and Cowan (2001).

[26] See Freeman (1993) for a discussion of the Generic Viewpoint assumption in visual perception.

3.2. Object Segregation, Object Recognition, and Binding

The general worry about the inverse optics problem discussed above leads to a more specific worry, one that is more relevant to explaining why we have the common-sense beliefs and intuitions we do about which objects exist. Two of the primary tasks the human visual system faces are that of *object segregation* and *object recognition*. These are the processes by which the visual system constructs representations of the physical environment as divided into various, distinct objects, representing boundaries between objects (segregation) and then is able to recognize those objects for what they are and sort them into conceptual categories (recognition). The visual system uses various kinds of data to accomplish these tasks, including measures of shape, size, location of edges, and luminance.[27] Just as with other cognitive tasks, the visual system employs heuristics and is subject to biases and illusions. This is why, for example, we sometimes seem to be seeing a single object (i.e., the content of our perceptual state is $\exists x$), but then realize that we are looking at two objects that appeared to be one (the content thus being revised to $\exists x$ & $\exists y$ & $(x \neq y)$).[28]

Another important cognitive process used in representing objects is that of *binding*. This is the process by which the visual system determines which environmental features 'go together', so to speak, and are to be bound together as belonging to a single group (*perceptual grouping*), e.g., a flock of birds, or as belonging to a single object (*feature binding*), e.g., the *redness* and *roundness* of a red ball. Binding is the mechanism that allows us to have visual experiences with the content $\exists x[\text{Red}(x)$ & $\text{Round}(x)]$ rather than merely $\exists x(\text{Red}(x))$ & $\exists y(\text{Round}(y))$. Binding, in turn, is intimately bound up with *attention* and *selection*, which aid in the process of determining which information is relevant to the cognitive task at hand.[29] The important point is that our visual representations of the external world do not come pre-packaged: the information must be received, broken down, and put back together. So, as Korman (2014: 2) suggests, there is indeed a "tendency to perceive only certain arrays of qualities as being borne by a single object," and as he suggests, these tendencies evolved based on which kinds of tasks were most important for fitness.[30]

There are numerous examples within psychology of various factors systematically affecting object segregation, recognition, and binding, and our perception of objects in general. Biederman (1987) demonstrated our ability to perceive otherwise ambiguous shapes as objects in contexts in which they seem to form a familiar scene. In an arrangement of simple shapes (e.g., cubes) that look like an office, for example, it is easier to tell which otherwise-ambiguous block-like object is the desk and which otherwise ambiguous slab-like object is the back of the desk chair, etc. In other words, our ability to perceive objects, and the way in which we do so, is context-dependent: we are better at doing so when the scene being perceived is familiar. Similarly, Green and Hummel (2006) demonstrated that our recognition of objects is influenced by perceived functional relations among those objects.

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[27] See Marr & Hildreth (1980) for a discussion of the theory of edge detection in vision.

[28] The thesis that perceptual (in this case, visual) experiences have 'contents'—known as *the Content View*—is somewhat controversial, but I will assume it here. For a discussion and defense of the (Rich) Content View, see Siegel (2010); in particular, see chapter 6 for a discussion of the role of objects in visual experience. See also Siegel (2012) for a relevant discussion of cognitive penetration in visual experience and perceptual justification.

[29] See Alvarez & Scholl (2005) for a discussion of attention and selection in object perception.

[30] For example, see Nilsson (2009; pgs. 2833, 2838) for a discussion of some such tasks.

In particular, they showed that our perception of objects is improved when those objects appear to be in a familiar, interacting pair.[31]

It has also been shown that factors such as spatial proximity, similarity, orientation, and shape affect perceptual grouping and binding.[32] Beck (1966) demonstrated that object orientation trumps object similarity in perceptual grouping: objects that are oriented differently will likely be grouped separately, even if they are otherwise similar. And Palmer (1992) showed that being located within a common region of space can trump other robust factors, like similarity and shape, in perceptual grouping.[33] Feature binding, like perceptual grouping, works based on factors like proximity, similarity, and orientation, as well as things like color and texture. Taraborelli (2002) discusses what he calls a "feature co-instantiation property," which is what determines whether and how various features are perceived as belonging to a single, common object. As he notes, "we cannot consciously perceive an object as a [unified] whole without perceiving it as *having a value* for each of these sensory qualities [namely, color, shape, size, brightness, texture, and location]."[34] There is good reason to think that feature binding works in similar ways as perceptual grouping, as discussed above.[35]

