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Theories of Properties and Ontological Theory-Choice: An Essay in Metaontology

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THEORIES OF PROPERTIES AND ONTOLOGICAL THEORY-CHOICE: AN ESSAY IN METAONTOLOGY

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This dissertation argues that we have no good reason to accept any one theory of properties as correct. To show this, I present three possible bases for theory-choice in the properties debate: coherence, explanatory adequacy, and explanatory value. Then I argue that none of these bases resolve the underdetermination of our choice between theories of properties.

First, I argue considerations about coherence cannot resolve the underdetermination, because no traditional theory of properties is obviously incoherent. Second, I argue considerations of explanatory adequacy cannot resolve the underdetermination, because every traditional theory of properties lacks the theoretical resources to adequately explain resemblance, causal powers, and predication. However, these inadequacies are easily remedied with theoretical modifications. But this results in an overabundance of modified, but adequate, theories of properties. Third, I argue explanatory virtues cannot resolve the underdetermination, because we have no reason to think explanatory virtues make theories of properties more likely to be true. I reject the common argument that explanatory virtues are truth-conducive in theories of properties because they are truth-conducive in scientific theories. Since none of the three bases for theory choice can resolve the underdetermination, I conclude that we have no good reason to accept any one theory of properties as correct.

Finally, I consider the possibility of choosing one theory over the others on pragmatic

grounds. But I argue that pragmatic grounds cannot resolve the underdetermination either. Instead, I suggest we accept the view I call 'instrumental pluralism,' which allows practitioners to use whatever theory of properties they find useful.

For my family.

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CHAPTER 1

PROPERTIES: AN INTRODUCTION

> Do you want us to begin our examination, then, by our usual procedure? As you know we customarily hypothesize a single form in connection with each of the many things to which we apply the same name. Or don't you understand?
>
> *The Republic* (trans. Grube)
> PLATO

THINGS HAVE FEATURES: Callias is pale, the stone is round, the iron is hot. This much is uncontroversial. But any philosophical interpretation of properties must answer difficult metaphysical questions. Are these properties entities in their own right? That is, if there were a full inventory of what exists, would paleness and roundness and hotness *themselves* make the list, alongside Callias and the stone and the iron? And assuming properties exist in their own right, what is their nature? What are properties like in themselves? In this dissertation I am particularly interested in the latter question: that is, assuming that properties exist in their own right, what is their nature?

Despite the age of this question, philosophers have not reached any consensus about the nature of properties, although they have developed several theories of properties in the meantime. A cynic might say that we haven't reached a consensus about the nature of properties because the nature of properties is beyond human knowledge. I count myself among the cynics. In this dissertation, I will argue that we have no good reason to accept any one account of the nature of properties as true, because we lack any principled basis for choosing one theory of properties over its competitors. I then consider whether pragmatic considerations could resolve the underdetermination and conclude that they cannot. I then suggest an alternative approach, called 'instrumental pluralism,' which

accepts and deals with the underdetermination.

But before we can turn to the main question of this dissertation, I must provide some background. First, in §1.1, I will characterize the concept of a property. Next, in §1.2 I will characterize the debate over the nature of properties in terms of disagreements about the nature of properties, and then present seven traditional theories of properties that emerge from these disagreements. Finally, in §1.3 I will introduce the overall project of the dissertation, providing a brief outline of the remaining chapters.

1.1 Characterizing Properties

Before we turn to the debate over the nature of properties, we should have at least a rudimentary grasp on what properties are. I will not give a conceptual analysis of the concept of a PROPERTY, as there is no uncontroversial analysis. And since this dissertation is interested in metaontological questions *about* the debate over the nature of properties, selecting a particular concept of a PROPERTY risks prematurely taking sides *within* that debate. Instead, I will characterize the concept of properties in terms of what metaphysicians think properties are supposed to explain. So, for our purposes, properties are a theoretical entity that philosophers posit to do explanatory work.[1]

Being philosophers, metaphysicians obviously disagree about what explanatory work properties should do, but there are a few core phenomena that properties are supposed to explain. Namely, properties are supposed to serve as the ground or cause of the phenomena of resemblance, causal powers, and predication. Even if a theory of properties ultimately rejects these pretheoretical demands for explanation, the adherents of that theory have an explanatory burden placed upon them; their opponents demand that they provide

[1]Note well that I mean 'property' to refer to both monadic properties (properties that belong to a single thing), as well as polyadic properties (relations between things).

an alternate explanation for those phenomena.[2] To see why resemblance, causal powers, and predication are core explanatory goals for theories of properties, let's consider each phenomenon in turn, and see how they seem to rely on properties for their explanation.

First, things resemble each other in virtue of their properties. Paradigmatically, two things are exactly similar in some respect because they share a property. For example, take two red apples. The two apples resemble each other in a number of respects, including their color. And those two apples resemble each other with respect to color because they each have the property of *red*. That is, each apple is a token (a particular case of) of a general type (what the apples share in common), *red* (Campbell 1990, 2). In technical terms, the *property* of *red* in each apple is an *instantiation* of the general, shared property of *red*, where a particular *instantiates* a property if and only if it has an instantiation of that property. And when a *thing* instantiates a property, it is an *instance* of that property: each apple is an instance of *red*.[3] And so, the apples instantiating the same property of *red* explains their resemblance in that respect.[4] Had one of the apples been green and the other orange, then the apples wouldn't have resembled each other with respect to color. And so whatever properties turn out to be, they are expected to explain resemblance holding between particulars.

Second, a thing has the causal powers it has in virtue of its properties. Paradigmatically, a thing is disposed to ϕ in certain conditions because it has a property (or properties) that grounds its disposition to ϕ in those conditions.[5] For example, a record is disposed to

[2]For extended discussion of arguments charging explanatory inadequacy, see chap. 3.

[3]Philosophers use the term 'instance' in three ways when discussing properties. As a verb, philosophers use 'instance' instead of 'instantiate' ('this red apple instances *red*'). As a noun, 'instance' can refer to instantiations of property ('the color of this apple is an instance of the property of *red*'), or to what instantiates the property ('this red apple is an instance of the property of *red*'). I use the term 'instance' in this last sense only.

[4]Or we equally well could have said 'the apples each having an instantiation of *red* explains their resemblance' or 'each apple being an *instance* of *red* explains their resemblance."

[5]Admittedly, on some views the grounding property just *is* the disposition. For two recent, extended treatments of this view, see Bird (2007) and Mumford and Anjum (2011).

make certain sounds when a needle is passed over it. This disposition is grounded in the physical properties of the record: the shape of the record's grooves, its texture, its hardness, and so on. These properties explain why the record is disposed to produce *those* sounds when a needle is passed over it under normal conditions. Had the record had differently shaped grooves, or a different texture, or had been much softer than it actually is, it would not be disposed to produce the very same sounds it actually does under normal conditions. And so whatever properties turn out to be, they are expected to (at least partially) ground the causal powers of their instances.

Third, predicates apply to a thing in virtue of its properties. Paradigmatically, 'a is F' is true because a has the property F. In this paradigmatic case, the predicate 'is F' corresponds directly to a single property of the thing. For example, 'is negatively charged' applies to any given electron because electrons have the property of *having negative unit charge*. The property of *having negative unit charge* is what explains the applicability of the predicate. Of course, not all predicates directly correspond to a single property, and in those cases the explanation for how that thing's properties ground the applicability of a predicate will be more complicated. But one way or another, most predicates about a thing will apply or fail to apply to it in virtue of the ways that thing is, and things are the way they are in virtue of their properties and the relations they bear to other things. So whatever properties turn out to be, they are expected to explain the applicability of predicates to their instances.

So, whatever properties are, they are taken to be the ultimate ground or cause of the familiar facts of resemblance, causal powers, and predication. And theories of properties, trying to meet these expectations, posit entities to serve as the ground of these phenomena and present a narrative of how these entities give rise to them. One important question that theories of properties disagree about is the nature of properties, which is the focus of this dissertation. The most basic disagreements about the nature of properties run along

four major axes. Philosophers disagree whether properties are:

- universal or particular;
- immanent or transcendent;
- sets or individuals;
- sparse or abundant.

To get a better understanding, let's look at what each side of these four debates claim.