It is relatively simple, then, to see—from the evidence that factors like similarity, familiarity, and proximity affect object recognition, segregation, and binding—why we perceive there to be some kinds of objects and not others. For example, we perceptually group things like legs, seats, and backs into what we take to be a single, unified object (the 'chair') because they occupy the same region of space, are familiar, and share a functional relationship. On the other hand, we don't perceive there to be trogs because we don't perceptually group dogs and trees together, since most of the time they occupy distinct regions in space, are not particularly similar in their qualities, and don't share an obvious functional relationship.[36]

The important point in support of the *explanatory premise* is that while familiarity, functional relationships, similarity, and other such factors affect our ability to perceive and cognize objects, many of these factors seem irrelevant to the philosophical issue of which kinds of objects exist. For example, presumably certain objects being more familiar to us, or sharing functional relationships, or being similar, or (as we will see below) being useful or adaptive to believe in doesn't make it more likely that those objects actually exist, or that

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[31] See Kim & Biederman (2010) and Alvarez (2011) for similar findings and related discussions. For other discussions and studies on object perception, segregation, and recognition, see Hochberg & Peterson (1987), Peterson & Gibson (1994), Peterson (1994), Oliva & Torralba (2007), Spelke (1990), Needham & Baillargeon (1998 & 1996), Spelke, et al. (1995, ch. 10), Needham (2001), and DiCarlo et al. (2012). See Peterson (1999) for a partly historical discussion of object segregation and recognition in the context of Gestalt psychology.

[32] This is very much in line with the core idea from Gestalt psychology that the mind uses holistic principles of unity and organization to represent objects as wholes that are in some sense "over and above" or "prior" to their parts.

[33] For more on perceptual grouping, see Treisman (1982), Selinger & Nelson (1999), Bravo & Bake (1990), and Watt & Phillips (2000).

[34] Taraborelli (2002: 2).

[35] For other studies on binding, see Wheeler & Treisman (2002), Treisman (1998), Hummel & Biederman (1992), and Hummel (2001). For a study on the role of neural synchrony in perceptual binding, see Blake and Yang (1997). See also Roskies (1999) for a brief but comprehensive overview discussion of "the binding problem."

[36] See Goldman (1987) for a relevant discussion of Gestalt psychology and "unity principles."

they compose further objects, in the relevant metaphysical sense.[37] Nevertheless, such factors are vital to our ability to perceive and cognize objects, and so inevitably affect our beliefs about which objects there are. This is the kind of deviant causation discussed above: the factors that cause our common-sense beliefs about which objects exist are not properly related to the facts about which objects exist, and indeed, often have little or nothing to do with those facts. As a result, those beliefs are not explained by the facts in the right way, but are instead explained by other facts. And so, drawing on this evidence, if our beliefs about which objects exist are based on our perceptual experiences (as presumably they are), but the content of our perceptual experiences is based on representational systems and factors that aren't connected in a non-deviant fashion with the facts about which objects exist, then the conclusion of the debunking arguments that employ something like the *explanatory premise* would seem to follow. Such a conclusion, again, might be that our common-sense beliefs about which objects exist are epistemically unjustified, or that those beliefs shouldn't be taken as indicative of the facts about which objects exist, or that they should be abandoned (at least within philosophy), etc.[38]

3.3. Evolutionary Pressures on Object Perception

Resources from evolutionary biology regarding the evolution of the visual system are also relevant, since they make it clearer *why* our visual system works the way it does. Our visual system evolved to perceive and cognize objects in the ways that were maximally beneficial to fitness while still being biologically feasible. The segregation of the environment into some kinds of objects (e.g., those that can harm or nourish) would have been—and presumably *was*— evolutionarily advantageous, while segregation into others (e.g., strange fusions like trogs or trout-turkeys) would not have been. Nilsson (2009) argues that the best explanation of the data concerning the evolution of the eyes is that the development and selection of the visual system was based around success at "sensory tasks" that had a positive effect on fitness. Two of the tasks he outlines that likely led to the development of spatial vision are "navigation in relation to inanimate structures" and "interaction with other animals."[39] Success at these sensory tasks would constitute success at navigating and interacting with one's macroscopic environment, both organic and inorganic.[40]

As a result of the sharp capacity and processing limits discussed earlier, the visual system would have had to make compromises in determining which representations and kinds of information were most important to survival. On this issue, Anne Treisman says this:

> Other consequences follow from the limit [of our visual system] to a single representation. A variety of external factors could make the difference between life and death, so it is important that we have ready access to as much

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[37] That is, unless one adopts an anti-realist (e.g., conventionalist) view according to which the objects that exist are dependent upon our beliefs and practices. However, such views are not at issue here.

[38] However, the common-sense ontologist could plausibly object here that some of the factors that affect our ability to perceive and recognize objects—like proximity and spatial continuity—*do* seem relevant to the issue of which objects exist, i.e., when composition occurs. I will address this objection in section 4.1.

[39] Nilsson (2009; pg. 2833, 2838).

[40] Similarly, G. A. Horridge (1987) holds that visual mechanisms evolved based partly on their ability to discern and separate stationary objects in the environment.

> information as possible. The viewing conditions are often as relevant as the objects themselves, since interacting physically with the objects requires that we know their current distances, sizes, and angles. Evolution seems to have crammed information in the most compact form into the single "screen" that we have available. But a single representation cannot do everything. […] So the conscious representation makes some funny compromises.[41]

The important point is that a combination of strict capacity limits and evolutionary pressures made some kinds of representations more feasible and more valuable to fitness than others, such that maximal representational accuracy had to be abandoned for the sake of efficiency and survival. And so, there would have been, and still are, evolutionary pressures to perceive, recognize, and hold beliefs in some kinds of objects and not others, since some are relevant to survival and others are not. This provides support for the *explanatory premise* because it suggests that the explanation for our common-sense beliefs about which kinds objects exist may be that belief in some objects proved more evolutionarily beneficial and biologically feasible (even if those objects didn't technically exist), while belief in others wouldn't have been as useful or feasible (even if those objects *did* technically exist).[42] This is in line with the observation (e.g., as made forcefully in Stich 1990; see also Graham 2012) that sometimes, even *systematically* false beliefs are the most useful and adaptive ones to hold.

However, contra this, Palmer (1999: 6) and Graham (2012: 473-74) both argue that the reason that visual perception was evolutionarily adaptive is because it is largely veridical and provides us with reliable information about our environment—vision is useful and adaptive precisely because it is accurate. Indeed, Graham argues that the etiological function of perception is to reliably produce true beliefs. This may very well be correct, but I do not think it undermines my project here. While it may be true that perception was (and is) adaptive because it is largely veridical and accurate, one must ask: accurate *with respect to what?* Presumably visual perception is not accurate with respect to *every* object, feature, and relation that might be in the environment, or indeed, even most of them. There is presumably lots of information that effectively flies under the radar of visual perception. So while visual perception may be reliably accurate with regard to basic features of the environment (e.g., the distance, location, shape, orientation, and movement of *some* objects), and perhaps also some higher-level features, I think there are very good reasons to doubt that it is reliable about, or more importantly, that it is even *attuned to* when mereological composition occurs, i.e., which kinds of objects exist. So it would be more appropriate to say that perception is useful and was adaptive because it is reliably accurate with regard to certain important, but *limited*, features of the environment. This leaves room for visual perception to be limited in both its accuracy and its scope, as it clearly is.

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[41] See Treisman (2003). See also Singh & Hoffman (2013) for a discussion of the role of shape perception in natural selection, and Mark et al. (2010) for a discussion of veridical perceptions in natural selection.

[42] It's relatively easy to see how a debunking argument based on a *sensitivity principle* (see fn. 3) might fit in here. Such an argument would point out that, for various reasons, we still would have believed in the kinds of objects that we do *even if* those objects didn't exist. Thus, the methods by which those beliefs were formed are unreliable, or the beliefs unjustified, etc. But as I have said, this is an alternative approach to the one I am using here.

3.4. Chunking: A Case Study

As a case study, it will be helpful to look at how a particular form of top-down processing in object perception interacts with considerations from the philosophy of perception. Korman (2009: 256), in defending common-sense ontology via folk belief, discusses the distinction between something 'looking' a certain way in a *phenomenal* sense (looks$_p$) and 'looking' a certain way in an *epistemic* sense (looks$_e$), where background beliefs play a role in the latter but not in the former. Korman considers whether some group of things looking like a single, composite object is a matter of looking$_p$ or looking$_e$. It's no surprise that many objects look$_p$ like composites to us, since our visual system doesn't differentiate between the microscopic entities that make them up. But the fact that many objects look$_e$ like composites to us *even given* our background beliefs that those objects are made up of smaller objects, he argues, suggests that our beliefs in the existence of ordinary objects are not merely a matter of them looking$_p$ like composites.