Universal vs. Particular. The traditional theories of properties disagree about whether properties are universals or particulars. Historically, philosophers call theories of universals 'realist' theories of properties or 'realism.'[6] Realist theories of properties take the claim that multiple particulars can instantiate the *same* property literally: for any property, there exists a single, unified entity that each of its instances instantiate – a universal. More specifically, if properties are universals, there is *just one* property of *red* that is *wholly* instantiated by every red thing; despite *red*'s many instantiations, the property of *red* is one thing, undivided.[7] Therefore, if properties are universals, then the *red* this apple instantiates is literally one and the same as the *red* that apple instantiates. If, on the other hand, properties are particulars, then instantiations of a single property turn out to be many distinct entities. There are many red things, and there are equally many qualitatively identical, but numerically distinct, instantiations of *red*. So, on this view, the *red* in this apple is qualitatively identical, but numerically distinct, from the *red* of that apple.[8]

[6]The terms 'realist' and 'realism' are unfortunate, because they wrongly suggest all other theories of properties are anti-realist or eliminativist. But philosophers sometimes frame the properties debate as a debate over the existence of universals (realism versus nominalism), where realist theories are those theories that accept universals and nominalist theories are those that deny their existence. Although I do not frame the debate as 'realism versus nominalism,' I nevertheless use 'realist' and 'realism' to refer to these views. I hope to avoid confusion by using the standard terminology rather than inventing an idiosyncratic one.

[7]Although realists disagree whether the wholly instantiated universal is itself present in its instances. See §1.2

[8]The situation is more complicated in theories that take properties to be set-theoretic, as sets are particular, not universal.

Immanent vs. Transcendent. Immanent theories of properties say that properties are *in* their instances. But 'in' is ambiguous here. Are properties literally parts of the their instances? That is, are immanent properties supposed to be parts of their instances in the very same way that ordinary, particular things (like hearts) can be part of other particular things, and thereby exist in them (like hearts do in human beings)? If not, is the 'in' simply metaphorical for some other kind of parthood reserved for properties of things? Different theorists say different things.[9] But wherever they come down on this question, immanent property theorists all agree that if a property is immanent in its instance, that property is *wholly present* in that instance, differing only on what the ontological cash value of 'being wholly present in' is. As a result, immanent properties are part of the causal, spatiotemporal world. Nicholas Wolterstorff (1960, 196) makes the case for immanence in the following:

> Greenness *does* appear at certain times and places; the father in teaching his child says 'Here's green, and here's green, and here's green again.' And although we'd probably never ask 'Where is green?' men have asked 'Where is virtue to be found?' and conductors have no doubt inquired 'Where is that *F*-sharp coming from?'

Transcendent properties, on the other hand, are not wholly present in their instances, their existence being at least partly independent from them.[10]

[9]David Lewis (1986b, 64), for example, thinks that if immanent universals and/or tropes exist, then they are mereological parts of their instances (see also Lewis (1986a, 36)). Peter Simons, on the other hand, says that properties are best conceived as way things are, and so conceiving of properties as parts of their instances is wrong-headed. A way something is, Simons says, "is something about it, but not a part of it. Examine all the parts of a complex artifact, like an airplane. You will find its wings, its radar systems, its engines, its ailerons, etc., down to smaller parts like bolts, rivets, transistors, and bits of cable. You will not find its being 10.5 tonnes in weight among them. Parts are one thing, properties another (and properties of parts something else again)" (1994, 563). See C. B. Martin (1980, 7–8) for a similar argument.

[10]Why say they're partly independent and not wholly independent? I take care here to avoid a possible exception: if properties are sets, and sets exist where their members are, then properties are partly present in each of their instances. The property of *being a donkey* is partly present wherever there is a donkey (Lewis 1983, 344–45). Therefore, the property of being a donkey is not immanent in its instances, as it is not wholly present in them. Nor would the the property of *being a donkey* be transcendent, if we demanded transcendent properties to be wholly present in each of its instances; for on such a view about properties,

Sets vs. Individuals Some theories of properties take properties to be sets, while other theories say properties are individuals. Sets are just the familiar entities from mathematics, and individuals are non-set-theoretic entities, like you, me, and the ground beneath our feet. Circularly defined, individuals are the members of first-order sets.

Sparse vs. Abundant. The term 'property' is highly ambiguous. One such ambiguity results from the fact that we seem to have two competing conceptions of properties. On the one hand, we think that properties are *abundant*: at the very least, there is a property for every predicate we could ever cook up, such that (with maybe a few exceptions) for any predicate 'is *F*' there exists a corresponding property of *F-ness*. These properties, as Lewis (1986b, 59) puts it,

> may be as extrinsic, as gruesomely gerrymandered, as miscellaneously disjunctive as you please. They pay no heed to the qualitative joints, but carve things up every which way. Sharing of them has nothing to do with similarity.

Thus, on the abundant conception, *grue* and *bleen* are perfectly good properties, along with properties that are far more disjunctive and gerrymandered besides.[11] Sparse properties, by contrast, are not extrinsic, gerrymandered, or disjunctive. Rather, there are "only just enough of them to characterize things completely and without redundancy" (60). That is, on the sparse conception, the only properties that exist are the bare minimum needed to explain objective resemblance and the causal powers of things.

Admittedly, the sparse-abundant debate seems different from the other three debates we have discussed. Namely, the sparse-abundant debate seems unconcerned with the *nature* of properties. Rather, it seems like a debate over the *number* of properties, and not over what properties are like in themselves. But I think that this is a misinterpretation

properties would be (in some sense) made up of their instances.

[11] Where *being grue* is the property of being green and examined before time t, *or* not being so unexamined and blue (Goodman 1983, 74); *being bleen* is the property of being blue and examined before time t, *or* not being so examined and green (79). See also Cohnitz and Rossberg (2014, §5.3).

of the debate. Namely, sparse theorists do not think that there just happen to be just the right number of properties to explain resemblance and causal powers. Rather, they think it is in the nature of properties to account for objective resemblance and causal powers. That is, they think that properties have an intrinsic qualitative and causal character that makes them grounds for objective similarity and causal powers by nature. Otherwise it would be a mere coincidence that properties were sparse: it would just so happen that the only properties that exist are just those required to characterize things completely and non-redundantly. But that is too implausible to attribute to the sparse theorist. Rather, they think that properties are sparse, not by coincidence, but because it is in the nature of properties to be causally relevant and make for resemblance. For the sparse theorist, properties cannot be abundant because it would allow for properties to be irrelevant to causal powers and resemblance. And that would go against the very nature of properties according to their view. On the other hand, abundant theorists deny that properties are by nature causally relevant and make for resemblance. Some properties have these features, while others do not. The abundant theorist sets a lower bar for what it takes to be a property, and the weakened conditions allow more than a sparse number of properties to exist. So, the sparse-abundant debate is not merely a debate about the number of properties, but a debate over the nature of properties as well.

Although there are sixteen possible ways one could come down on these debates, philosophers have traditionally been interested in only seven of them: immanent realism (universal and immanent and individual), transcendent realism (universal and transcendent and individual), trope theory (particular and immanent and individual); each of these views has a sparse version and an abundant version, resulting in six of the seven views.[12]

[12]A classic survey of these views is Armstrong (1978), updated in Armstrong (1989). Another comprehensive survey is Alex Oliver (1996). Douglas Ehring (2003, 5–11) provides a particularly excellent (but

Finally, class nominalism attempts to use set theory to account for properties, where there is a property F for every set of F-things. The nature of sets is controversial in its own right, and I will discuss these issues only in passing. But two things are uncontroversial among traditional class nominalists: properties are *not* wholly present in their instances, and properties are abundant. So, we have a seventh view that is quite different from the others, but whose historical and philosophical significance demand our attention. Let's now look at the basic claims of each of these views in turn, beginning with theories of universals.

1.2 Traditional Theories of Properties

Realists divide into two camps: immanent realists and transcendent realists. Immanent realists and transcendent realists agree that properties are universals, but disagree about how universals are instantiated. Immanent realists argue that universals are repeatable, or capable of being wholly present in multiple, distinct instances. Therefore, immanent universals are a part of, or in, the particulars that instantiate them. But we must clarify what we mean by 'capable of being *wholly present* in multiple, distinct instances.' Namely, the claim that an immanent universal can be wholly present in two or more places means that that universal can be present in multiple distinct places simultaneously, without the universal being spread out with different parts at different places. That is, as John Bigelow puts it, the universal is wholly present in each place it is instantiated in the sense that "is not just a part of the thing which is present at each different place; it does *not* mean that it is present at that place *and no other*" (Bigelow 1988, 21).

On the other hand, transcendent realists argue that universals exist separately from their instances. Transcendent universals, or 'Forms,' in honor of Plato, are non-spati-

brief) introduction to the different theories of properties and their issues.

otemporal and acausal, and therefore exist apart from their spatiotemporal and causally powerful instances. Things instantiate properties by 'participating' or 'partaking' in these Forms, which are ontologically independent from their participants.[13] The many particular red things participate in the single, unified Form of *red*, in virtue of which each red thing is red. As a result, immanent and transcendent realists disagree about the existence conditions for universals. Since immanent universals are instantiated only when they are wholly present in some particular, a universal must be instantiated at least once if it is to exist; there are no uninstantiated immanent universals.[14] But since the Forms of transcendent realism are ontologically independent from their instances, they face no such 'instantiation requirement' for their existence; Forms exist whether they are instantiated or not.[15]

Trope theories say the features of things are non-repeatable, particular property-instantiations called 'tropes.'[16] So, unlike immanent universals, tropes are not repeatable: two things may be perfectly similar in some respect, but these perfectly similar features are unique entities – tropes. But, like immanent universals, tropes are immanent, or wholly present in their instances.[17] So, tropes themselves are strictly speaking not prop-

[13]The *locus classicus* for transcendent realism is Plato, especially the *Republic* and the *Phaedo*. However, Plato strongly criticizes transcendent realism in the *Parmenides*. In the contemporary literature, an early, key source is Russell (1912, chaps. IX and X). For examples of more recent works by transcendent realists, see Panayot Butchvarov (1966), Michael Loux (1978), Reinhardt Grossmann (1983), Evan Fales (1990), Gary Rosenkrantz (1993), Linsky and Zalta (1995), Peter van Inwagen (2004), Michael Jubien (2009), and Linda Wetzel (2009).

[14]*Pace* Andrew Newman (1992, §3.2), who claims that uninstantiated immanent universals don't exist, but that they are still ontologically significant. However, his view could be fairly construed as a hybrid view of immanent and transcendent realism.

[15]The *locus classicus* of contemporary immanent realism is Armstrong (1978) *Universals and Scientific Realism*, vols. 1 and 2. Armstrong (1989) updates his position. David Lewis's (1983) "New Work for a Theory of Universals" is an extremely influential take on the benefits of Armstrong's theory.

[16]As an alternative to the name 'trope,' these non-repeatable property-instantiations are often called 'abstract particulars,' following D. C. Williams (1986). This is not to say that these abstract particulars are non-spatiotemporal. Keith Campbell warns that "The solidity of this bell, here and now, is a definite, experienceable and locatable reality. It is so definite, experienceable, and locatable that it can knock your head off, if you are not careful" (1990, 3).

[17]Trope theories do not need to say properties are immanent, but philosophers apparently find transcendent tropes unappealing (although Bacon (1995, 7–8) comes close with his 'nonexistent tropes.')

erties, but property-instantiations; a trope can exist in only one particular thing at a time, and so they cannot serve as a general property. The *red* of this apple, for example, cannot be the property of *red*, because this other apple has its own *red*. But the two apples have the same general property of *red*. So, properties are in fact sets of trope instances, and one could consider trope theories individual-set-theoretic hybrids, where a property F is the set of everything that instantiates an F-trope.[18]

Class nominalism says properties are sets of their instances.[19] That is, a property F is just the set of F-things, and to have the property is just to be a member of the set (Lewis 1983, 344). Sets are not immanent in their instances; that is, they are not wholly present in their instances. For example, the set of red things is not wholly present in a red apple. On one view about the location of sets, sets exist where their members are, spreading properties out among their instances (344). The property of *being a donkey* is partly present wherever there is a donkey (344–5). But since the property itself is spread out among its instances, they are not immanent in their instances, but scattered. On another view, sets exist apart from their members, much like transcendent realist's Forms

[18]The *locus classicus* for contemporary trope theory is D. C. Williams (1953a) and (1953b) (see also his posthumously published (1986)). However, the twentieth-century version of the view begins with G. F. Stout (Stout 1921, 1923), or perhaps, as Mathieu Marion (2015) argues, with John Cook Wilson (1926, chap. XV). Although once a minority view in ontology, the past thirty years has seen a flurry of research on trope theory. For extended expositions and defenses of trope theories, see, for example: David A. J. Seargent (1985), Keith Campbell (1990); John Bacon (1995); Arda Denkel (1996); Anna-Sofia Maurin (2002); John Heil (2003, chap. 13) and (2012, chaps. 4 and 5); and Douglas Ehring (2003).

[19]Class nominalism serves as the sole representative of traditional nominalist views about properties in this dissertation. Other nominalisms, such as concept nominalism, resemblance nominalism, predicate nominalism, and ostrich nominalism, deny the existence of properties altogether. Although these views freely admit that particulars have features, they deny that these features have any ontological significance of their own (Newman 1992, 3). Rather than posit a fundamental category of entities to play the role of properties, the nominalist explains away the properties phenomena in more respectable terms, such as concepts, resemblance relations, or predicates (while ostritch nominalism simply denies the need for explanation at all). Class nominalism stands apart, however, in that it *identifies* properties with sets. Therefore, according to class nominalism, properties exist independently of our thoughts and language, so long as sets do, and properties are thereby ontologically significant. As a result, I think, class nominalism deserves to be considered a full-fledged theory of properties, and not a mere nominalism. For a survey and criticism of the various nominalisms, see Armstrong (1978, vol. 1) and (1989). For expositions and defenses of class nominalism, see G. E. Moore (1953, chaps. XVII and XVIII); Anthony Quinton (1957) and (1973, 263–5); and David Lewis (1983) and (1986b).

exist apart from their participants. Obviously, if sets exist apart from their members, properties (sets) are not immanent in their instances (their members).

1.3 An Outline of the Remaining Chapters

So, there are seven traditional theories of properties: sparse and abundant versions of immanent realism, sparse and abundant versions of transcendent realism, sparse and abundant versions of trope theory, and class nominalism. Now that we have an understanding of what the different starting positions are in the properties debate, we can see whether we have good reason to accept any one theory of properties as correct. In this dissertation, I consider three different grounds for theory choice in the properties debate: coherence, explanatory adequacy, and explanatory value. I argue that none of these three potential grounds for theory choice succeed in giving us reason to believe in any *one* theory of properties. Therefore, I conclude that the evidence greatly underdetermines what theory of properties we should accept, to the exclusion of others. I then propose a pragmatic way to deal with the underdetermination. This argument is divided up over the next five chapters.

In Chapter 2, I consider whether any of the seven traditional theories of properties are incoherent – that is, whether the theory is contradictory, or entails a contradiction. If some of the traditional theories are incoherent, then we could ease or resolve the underdetermination. First, I consider the argument that immanent realism is incoherent, because multi-location of immanent universals leads to paradox. But I argue that multi-location is paradoxical only in conjunction with controversial metaphysical assumptions that immanent realists reject. Second, I consider arguments that class nominalism is incoherent, because it makes distinct, but necessary coextensive, properties identical. I argue that the class nominalist can explain the distinctness of necessarily coextensive properties

by following David Lewis's appeal to structured set-theoretic properties and a plurality of possible worlds. Third, I consider arguments that transcendent realism is incoherent, because of paradoxes of self-predication, as encapsulated in various versions of the Third Man Argument. I argue that paradoxes of self-predication rely on an uncharitable interpretation of transcendent realism. Finally, I consider Bradley's regress, which argues that the nature of property instancing leads to an infinite regress. I argue that Bradley's regress cannot resolve the underdetermination, because if it succeeds, it applies to all seven theories of properties. Further, the theoretical posit of a non-relational tie provides a way to block the regress, albeit at an explanatory cost. Since none of the theories are obviously incoherent, we cannot ease the underdetermination by ruling out some properties on the basis of coherence.

In Chapter 3, I consider whether explanatory adequacy could serve as grounds for theory-choice and resolve the underdetermination. Explanatory adequacy requires more than mere coherence, as a theory is explanatorily adequate only if the theory *itself* has the theoretical resources to explain resemblance, causal powers, and predication. But I argue that none of the traditional theories themselves have the necessary resources to explain resemblance, causal powers, and predication; and so all are inadequate as they stand. Namely, sparse theories of all kinds cannot account for predication, and abundant theories of all kinds cannot account for resemblance and causal powers. Over and above these inadequacies, immanent realism cannot account for imperfect resemblance; transcendent realism cannot account for causal powers; trope theories cannot account for resemblance; and class nominalism cannot account for causal powers or resemblance. So each theory must posit more entities or theoretical primitives to fill its explanatory gaps. But these modifications are easily made, and so there is an abundance of adequate theories of properties. I conclude that considerations about explanatory adequacy also greatly underdetermine which theory we should accept.