It shouldn't seem surprising that beliefs in composite objects are maintained relative to both looking$_p$ and looking$_e$. Presumably the folk are not engaging in philosophical deliberation to arrive at their beliefs in such objects, and probably do not have beliefs about whether atoms arranged x-wise compose an x, at least not in the relevant philosophical sense. And so it's unclear why the contribution of (background) beliefs should make looking$_e$ any more veridical than looking$_p$ in this case. But more to the point, the issue can also be addressed, at least in part, by reference to a well-documented phenomenon known as *chunking*, which is a particular kind of perceptual grouping. It is the process by which we group information—particularly perceptual structures—in both perceptual cognition and memory. Information, often objects, is *chunked* into groups based on background beliefs and perceptual tasks. So objects that are in one sense distinct are grouped into composite structures for the sake of perception and memory. Salient examples are pieces on a chessboard and birds in a flock being treated in perceptual cognition as constituting a single entity.[43] This helps explain why things look a certain way to us—especially in terms of looking$_e$—because *chunking* occurs not only in perception, but also in cognition and memory related to perception.

So even though the folk likely typically believe that a given physical object is in fact made up of many smaller objects or parts (in some sense of "made up of"), but still perceive it as a unified whole, they may not believe that it is a *composite* in the philosophically relevant sense. The fact that some groups of objects look$_e$ like composites to us likely does not have much, or anything, to do with well-informed background beliefs about the issue, or even with the intrinsic structure of the world. Instead, it is likely because there are other top-down cognitive processes going on in the background, like *chunking*, that affect the processing of perceptual information.[44]

3.5. Intuitiveness as Cognitive Bias

Further relevant data come from developmental psychology. One might think that

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[43] For the chess example, see Chase & Simon (1973). For the bird example, see Marr (1982, ch. 1). See Gobet et al. (2001) for a general discussion of chunking in the context of human learning.
[44] See also Alvarez (2011) for a related discussion on representing objects as an "ensemble."

what I've said so far provides an explanation for common-sense *beliefs* in ordinary objects, but that it does not account for our *intuitions* about which objects exist. Indeed, this distinction is a key part of the rationalist response to the debunking threat, and so it is important to address. Sarah-Jane Leslie (2013) provides a compelling case that at least one central class of philosophical intuitions—those about essences and natural kinds—has its seat in an implicit belief set that arises as early as age 4. However, these beliefs and intuitions conflict, she argues, with extensive empirical data from biology and chemistry. The fact that some philosophical theories—in this case, the Kripke-Putnam view of essences and natural kinds —seem *so intuitive,* Leslie argues, "is due to a deep-seated cognitive bias, rather than any special insight into the nature of reality."[45]

I will not attempt to recount her argument here, as it is long, complex, and depends on extensive experimental research. However, one particularly salient finding discussed in her paper is that children as young as two years old prefer to base their inductive inferences on judgments about kind membership, rather than on perceptual similarity.[46] This is evidence, Leslie holds, that human beings are what she calls "quintessentialists": we possess an implicit belief in an entity akin to metaphysical substance that exists within objects and grounds many of their persisting properties.[47] This is precisely why the Kripke-Putnam theory of natural kinds seems *so* intuitive. The important point is that there is strong psychological evidence that intuitions can arise from or be shaped by (implicit) beliefs, and so the fact that something seems intuitive to us can have its root in cognitive bias or habituation.

In a similar vein as some of the research that Leslie cites, there is also extensive psychological research that shows that children have complex implicit belief-sets about the nature of physical objects, which arise very early in life.[48] Most relevantly, these are interrelated beliefs about object unity, object boundaries, and object segregation—broadly, beliefs about the nature of numerical identity for physical objects.[49] The findings look structurally quite similar to those concerning preschooler beliefs about essences and natural kinds that Leslie cites. And since infants form these beliefs as early as around 4 months, they are presumably doing so before they could be undertaking any serious conceptual cognition, and before they could be (reliably) intuiting the facts about which objects there are. Leslie's account, combined with this research concerning the beliefs of infants about the nature of physical objects, gives some reason to think that intuitions about which kinds of objects exist might similarly have their seat in implicit belief sets and cognitive biases. If so, this would be yet another instance of deviant causation: our intuitions about what kinds of objects there are may very well not be caused or explained by the facts about what objects there are, but instead by other factors.

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[45] Leslie (2013, pg. 2). Page numbers are in reference to the penultimate online version of the paper.

[46] See Gelman & Coley (1990). See also Soja et al. (1991).