In Chapter 4, I consider whether explanatory value could serve as grounds for theory-choice in the properties debate and resolve the underdetermination. First, I present several examples of arguments from explanatory value, which have a common form: we should prefer some theory of properties to its competitors, all else being equal, because that theory exhibits some explanatory virtue or virtues better than its competitors. Philosophers justify this kind of argument with the claim that explanatory virtues, like simplicity and unity, are truth-conducive: ontological theories that exhibit explanatory virtues are more likely to be true. And explanatory virtues are truth-conducive in ontological theories, they argue, because these virtues have proven truth-conducive in scientific theories. But, I argue that we have good reason to doubt that explanatory value is a good basis for theory choice even in science. Namely, I cite what P. Kyle Stanford calls the "problem of unconceived alternatives," which argues that the history of science illustrates the unreliability of using explanatory value to choose between scientific theories whose domains are remote, hidden, or inaccessible. Further, even if we grant the controversial claim that explanatory virtues are truth-conducive in some scientific theories, it does not follow that they would be truth-conducive in theories of properties. For we have good reason to think explanatory virtues are truth-conducive in scientific theories only if we have good reason to think the facts in those theories' domains cooperate with the explanatory virtues (like simplicity and unification) by really being simple, unified, and so on. And even if we suppose that we have good reason to think that the facts in scientific domains cooperate with explanatory virtues in this way, that does not necessarily give us good reason to think the the facts about properties cooperate with the explanatory virtues as well. Therefore, the analogy between scientific theories and theories of properties is unestablished, and considerations about explanatory value cannot resolve the underdetermination.

In Chapter 5, I summarize the dissertation's argument so far, concluding that our choice between theories of properties is hopelessly underdetermined. I then consider

the consequences of this conclusion. The argument of the previous chapters shows that we have no good reason to accept any *one* theory of properties as *true*. But that leaves open the possibility that we might accept one theory of properties as correct on pragmatic grounds. I then argue that, in fact, pragmatic grounds cannot resolve the underdetermination either. Instead I suggest what I call 'instrumental pluralism,' a view which claims that we allow practitioners of the various inquiries to use whatever theory of properties they find useful.

CHAPTER 2

COHERENCE

> Good-bye to the Platonic Forms; they are meaningless noises.
>
> *Posterior Analytics* (trans. Ross)
> ARISTOTLE

ONE GOAL OF THIS DISSERTATION is to show that we lack a principled basis for choosing any one theory of properties as the correct theory. The first potential basis for theory-choice is *coherence*. Perhaps we can rule out some of the traditional theories of properties because they are incoherent, where a theory is incoherent if it is inherently contradictory or leads to contradiction. Such arguments have a long history in the properties debate, and I will consider some of the most pressing. In the end, I conclude that each of these arguments fails to show that any of the traditional theories of properties are incoherent.[1]

To begin, I consider arguments that immanent realism can be ruled out as incoherent in §2.1, which say immanent universals' repeatability leads to paradox. First, I explain why repeatability through time (endurance) and through space (multi-location) are, at most, problematic for particulars, but not immanent universals. Second, I consider an ob-

[1]The argument of this chapter (and to some extent, this dissertation) mirrors the excellent arguments of Nicholas Wolterstorff (1960). In that paper, Wolterstorff considers a few of the complaints typically raised against "realist" and "nominalist" theories (apparently immanent realism and trope theory, respectively) and finds them wanting, much like the argument in this chapter. After that, the similarities to this dissertation continue, as Wolterstorff then briefly considers whether there are any grounds to *prefer* one to the other on the basis of simplicity and clarity (for my view on arguments of this sort, see chap. 4 below). He then concludes that the benefits of realism and nominalism are evenly matched, and concludes that the realism-nominalism debate is "a meaningful but pointless dispute" (1960, 199). But, despite the similarity in conclusion and tone, Wolterstorff's argument is quite different from the one presented in this dissertation. Namely, Wolterstorff considers only objections to immanent realism and trope theory, and none of the particular criticisms Wolterstorff canvases are considered here (with the exception of Nelson Goodman's Imperfect Community objection to primitive resemblance relations—see §3.3 below).

jection from E. J. Lowe that universals violate the transitivity of the relation *being wholly in the same place as*. I argue that this argument begs the question. Finally, I consider a set of paradoxes, presented by Steven Barker and Phil Dowe (2003), that are supposed to follow from immanent realism. I argue that these paradoxes fail to appreciate important, theoretical subtleties of immanent realism. In §2.2, I consider arguments that class nominalism is incoherent, which say that if class nominalism were true, then coextensive properties would be made identical when they are supposed to be distinct. I argue that class nominalism can avoid this paradoxical result by following David Lewis's appeal to structured set-theoretic properties. In §2.3, I consider arguments that we can rule out transcendent realism as incoherent, because it leads to the third man regress. I argue that the third man regress, and others like it, succeed only in conjunction with auxiliary hypotheses that the transcendent realist can dispose of without consequence. Finally, in §2.4 I consider Bradley's Regress and argue that, if successful, it applies to all theories of properties; and that we have good reason to think that it fails.

2.1 Immanent Realism and Paradoxes of Multi-Location

Immanent universals are repeatable: they are wholly present wherever they are instantiated (Lewis 1983, 343). As a result, immanent universals (a) *endure* through time and (b) are *multi-located* in space. Traditionally, detractors argue that both of these results are paradoxical.

First, let's look at (a): universals persist by enduring rather than perduring. David Lewis distinguishes the two kinds of persistence in the following:

> Let us say something *persists* iff, somehow or other, it exists at multiple times; this is the neutral word. Something *perdures* iff it persists by having different temporal parts, or stages, at different times, though no one part of it is

> wholly present at more than one time; whereas it *endures* iff it persists by being wholly present at more than one time. (Lewis 1986b, 202)

Since immanent universals are wholly present whenever they are instantiated, *when they persist*, they endure by definition; they are wholly present at more than one time.

Is the endurance of immanent universals problematic? Admittedly, endurance of *particulars* leads to an apparent paradox, known as the problem of temporary intrinsics. This paradox for particulars might color our response to the coherence of multi-located *universals*, although I shall argue that the paradox does not apply to immanent universals. The problem arises in the case of particulars, because endurance is a case of overlap: if one thing wholly exists at more than one time, then those times literally share the enduring thing as a part (202). But things change: at one time Alfred stands, at another he sits. Therefore Alfred both stands and sits. Since Alfred is wholly present at both times, he has the incompatible shape-properties of *being straight* while standing, and *being bent* while sitting. This is problematic, as Alfred has his shape intrinsically, as it is a property of Alfred in and of himself.[2] And by the Indiscernibility of Identicals, Alfred-that-sits and Alfred-that-stands cannot be identical, as they differ intrinsically. But Alfred endures through time, and so Alfred-that-sits and Alfred-that-stands must be identical. Contradiction.

There are several solutions to this paradox, but I need not rehearse them here, as the problem of temporary intrinsics does not apply to immanent universals. The apparent paradox for particulars arises only because particulars can undergo intrinsic change. But, by definition, a universal never intrinsically differs between instantiations. Therefore, when a universal persists, a universal cannot intrinsically differ between times, and thereby cannot undergo intrinsic change. Therefore, enduring universals avoid the prob-

[2] I am careful to say that Alfred *intrinsically* has his shape, not that shape is itself an intrinsic property. I here follow Carrie Figdor (2008).

lem of temporary intrinsics that troubles enduring particulars.

Now let's look at (b): universals are multi-located in space. Like endurance through time, multi-location also leads to apparent paradox for particulars, but not universals. Lewis (2002, 3) gives the example of saintly bilocation. Suppose "a bilocated saint is wholly present in Rome and wholly present in Byzantium" (Lewis 2002, 3), but is sitting in Rome and standing in Byzantium. Therefore the saint both stands and sits. It seems that the saint, wholly existing in two places, has the incompatible shape-properties of being straight while standing, and being bent while sitting. Again, the saint has her shape intrinsically, as it is a property the saint has in and of herself. And so by the Indiscernability of Identicals, the saint in Rome is not identical with the saint in Byzantium, as they differ intrinsically. But the saints in Rome and Byzantium are identical by hypothesis. Contradiction.

Again, one could whip up a number of solutions to this problem, but I need not rehearse them here. Bilocated particulars are problematic only if they intrinsically differ, and identicals are supposed to be indiscernible. But universals do not intrinsically differ between their instantiations. They are intrinsically identical in each instantiation – their intrinsic nature does not vary with location. Therefore, multi-location is not thereby paradoxical for universals.

Finally, some philosophers take issue with the very idea of multi-location. E. J. Lowe puts the classic objection well:

> the relation of *being wholly in the same place as* appears to be an equivalence relation and therefore a symmetrical and transitive relation, which poses the following difficulty. Suppose that tomatoes A and B exemplify exactly the same shade of redness and that this universal is both wholly in the same place as A and wholly in the same place as B. Then it seems to follow, given the symmetry and transitivity of the relation *being wholly in the same place as*, that tomato A is wholly in the same place as tomato B–which we know to be necessarily false, given the non-identity of A and B. (2006, 24)

The problem, then, is this: if x and y wholly exist at the same place, and y and z do as well, then x and z must exist wholly at the same place.[3] So, since A and *red* wholly exist at the same place, and red and B do as well, it follows that the A and B wholly exist at the same place. But A and B are spatially non-overlapping by hypothesis. Contradiction.

But this argument fails, as it would commit the immanent realist to a claim they reject. Namely, given that multi-located universals exist, the immanent realist denies that *being wholly in the same place as* is an equivalence relation by implication. Because immanent realists posit multi-located entities into their ontology, they obviously do not accept that *being wholly in the same place as* is an equivalence relation; it straightforwardly follows that the relation is non-transitive given that multi-located entities exist. Therefore, there is no paradox because the immanent realist does not, and need not, accept the key premise of Lowe's argument. Lowe foresees this response and replies that "this response strikes me as being both unprincipled and question-begging" (2006, 24). But why think this response is unprincipled and question-begging? Let us consider each charge in turn.

First, there are no grounds for Lowe's claim that the immanent realist's response is unprincipled. The immanent realist accepts a direct consequence of his or her view: since immanent universals are wholly present in spatially non-overlapping particulars, the relation of *being wholly in the same place as* is not an equivalence relation. But this response seems principled. The response would be unprincipled if it ignored the objection outright, or asked us to hold conflicting views.

However, perhaps Lowe is claiming that the view is unprincipled because it treats particulars and universals differently with respect to the relation *being wholly in the same place as*. For if we restrict our quantification to the domain of particulars, then the relation *is* transitive. However, once we quantify over universals, the relation is non-transitive.

[3] I'm not sure why Lowe thinks that the symmetry of the relation is necessary for the argument to go through.

The immanent realist certainly accepts these two claims. But, again, why would it be unprincipled for the immanent realist to treat the relation differently with respect to these different domains of quantification? Perhaps particulars really are singly-located, a point which I will grant, and so the relation is thereby transitive when we quantify over only particulars. But universals have the characteristic privilege of multi-location, and therefore the relation is non-transitive if we quantify over both particulars and immanent universals. This difference seems to be a perfectly principled response to these facts.

Or perhaps Lowe is claiming that it is unprincipled for the immanent realist to accept that the relation of *being wholly in the same place as* is non-transitive, because such a move is *ad hoc*. But this can't be right either. *Ad hoc* claims are unprincipled changes to one's view in response to a criticism. But the immanent realist's claim that the relation is non-transitive is neither a change in view, nor a response to a criticism. For the non-transitivity of the relation of *being wholly in the same place as* follows directly from immanent realism's claims about the multi-location of universals. Therefore, the immanent realist accepts that the relation is non-transitive for principled reasons.

Second, there are no grounds for Lowe's claim that the immanent realist is begging the question against his or her opponents. In fact, Lowe's claim gets the dialectic backwards. Namely, for the proponent of immanent realism to beg the question against the opponents of the view, the dialogue would have to go like this:

> **Opponent**: The relation of *being wholly in the same place as* is an equivalence relation. Therefore, universals are incoherent.
>
> **Proponent**: No, the relation is non-transitive.
>
> **Opponent**: But that begs the very question at issue! The burden is on you to provide an independent reason to think that the relation is not in fact an equivalence relation.

Here the proponent of immanent realism begs the question against her opponent because the proponent denies the opponent's claim by assuming that the relation is non-transitive *without argument*. But this is not how the dialectic proceeds. Rather it proceeds like this:

> **Proponent:** I take the relation of *being wholly in the same place as* to be non-transitive because of the different nature of universals and particulars.
>
> **Opponent:** But that relation is in fact an equivalence relation, and immanent realism thereby leads to paradox.
>
> **Proponent:** But you're just assuming that immanent realism is false, because if universals exist, then the relation is non-transitive. The burden is on you to show that we have an independent reason to think that the relation is in fact an equivalence relation.

So, Lowe gets the dialectic backwards, as it is really the opponent of immanent realism who begs the question against the proponent. As a result, the immanent realist's response to Lowe is neither unprincipled, nor question-begging.

So, the traditional arguments against universals do not show that immanent realism is incoherent. But Steven Barker and Phil Dowe (2003) argue that multi-location of universals lead to two novel paradoxes. First Barker and Dowe ask us to suppose the following:

> Take a multi-located entity O, …[a] universal. Say that O is multi-located throughout a 4D space-time region R. Thus there is a division of R into sub-regions r, such that O is wholly located at each r….the rs will either be temporal slices or spatio-temporal slices of R, say points. (2003, 107)

So, a universal O is multi-located at every sub-region r in the four-dimensional space-time region R. Following Barker and Dowe, let O_r be the universal at a given r, and $F(O_r)$ be the fusion of all the O_rs (2003, 107). To visualize this, let's imagine R as being a 3×3 grid,

one axis spatial, and the other temporal.[4] Call the first point '1,' the second '2,' and so on. Call the universal O at 1, 'O_1'; O at 2, 'O_2'; and so on.

Now, Paradox 1 is supposed to go like this: on the one hand, every O_r is three-dimensional, because they exist at a single point – one of 1–9. And each O_r is identical to every other, as O_1–O_9 are really just O wholly present in different locations. Therefore, the fusion of O_1–O_9, $F(O_r)$, is identical to O, its only (improper) part. And since O is three-dimensional, $F(O_r)$ is too. But, on the other hand, $F(O_r)$ has parts at every point in the temporally extended R. So $F(O_r)$ is four-dimensional. Therefore, $F(O_r)$ is both three- and four-dimensional. Contradiction.

But Paradox 1 fails, as the argument that $F(O_r)$ being four-dimensional is lacking. For Barker and Dowe argue that $F(O_r)$ must be four-dimensional due to the following principle, which they call WLP:

> If an entity W and a space-time region R are such that for some division of R into sub-regions r, W has a part p located at each sub-region r, then W is located at R and is a 3 or 4D entity according to the dimension of R itself. (2003, 109)

WLP is a plausible principle, as something wholly contained in a three-dimensional region must itself be three-dimensional, as it could not be temporally extended: the region it occupies has no temporal dimension that it could be extended along. And something that has parts spread out through every sub-region of a four-dimensional region must itself be four-dimensional: the region has a temporal dimension along which the thing is extended.