[47] This hypothesis is more commonly known as *psychological essentialism*, and is well-confirmed. For a thorough review of the data on the topic up to 2003, see Gelman (2003).

[48] See, for example, Spelke (1990), Needham & Baillargeon (1998, 1997), Baillargeon et al. (1992), Needham (2001), and Spelke et al. (1995).

[49] Much of this relates back to my earlier discussion of object segregation and recognition, and the papers cited there.

This, of course, is more speculative than the other evidence I have presented above, and I do not suggest that it is conclusive. But philosophers are often inclined to treat intuitions as *prima facie* reliable, without wondering where they might come from, and are also sometimes resistant to psychological explanations of those intuitions.[50] And so the point here is to emphasize that there are potential, psychological explanations of our philosophical intuitions: whether those about essences and natural kinds (as for Leslie), or those about which kinds of objects exist. This is simply more empirical grist for the debunker's mill in support of the *explanatory premise.*

3.6. Implications of the Empirical Data

I have discussed various pieces of evidence from the cognitive science of vision, evolutionary biology, and developmental psychology in support of a debunking explanation of our common-sense beliefs and intuitions about which objects exist, according to which they do not bear an appropriate explanatory connection to the facts about which object exist. Rather, they are based on various factors, like efficiency, utility, and familiarity, which are not relevant to the issue of which objects there are. This supports an explanation of those beliefs and intuitions in terms of deviant causation: they are not caused, at least not in the right way, by the facts that they purport to be about, and thus are not explained by those facts. This does two things. First, it provides concrete empirical support for *the explanatory premise*, as it appears in debunking arguments in material-object metaphysics aimed at common-sense ontology. Second, it challenges the rationalist position that can be adopted in response to the debunking threat, whereby intuition or rational insight provides the requisite explanatory connection between our beliefs about which objects there are and the facts about which objects there are. The challenge for the rationalist response consists in the fact there is already a plausible, empirically grounded explanation for why common sense tells us that some objects exist and others do not. And this explanation has nothing to do with being in reliable contact with, or the rational apprehension of, non-empirical facts.

4. Responses to the Debunking Threat: Objections and Replies
4.1. Response One: Embracing the Data

In response to the empirical evidence I've presented here in support of the *explanatory premise*, the common-sense ontologist might simply say, "yes, and all that is evidence for my ontology! The explanation for why our visual system divides the world up the way it does is because the world *is* that way. The reason that factors like proximity and spatial continuity affect how we perceive and cognize objects is because those factors *are relevant* to which objects there are."[51] The strategy here, then, would be to try to assimilate the

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[50] See Leslie (2013) for a discussion of this and related issues.

[51] This kind of response is suggested in Scholl (2007) in a discussion of the psychology and philosophy of object persistence. Scholl argues that metaphysical intuitions regarding object persistence may be based on psychological mechanisms that allow for the experience of object persistence, and which are based on the same factors, like spatiotemporal continuity. He suggests that this connection could vindicate the reliability of such intuitions. If so, the metaphysician could embrace the data regarding the origins of the relevant intuitions. However, I am far from convinced that such an inference is justified, whether in Scholl's case or the case at issue in this paper.

evidence I've presented and simply resist the claim that it provides support for the *explanatory premise.*

An initial issue with this response is that it runs the risk of trivializing the common-sense ontologist's position. If any factors that affect the way we perceive and cognize objects can be assimilated as part of the 'common-sense ontology', then common-sense ontology simply becomes a catch-all for all the factors that happen to play a role in producing our common-sense beliefs and intuitions about what objects there are. But this does not leave room for the possibility that those beliefs and intuitions are subject to irrelevant influences and deviant causation, and this certainly seems possible—and as I've argued, is an actuality. Such a 'catch-all' picture may be acceptable on, e.g., a conventionalist view of ontology, according to which our beliefs explain the facts, and not the other way around. On such a view, it would perhaps be trivially true that whatever factors influence our common-sense beliefs about which objects exist are relevant to the issue of which objects exist, since the facts about which objects exist would be dependent upon our collective beliefs about the matter. But, as noted above, the kinds of views I am primarily concerned with here, i.e., rationalist positions, are staunchly realist: they hold that there are objective, mind-independent facts about composition and kind membership. And so it must be possible, in principle, that we could effectively get those facts wrong.