From WLP, Barker and Dowe reason that $F(O_r)$ must be four-dimensional, because $F(O_r)$ has parts at every sub-region r of the four-dimensional R. But this inference is unwarranted, as WLP is ambiguous: WLP says that if some something has *parts* at every

[4]This is, of course, a simplification, as we are collapsing all three spatial dimensions into one for illustrative purposes.

sub-region of a four-dimensional region, W is located at that region and is thereby four-dimensional as well. This is certainly true, if by 'parts of W' we mean *proper* parts of W. For something has extension throughout a region only if it has *proper* parts at every sub-region of the region in question. For the intuitive idea behind things being four-dimensional is that they are spread out through time, partly here and partly there. But $F(O_r)$ does not have a proper part at every sub-region r of R, as WLP requires, but an *improper* part – itself. $F(O_r)$ is not spread out across times, but is rather wholly present at different times. As a result, $F(O_r)$ does not satisfy the antecedent of the clarified WLP. Otherwise WLP would be clearly false, as $F(O_r)$ is not located at R, but multi-located at the *sub*-regions of R. And since $F(O_r)$ is wholly located at each of those temporally unextended sub-regions, it is not temporally extended. Therefore, $F(O_r)$ is *not* four-dimensional, despite the truth of the clarified WLP.[5]

Barker and Dowe resist these claims, and insist that $F(O_r)$ is four-dimensional. They argue as follows:

> The space-time region in which O is multi-located is the region R. Take the space-time region adjacent to R, R^*, which shares its times but not its spaces. Assume that there are entities E located at each 3D slice of R^*. Suppose now that none of these entities is identical with the other. Let $F(E)$ be the fusion of all these non-identical entities. $F(E)$ is a four-dimensional object. Take any part of $F(E)$, and there is an O_r that is located at the same time. There is a one-to-one correspondence between parts of $F(E)$ and parts of $F(O_r)$. We might think of $F(E)$ as a temporal ruler for $F(O_r)$. $F(O_r)$ has the same temporal extent as $F(E)$. As $F(E)$ is a 4D object, so is $F(O_r)$. (2003, 109)

We can imagine this as follows. Let R^* be a 3×3 grid, just like R. Call the first point 1^*, the second 2^*, and so on. And at point 1^*, the universal F is instantiated; at point 2^*, the universal G is instantiated; …; and at point 9^*, the universal N is instantiated. For simplicity's sake, let's assume that space-time points themselves are what instantiate

[5]I thank Jeremy Skrzypek and Sam Cowling for comments that convinced me to address WLP in greater depth.

the universals in question. Further assume that universals F through N are all non-identical. Finally, let's call the universals F through N collectively 'E.' The fusion of E, $F(E)$, is four-dimensional, as it has a proper part at every sub-region r^* of R^*. That is, it has different proper parts that are spread out across different times. And given the isomorphism of R and R^*, $F(E)$ and $F(O_r)$ have the same temporal extent. And since $F(E)$ is a four-dimensional, so is $F(O_r)$.

Yet I must stubbornly insist that $F(O_r)$ is three-dimensional: $F(O_r)$ has only one part, O, and so it does not have different proper parts at different times; it is multi-located at those different times. Therefore, $F(O_r)$ is not four-dimensional. And Barker and Dowe's argument gives us no reason to think otherwise. To show why, let's consider their reasoning in greater depth. First, Barker and Dowe reason correctly that, by the clarified WLP, $F(E)$ must be four-dimensional, because it has proper parts spread out across the four-dimensional region, R^*. Then, Barker and Dowe claim that since R is isomorphic to the four-dimensional R^*, the O_rs are instantiated in the exact same pattern at R as E (that is, the universals F–N) is at R^*. And since $F(E)$ and $F(O_r)$ are fusions of universals that are instantiated in the same pattern, we can use $F(E)$ as a 'temporal ruler' for $F(O_r)$. Therefore, since $F(O_r)$ and $F(E)$'s parts (be they proper or improper) are instantiated in the same pattern, and $F(O_r)$ and $F(E)$ must have the same temporal extent, making $F(O_r)$ four-dimensional like its counterpart, $F(E)$.

But this last step in Barker and Dowe's reasoning does not follow: the reason why $F(E)$ is four-dimensional does not apply to $F(O_r)$. We think $F(E)$ is four-dimensional because it is spread out across a four-dimensional region, R^*, having a proper part at every sub-region of R^*. But this same reasoning does not carry over to $F(O_r)$, as $F(O_r)$ is not spread out across the four-dimensional region R. Rather, as I have repeatedly stressed, it has an *improper* part at every sub-region of R. In other words, $F(O_r)$'s only part, O, is wholly present at every sub-region of R; O is multi-located throughout R. So, $F(O_r)$ is

three-dimensional because its only improper part is. This teaches us an important lesson: given that immanent universals have the characteristic privilege of repeatability across space and time, we cannot simply assume that two fusions like $F(O_r)$ and $F(E)$ are the same dimensionality just because they have the same pattern of instantiation in isomorphic, four-dimensional regions. For it may be that one fusion does not have proper parts at different times while the other does. Such possibilities arise once we allow entities capable of multi-location into our ontology. Admittedly, the three-dimensionality of $F(O_r)$ may be counterintuitive to opponents of immanent realism. Nevertheless, the appeal to temporal rulers doesn't succeed in showing $F(O_r)$ is four-dimensional anymore than the appeal to WLP did. Therefore, Paradox 1 collapses.

Barker and Dowe present another paradox for multi-located entities, one that is supposed to be independent of Paradox 1. Again, Barker and Dowe ask us to suppose that a universal, say *blue*, "is multi-located throughout a 4D space-time region R" (2003, 110). Alongside *blue* and R, Barker and Dowe suggest, is the **life of *blue***, ***L(blue)*** for short. The **life of *blue*** is "the qualitative persistence of blueness throughout R" (2003, 110). Barker and Dowe insist that "Lives are part of common sense ontology; we speak of entities – be they people, animate entities or inanimate – having long, interesting, varied, good, etc. lives" (2003, 110). And lives are four-dimensional, as "they have beginnings, middles, and ends" (110). So, the **life of *blue*** "is just like an event occurring at a region R; it is located at R with proper parts located at each sub-region r in R" (110).

But Barker and Dowe argue that the lives of immanent universals are "paradoxical entities" (2003, 110). First Barker and Dowe assume, with Hume, that there are no necessary connexions between distinct existences. Therefore, the persistence of *blue* in a given region and the **life of *blue*** in that region are not distinct; *blue* is either a part of the **life of *blue***, or somehow constitutes its own life, perhaps with the help of other entities (110). After helping themselves to these assumptions, Barker and Dowe ask us to suppose the

following for *Paradox 2*:

> Take [a universal] O that endures by multi-location through the temporal region of R. There is a 4D object ***L(O)*** with proper parts located at each sub-region r of R. Split ***L(O)*** into two proper parts. Call them ***L(O)*1** and ***L(O)*2**, which are located at distinct regions $R1$ and $R2$ (2003, 110–11)

Let R be a 1×4 grid, where the spatial axis is only 1 point wide, and the temporal axis four points long.[6] Call the four points along the temporal axis 1–4. Next, let $R1$ be the spatiotemporal region composed of points 1 and 2, and $R2$ be the spatiotemporal region composed of 3 and 4. Now, following Barker and Dowe, O is an immanent universal that is multi-located at 1–4. This supposedly leads to Paradox 2. On the one hand, ***L(O)*1** (the life of O in $R1$) and ***L(O)*2** (the life of O in $R2$) *are* bounded by $R1$ and $R2$. That is, the life of O in $R1$, ***L(O)*1**, exists within $R1$, and the life of O in $R2$, ***L(O)*2**, exists within $R2$. But ***L(O)*1** and ***L(O)*2** both have O as a proper part, which is *wholly* located in both $R1$ and $R2$. As a result ***L(O)*1** is not bounded by $R1$, and ***L(O)*2** is not bounded by $R2$, because each have a proper part located in the opposing region. Therefore, ***L(O)*1** and ***L(O)*2** are *not* bounded by $R1$ and $R2$. Contradiction.

To clarify the issues at hand, let's reconstruct Paradox 2 in plainer English. Suppose the immanent universal of *blue* is multi-located at points 1–4 (that is, *blue* is multi-located at every point r in R), and that, for simplicity's sake, it is points 1 through 4 themselves that instantiate *blue*. So, there is a four-dimensional object in R, the **life of *blue***, which is "the qualitative persistence of [*blue*] throughout R" (110). Now divide **life of *blue*** into two halves: **young *blue*** and **old *blue***, which occupy sub-regions of R, $R1$ (points 1 and 2) and $R2$ (points 3 and 4) respectively. So, **young *blue*** and **old *blue*** are "bounded by distinct regions $R1$ and $R2$ respectively, and nowhere else." On the other hand, **young *blue*** and **old *blue*** both have *blue* as a part. Therefore, **young *blue*** is not bounded by

[6] Again, we are collapsing all three spatial dimensions into one dimension here for illustrative purposes.

$R1$, as one of its parts, *blue*, is also located in $R2$. And **old *blue*** is not bounded by $R2$, as one of its parts, *blue*, is also located in $R1$. Contradiction.