The common-sense ontologist's attempt at assimilating the evidence is not entirely misguided, of course. Far from it. It is certainly true that the way our visual system represents the world is reactive to particular features of that world: it does not construct representations arbitrarily. For example, our eyes use measures of luminance to locate edges, and then the visual system uses that information about edges to help construct representations of bounded objects.[52] But, as I have discussed, the information the visual system has access to at any given time underconstrains and underdetermines the representations it must construct. And so, while our visual representations are far from arbitrary, they are also not fully determined by the external world. And so, the common-sense ontologist cannot simply infer from the fact that our visual system carves up the world in a certain way that the world in fact *is* that way. Some way of teasing apart top-down and bottom-up influences on perception would need to be given to justify the inference, and to effectively assimilate only the 'correct', external influences.

A further problem with this first response is that even if factors like proximity and spatial continuity *are* relevant to when composition occurs, this does not uniquely provide support for common-sense ontology. This is because even if a revisionary ontology like mereological universalism—according to which any two or more non-overlapping *x*s compose a *y*—were true, factors like proximity would *still* affect how we perceive and cognize objects. Our visual system would be the same, and there still would be all the objects countenanced by common-sense ontology. There would just be many more as well. It *could* be that proximity and spatial continuity affect how we perceive and cognize objects because those factors are uniquely relevant to when composition occurs, i.e., because common-sense

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[52] Again, see Marr & Hildreth (1980) for a discussion of the theory of edge detection in vision.

ontology is true.[53] But it could also be that universalism is true, and we simply represent only a small fraction of the objects that there are because of their usefulness, our capacity limits, etc. The universalist could point out, drawing upon the evidence I've presented here, that it's not surprising that we don't perceive and represent *all* the objects in the environment. We couldn't possibly do so, given the strict capacity limits on cognition: there are virtually infinite objects! We just represent the one's that were most relevant to evolutionary success, and were feasible given biological constraints.

A final problem with this first response is that, while the cognitive processes I have discussed are purely empirical, the kinds of facts that the common-sense ontologist is concerned with (i.e., facts about when mereological composition occurs) are ostensibly non-empirical. If it is true, say, that atoms arranged x-wise compose an x, it is not supposed to be because of any *empirical* facts that this is the case.[54] As a result, even if our visual representations were *not* subject to top-down influence, it is not clear how beliefs formed on the basis of them could be indicative of non-empirical facts about which objects there are. Unless we have good, positive reason to think that there is some non-empirical, epistemic process intervening in the otherwise empirical perceptual processes, then the first response here bears little force.

4.2. Response Two: Intuition as Intervening Epistemic Process

Next is the rationalist response to the debunking threat that I have discussed above. The rationalist might admit that while there is a debunking explanation of why we hold the *beliefs* that we do about which objects exist, I have not ruled out the possibility that *intuition* provides an appropriate explanatory connection to the relevant facts. This, again, is the kind of response endorsed by Korman (2014, forthcoming), and is also suggested by things Markosian says (e.g., 1998, 2014). I have only shown that there is evidence that *some* intuitions, or instances of something *being intuitive*, are matters of cognitive biases. But this is a far cry from showing that all intuition is 'off-track'.

The rationalist response should be granted, at least to a point. It is true that I have not shown conclusively that all intuition, or even intuitions about which objects exist, are unreliable. I have simply presented some evidence that I think should make us quite wary about the reliability of our perceptual experiences and intuitions as sources of evidence for the facts about which objects there are. It is certainly *possible* that rational intuition—or another yet-unknown faculty—is putting us in reliable contact with the facts about which objects there are. But merely positing some such faculty is not enough on its own; we can posit any number of possible explanations that are *consistent* with the data. The rationalist needs to give us some positive reason to think that there *is* some such faculty, beyond the fact that it would vindicate common sense—especially when there are alternative explanations on offer for which there is solid positive evidence. About this issue, Alvin Goldman notes, "In the case of genuine perceptual modalities, it is understood, at least in general terms, how information can be reliably transmitted from external objects to internal

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[53] Although, even if this were true, it wouldn't explain why seemingly irrelevant factors like familiarity and functional relationships make a difference to object perception and cognition as well.