So, the lives of universals seem paradoxical: lives are supposed to be singly-located, yet the lives of universals turn out to be multi-located. And the lives of universals inherit their trait of being multi-located from the universals that constitute them. But the immanent realist should not think that the **life of *blue*** is multi-located, as it is not the universal of *blue* alone that constitutes the **life of *blue***. Rather, the immanent realist should say that the persistence of *blue* through R is constituted by the fusion of the blue particulars throughout R. Put another way, the immanent realist can say that the **life of *blue*** in R is constituted by 1 through 4 being blue.[7] And this account of lives makes sense, because if a blue coat persists in a four-dimensional region, it's the *coat's being blue* that constitutes the persistence of *blue* throughout that region, not simply the universal of *blue* itself. And so, the immanent realist should say that the **life of *blue*** is not simply constituted by the multi-located universal of *blue* itself, but by the fusion of singly-located, blue particulars throughout R. And since what constitutes the **life of *blue*** is the fusion of particulars in R that instantiate *blue*, we can say that the **life of *blue*** inherits the fusion's trait of being singly located. This undermines Paradox 2, as ***young blue*** is thereby constituted by the singly-located fusion of blue particulars 1 and 2, and ***old blue*** is constituted by the singly-located fusion of the blue particulars 3 and 4. That is, since the fusion of 1 and 2 is bounded by $R1$, so is ***young blue***; and since the fusion of 3 and 4 is bounded by $R2$, so is ***old blue***. Therefore, ***young blue*** and ***old blue*** are bounded by $R1$ and $R2$ respectively, as was required.

Barker and Dowe anticipate this response, saying that construing lives as fusions of "instantiations of universals" (2003, 112), which they call "states of affairs," only forestalls inevitable paradox. For if we are to "explain the necessary connection between persisting

[7] I thank Jeremy Skrzypek for pressing me to explain what constituted the **life of *blue*** in this example.

universals and lives we must still admit that universals are parts of lives" (2003, 112) and the particulars that instantiate those universals that constitute those lives. But "We can then apply our paradox of location to these entities. States of affairs are meant to be singly located entities, but, given that they contain universals as parts they must be multi-located. Contradiction again" (2003, 112).

But Barker and Dowe's reply isn't an objection to the view of immanent realism, it *is* the view. According to immanent realism, when two particulars instantiate a single immanent universal they literally share a part – they overlap. So it shouldn't be news to anyone that immanent realism says that states of affairs are partially composed of multi-located entities. Thus the new paradox of location, as applied to states of affairs, fails. Immanent realism is straightforwardly committed to states of affairs being multi-located *in so far as* the universals that partly constitute states of affairs are multi-located. Therefore, Barker and Dowe's key assumption that "States of affairs are meant to be singly located entities" (2003, 112) is false, and the updated Paradox 2 collapses as well.

So, it would seem that the multi-location of universals is not incoherent. First, the endurance of particulars *is* problematic, but only because particulars can undergo intrinsic change. But universals are, by definition, intrinsically identical whenever they are instantiated; as a result, they cannot undergo intrinsic change. Again, particulars being *spatially* multi-located is also problematic, but only in so far as particulars could intrinsically differ between locations. But a universal cannot, by definition, intrinsically differ between its instantiations. Second, I argued that E. J. Lowe's argument for the transitivity of *being wholly in the same place as*. Finally, I showed how immanent realism can cleanly dodge two (apparent) paradoxes of multi-location recently presented by Barker and Dowe (2003). So, it seems, immanent realism cannot be ruled out as incoherent on this basis.

2.2 Class Nominalism and Paradoxes of Coextension

According to class nominalism, properties are just sets of their instances. A property F is just the set of all and only things that are F, and to instantiate the property is just to be a member of the set. Relations, or polyadic properties, are just sets of ordered n-tuples, and for n things to bear the n-adic relation R to one another is just for them to be members of an ordered n-tuple that is a member of the set of all and only R-related n-tuples. And since properties are just sets, the identity-conditions for properties are the same as the identity-conditions for sets. Sets have very simple identity conditions: two sets are identical iff they have the exact same members. In other words, two sets A and B are identical iff A and B are coextensive – every member of A is a member of B and vice versa. So, since class nominalism holds that properties are just sets, we can translate these identity conditions for sets into identity conditions for properties: two properties are identical iff they have the exact same instances.

But some distinct properties seem to have the exact same instances. Take the hackneyed (and idealized) example of creatures with kidneys and creatures with hearts. The first group of creatures instantiates the property of *being a creature with kidneys*, and the second instantiates the distinct property of *being a creature with a heart*. But, as it turns out, the sets containing these two groups are coextensive. So, the right-hand side of the identity conditions for properties is met – *being a creature with kidneys* and *being a creature with a heart* have the exact same instances. Therefore, the left-hand side must also be true – *being a creature with kidneys* and *being a creature with a heart* are in fact one and the same property. But the two properties are distinct by hypothesis. Contradiction.

One solution to this paradox of coextension is to appeal to merely possible instances of *being a creature with kidneys* and *being a creature with a heart*. Although the sets of *actual* creatures with kidneys and *actual* creatures with hearts are coextensive, the sets

of *actual and possible* creatures with kidneys and *actual and possible* creatures with hearts are not coextensive. Because there could have been creatures with hearts but no kidneys and vice versa, there are merely possible creatures that instantiate *being a creature with kidneys* but not *being a creature with a heart* and vice versa. So, we can update the identity conditions for properties to avoid this problem: two properties are identical iff they have the exact same instances, *both actual and possible*.

But this solution merely pushes back the worry about coextensive properties, as some distinct properties are apparently *necessarily coextensive*: they have the exact same instances, both actual and possible, yet are apparently distinct. Take another hackneyed example, that of *being triangular* and *being trilateral*. The two properties seem distinct – one has to do with angles and the other has to do with sides. But triangles and trilaterals are *necessarily* coextensive. Although there could have been creatures with kidneys but no hearts (and vice versa), there couldn't have been a triangle that was not a trilateral (or vice versa). Necessarily, triangles have three sides, and trilaterals have three angles.

So we can run the paradox again with our example of necessarily coextensive properties, *being triangular* and *being trilateral*. The right-hand side of the identity conditions for properties is met – *being triangular* and *being trilateral* have the exact same instances, both actual and possible. Therefore, the left-hand side must also be true – *being triangular* and *being trilateral* are in fact one and the same property. But the two properties are distinct by hypothesis. Contradiction.

David Lewis (1986b) presents his own brand of class nominalism that avoids both the accidental and necessary coextension problems. Lewis avoids the problem of accidental coextension in the way mentioned above, by famously accepting a plurality of worlds:

> absolutely *every* way that a world could possibly be is a way that some world *is*. And as with worlds, so it is with parts of worlds. There are ever so many ways that a part of a world could be; and so many and so varied are the other

> worlds that absolutely every way that a part of a world could possibly be is a way that some part of some world is. (1986b, 2)

Since every way a part of world could be is a way that some part of some world is, some otherworldly creatures instantiate *being a creature with a heart* but not *being a creature with kidneys*, and vice versa. So, such accidentally coextensive properties are not coextensive when we leave our quantifiers unrestricted, ranging over all possible worlds. So, Lewis himself faces no problem of accidental coextension. Further, Lewis presents a solution to the problem of necessary coextension that works particularly well, as it identifies and addresses the underlying problem that leads to cases of seemingly distinct but necessarily coextensive properties.

First, Lewis notes that there seem to be two conceptions of properties at work in these cases, one coarse-grained the other fine-grained. The coarse-grained conception of PROPERTY is purely extensional, and so *being triangular* and *being trilateral* are in fact the same property on this conception. So far, this has been the only conception of PROPERTY that we have considered in our discussion of class nominalism. But there is another conception of PROPERTY that "ties the properties more closely to the meanings of their standard names, and to the meanings of the predicates whereby they may be ascribed to things" (56). And this is what drives the paradox: *being triangular* and *being trilateral* are the same property in the coarse-grained sense, but not in the fine-grained sense – one is about angles, and the other is about sides.