[54] See Merricks (2001: 8-9, 88) on this point.

cognitive states. But it remains a mystery how such transmission could work in the case of intuition, where the alleged medium is unknown to science."[55]

That is, we have a fairly good understanding of how information is taken in via the senses, processed by the brain, distributed for use in cognitive tasks, etc. We don't, on the other hand, have any comparable understanding of how information is delivered via intuitional states, particularly when such states (according to the rationalist) are supposedly putting us in contact with non-empirical entities like universals, kinds, or essences. Goldman calls this the "free-floating classifier (FFC)" approach, and says that "any defense of intuitional methodology by appeal to FFCs…owes us a story about how such a grasp [of FFCS] can be routinely attained."[56] Given that the question of if and when some material *x*s compose a *y* is *not* supposed to be an empirical question, then whatever we are ostensibly getting ahold of that makes our common-sense intuitions even potentially reliable would have be something like FFCs. But as Goldman says, we are owed an explanation of how all this supposed to work on the rationalist's account.[57]

4.3. Response Three: Unacceptable Skeptical Implications

The common-sense ontologist may object that my project here has unacceptable skeptical implications. In particular, one may worry that the evidence presented, and the associated debunking arguments, would imply some kind of external world skepticism, since they suggest that we can't know what kinds of objects there are. Indeed, Korman (forthcoming) holds that one primary motivation for positing our ability to directly apprehend facts via intuition, or *some* such ability, is avoiding global skepticism. This stems, in part, from classic worries regarding the infinite regress of justification.

It is true that the evidence I have presented here *should* make us somewhat skeptical about a naïve view of the nature of visual perception, even if this is philosophically uncomfortable. However, it is important to see that neither external world nor global skepticism follows from the debunking arguments supported here. I have not argued that we cannot know what kinds of objects there are, or, more fundamentally, whether or not there are any material objects at all. Rather, I've argued that there is empirical support for a debunking explanation of why we perceive and believe in the objects that we do, and thus that there are good reasons to doubt the force of appeals to common sense in defending (realist) common-sense ontologies. If we *can* know, say, that there are ordinary objects, then it will be via other routes.[58] Further—and this is important—I have not argued that visual perception is unreliable all the way down, only that it is so in ways that make our perceptual beliefs and experiences a poor guide to what kinds of objects exist in the sense that ontologists are concerned with.

Finally, it is also important to note that the debunking arguments I have provided support for here only apply to our common-sense beliefs and intuitions about which objects

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[55] Goldman (2010: 14).

[56] *Ibid.*

[57] To be fair, Bengson (forthcoming) attempts to develop an account of how such thing might work—how we might "grasp the third realm," as it were—though his account his more general, and he is not concerned specifically with grasping facts about mereological composition.

[58] E.g., perhaps it is an analytic truth. For this view about ordinary objects, see Thomasson (2007).

exist, and thus to ontologies that are meant garner support from common-sense. The arguments do not apply, or it at least is not clear how they would apply, to ontological views held for other reasons, such as those supported by arguments from vagueness or arbitrariness, e.g., universalism and nihilism. Thus, the debunking threat and the evidence in support of the *explanatory premise* need not have unpalatable skeptical implications, at least not with respect to our ability to know which kinds of objects exist, since it does not apply indiscriminately to all views on the matter.

4.4. Response Four: True Beliefs in Ordinary Objects as Evolutionarily Beneficial

Next, the common-sense ontologist may challenge the upshot of the evolutionary evidence I have presented by holding that our visual system evolved to recognize and segregate some kinds of objects and not others because having *true* beliefs about what objects were in our environment was evolutionarily beneficial. We believe that the world contains ordinary objects because there *really are* such objects, and given that some of them are nutritious while others are dangerous, it proved conducive to fitness to have true beliefs about them. Were we to have evolved with false beliefs about the objects that help and harm us, this would have been an evolutionary disadvantage.

This response to the debunking threat is unsuccessful. Why, for example, would having true beliefs about which objects there are rather than useful false ones—e.g., believing in *x*s rather than merely atoms arranged *x*-wise—have made any significant difference to our evolutionary success? One could just as effectively eat nutritious foods and avoid dangerous predators whether or not one had true beliefs about their mereological properties. Atoms arranged apple-wise would presumably be just as nutritious as an apple, and atoms arranged tiger-wise could presumably stalk and kill just as effectively as a tiger could. Certainly if one had *other* false beliefs, such as the belief that food wasn't nutritious, or that predators weren't dangerous, or that predators *didn't exist*, this would be detrimental to fitness for obvious reasons. But as for beliefs about when mereological composition occurs, it doesn't seem that having true ones rather than merely false but useful ones would provide an evolutionary advantage on its own. Even if there *weren't* any ordinary objects (e.g., if mereological nihilism were true), it still may have proved more beneficial to believe in them anyway, since thinking of and perceiving objects as unified composites likely would have reduced cognitive load (e.g., as in the discussion of *chunking* above). Thus, there doesn't seem to be good reason to think that evolution would have selected for true beliefs about composition, or for perceptual systems that would have been attuned to facts about it.

4.5. Reliable Indicatorship and Contingent Reliability

Finally, one may object that I am being unfair to the common-sense ontologist by requiring a condition of *necessary reliability* for the visual system to be a reliable indicator of the facts about which objects exist. This, the objection might go, is too much: a mechanism can be *contingently* reliable and still be a reliable indicator of something else. So the fact that the human visual system isn't *necessarily* reliable or indicative of the facts about which objects exist is not itself a problem for the common-sense ontologist. It may be, for example, that our visual systems evolved to be highly reliable in *this* world, even though they would not be

in other possible worlds. But this still means that they are contingently reliable in the actual world.[59]

This objection is correct that a condition of necessary reliability is a very high epistemic bar to set, and it would be unfair to demand that the common-sense ontologist meet it. However, I have not meant to argue here that she need do so. The point I have meant to emphasize in providing empirical support for the relevant debunking arguments is instead that the factors which very plausibly account for our common-sense beliefs and intuitions about which objects exist do not seem to be ones that *are related* to the issue of which objects exist, in the particular metaphysical sense at issue. I have referred to this as a 'deviant' connection or causal chain: the facts that account for our common-sense beliefs in trees but not trogs are, I have argued, *not* the facts about whether there are trees or trogs, whatever those facts are. So, as discussed above, the issue is not ultimately one of reliability or reliable indicatorship, whether necessary or contingent. Rather, the issue is whether our common-sense beliefs and intuitions about which objects exist are appropriately connected to, so as to be *explained by*, the facts that they purport to be about. I have argued, in line with the debunking arguments at issue, that there is good reason to think that they are not.

I think there is a relatively straightforward way of understanding why this problem arises. As discussed in section 4.1, ostensibly, the issue of if and when mereological composition occurs—e.g., if and when atoms or parts arranged x-wise compose an x—is not an empirical issue.[60] That is, it is not an issue one could resolve simply by investigating how atoms and molecules bond via electromagnetism, or any other empirical matter. It is, rather, a conceptual or metaphysical issue—at least this is how it is most commonly understood. However, whatever metaphysical facts consist in, it seems unlikely that our visual system is connected with or sensitive to them, given that they are non-empirical. Vision is, after all, one of the "empirical senses." This is precisely why rationalists appeal to a non-empirical faculty of rational intuition or apprehension to make sense of how we are in cognitive contact with abstract, non-empirical facts—in this case, those about mereological composition and kind membership. But as I have already argued, it is rather mysterious exactly how this intuitive faculty and the grasping of abstract facts is supposed to work.

However, and this is in some sense the crux of the issue, it is not *merely* that an explanation of our common-sense beliefs about which objects exist in terms of the rational apprehension of abstract facts is itself mysterious and heavy-handed that should make us wary of such an explanation. It is *also* the fact that there is an alternative explanation of those common-sense beliefs that is both well-grounded in cognitive science and non-mysterious, and that has nothing to do with our actually being in touch with objective, abstract facts about which objects exist. The rationalist account, in other words, faces stiff competition from the empirically-grounded debunking arguments.

5. Conclusion

In this paper, I've offered a body of empirical evidence intended to do two things.

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[59] Thanks to an anonymous referee for raising this objection.
[60] Again, see Merricks (2001: 8-9, 88) on this point.

First, it is meant to give empirical support to the *explanatory premise*, as it plays a role in various debunking arguments in material-object metaphysics, which hold that it is simply because of epistemically irrelevant biological (and cultural) contingencies that we believe in the kinds of objects we do. In particular, the empirical evidence supports an explanation of our common-sense beliefs and intuitions about which objects exist in terms of deviant causation: the facts which cause those beliefs and intuitions are not the facts that they purport to be about. Second, it is intended to challenge rationalist defenses of common-sense ontology in response to the debunking threat. The evidence offered here is not meant as a strict *reductio* of the rationalist position, or as a knock-down refutation. Rather, it is intended to show that there is a much more plausible, and much better supported, explanation for why common sense tells us what it does about which kinds of objects exist.

As a result, the empirical evidence offered here makes the rationalist response look extraneous at best. The challenge that faces the rationalist, then, is to show why we should prefer a speculative and somewhat mysterious explanation of our common-sense beliefs and intuitions over the scientifically grounded explanation I have offered evidence for here. The fact that the rationalist explanation preserves a realist picture of our common-sense conception of the world, and casts it as mostly correct, is not sufficient reason to prefer it, since that simply begs the question against the debunker.

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