So, we have (at least) two conceptions of properties, and Lewis argues that there's no point in choosing one conception of PROPERTY over the other. We have not zeroed in on "the things we call 'the properties', so that now we are ready to debate about such questions as, for instance, whether two of them ever are necessarily coextensive" (56). And we will never be able to zero in on a single conception of PROPERTY, as "we simply have two different conceptions" (56). We cannot choose one conception over the other

based on some conceptual analysis, as "The conception [of PROPERTY] is in considerable disarray. It comes in many versions, differing in a number of ways" (Lewis 1986b, 56). Instead, we should make room for both conceptions in our ontology: Both conceptions are legitimate, and we must account for both. According to Lewis,

> The question worth asking is: which entities, if any, among those we should believe in, can occupy which versions of the property role? My answer is, in part, that sets of *possibilia* are entities that we should believe in which are just right for *one* version of the properties role. (56–7)

Namely, sets of instances are just right for the coarse-grained, extensional conception of PROPERTY. But the problem involving *being triangular* and *being trilateral* shows that the class nominalist owes us further explanation of how class nominalism can account for properties in the fine-grained sense. Generally speaking, we need a set-theoretic way of making more fine-grained features of instances salient. One way is to structure properties in a way that connects the coarse-grained set of instances to the fine-grained feature in question. Lewis shows one way we could do this with the stock example of *being triangular* and *being trilateral*.

First, on the coarse-grained conception of PROPERTY, *being triangular* and *being trilateral* are identical as they have the same extension. Call this property C for 'coarse-grained.' But now we need to somehow distinguish two facets of the instances of C, their tri*angularity* and their tri*laterality*, something that mere extension is too blunt to capture. Lewis proposes the following solution involving relations between the following properties: C, the coarse-grained property of *being triangular*/*being trilateral*; A, the relation of *being an angle of*; and S, the relation of *being a side of*. C, A, and S cannot themselves capture *being triangular* and *being trilateral* on the fine-grained concept of PROPERTY. But we can take these and other unstructured properties and "build" structured properties that can capture these and other properties on the more fine-grained conception of PROPERTY.

So, let's begin with S and A and suppose for simplicity that S and A are unstructured relations. Now, let T be:

> the higher-order unstructured relation which holds between an unstructured property F of individuals and an unstructured relation G of individuals iff F is the property of being something which exactly three things bear relation G to.

There is a unique property that bears T to A: C (the property of *being triangular* in the coarse-grained sense). And again, a unique property bears T to S: C (the property of *being trilateral* in the coarse-grained sense). We can represent *being triangular* in the fine-grained sense as the structured property $\langle T, A\rangle$, and *being trilateral* in the fine-grained sense as $\langle T, S\rangle$. Since A and S are distinct, the structured properties of $\langle T, A\rangle$ and $\langle T, S\rangle$ are distinct as well. And so, the properties of *being triangular* and *being trilateral* on the fine-grained conception of PROPERTY are distinct, as was required. Not only are $\langle T, A\rangle$ and $\langle T, S\rangle$ distinct, they make salient the fine-grained features of the instances of C in a way that relates those finer-grained features to the set of instances themselves. In the case of triangularity, $\langle T, A\rangle$ makes salient the tri*angularity* of the instances of C, and connects A – the relation of *being an angle of* – to C through the relation T. Analogously, $\langle T, S\rangle$ makes salient the tri*laterality* of the instances of C, and connects S – the relation of *being a side of* – to C through the relation T.

So, Lewis's solution to the problem of accidentally coextensive properties is to accept the existence of a plurality of possible worlds, and to solve the necessary coextension problem with an appeal to structured properties. As a result, it seems that the paradoxes of coextension have at least one possible solution that can be given in purely in set-theoretic terms. Therefore, the paradoxes of coextension are not a threat to the consistency of class nominalism. Structured properties are a way for class nominalists to capture properties on the fine-grained conception that the purely extensional conception of PROPERTY cannot.

We avoid the apparent paradox of distinct but coextensive properties being identical on the *fine-grained* conception of PROPERTY. Admittedly, on the coarse-grained, extensional conception of PROPERTY, coextensive properties are identical. But this is as it should be, as the coarse-grained conception is extensional. And class nominalists should not, and need not, pretend that the purely extensional conception of PROPERTY can do the work of properties on other, more fine-grained conceptions. Fortunately for class nominalism, the set-theoretic universe is large indeed, and there are plenty of candidates that can play the fine-grained conception. Lewis's structured properties are one such candidate.

One might object to structured properties, as there are sets that could serve as the structured properties just as well.[8] For example, in the case of *being triangular* and *being trilateral*, why should the structured properties $\langle T, A\rangle$ and $\langle T, S\rangle$ serve as those properties on the fine-grained conception, rather than, say, $\langle A, T\rangle$ and $\langle S, T\rangle$?[9] But this question, presumably, should not worry the class nominalist. For class nominalists are looking for set-theoretic candidates to play the property-role in an intuitive way. Similarly, there are multiple ways to construct ordered pairs out of sets. For example:

- $\langle a, b\rangle =_{df} \{\{a\}, \{a, b\}\}$ (Kuratowski)
- $\langle a, b\rangle =_{df} \{\{a, b\}, \{b\}\}$ (Kuratowski reversed)

For an adequate account of ordered pairs we need a set-theoretic construction that can play the role of ordered pairs, and there are plenty. We select one and then use that construction uniformly. Similarly, class nominalism only needs an adequate candidate to play the role of fine-grained properties, and there are plenty. We select one and then use that construction uniformly. Of course, one might find this solution implausible, because

[8]This objection is due to Armstrong (1986, 87), although Armstrong there makes a general point from which I am extrapolating. As Rodriguez-Pereyra points out, this style of objection seems inspired by Paul Benacerraf's (1965) famous argument that numbers cannot be reduced to sets because "we have no more reason to think that, say, the number 2 is identical to $\{\{\varnothing\}\}$ rather than to $\{\varnothing, \{\varnothing\}\}$ or to the set of all two-membered sets" (Rodriguez-Pereyra 2002, 58).

[9]Since they are ordered pairs, $\langle T, A\rangle \neq \langle A, T\rangle$ and $\langle T, S\rangle \neq \langle S, T\rangle$.

it arbitrarily chooses one kind of set-theoretic structure to play the role of fine-grained properties when many others would do just as well. But the solution shows that class nominalism is not incoherent (nor inadequate) in this respect, as it has resources to respect our different conceptions of PROPERTY in a way that gets the right answer in cases of (apparently) coextensive properties without contradiction. Therefore, the paradoxes of coextension are soluble, overturning the claim that such cases prove that class nominalism is incoherent because of such cases.

2.3 Transcendent Realism and the Third Man

In the *Parmenides*, Plato's Parmenides presents the following argument against the young Socrates' theory of Forms:

> I suppose you think each form is one on the following ground: whenever some number of things seems to you to be large, perhaps there seems to be some one character, the same as you look at them all, and from that you conclude that the large is one .... What about the large itself and the other large things? If you look at them all in the same way with the mind's eye, again won't some one thing appear large by which all these appear large? .... So another form of largeness will make its appearance, which has emerged alongside largeness itself and the things that partake of it, and in turn another over all these, by which all of them will be large. Each of your forms will no longer be one, but unlimited in multitude. (132a, trans. Gill and Ryan)

Plato's Parmenides here presents what is known as the "third man argument" (*TMA* for short). *TMA* seems to say that the young Socrates' theory of Forms leads to a vicious regress. Exactly how we should interpret the regress as an argument against Plato's theory of Forms is not a question we can address here, as we have no time to climb the "Everest of scholarship" (Sellars 1955, 405) dedicated to such questions. What matters for our discussion is that the secondary literature has developed interpretations of the

regress that seemingly apply to a certain brand of contemporary transcendent realism, and thereby pose a threat to the coherence of these contemporary theories. So, I will not argue that any interpretation of the *TMA* is the correct interpretation of *Parmenides* 132a. Rather, I will present a version of *TMA* that in fact applies to *some* transcendent realist theories of properties, whose coherence is thereby questionable. But I will argue that the regress does not apply to *all* transcendent realist theories of properties, as it follows from transcendent realism only in conjunction with further assumptions, all of which the transcendent realist can abandon. Therefore, *TMA* does not show that transcendent realism is incoherent, although it does tell us something important about what shape more developed transcendent realist theories of properties must take.

In his seminal paper "The Third Man Argument in the Parmenides," Gregory Vlastos points out that *TMA* in the *Parmenides* is a non-sequitur unless we add some premises. The regress has two steps as written. According to Vlastos, the first step of the regress, put in general terms, claims the following:

> **(A1)** If a number of things, a, b, c are all F, there must be a single Form, F-ness, in virtue of which we apprehend a, b, c as all F. (Vlastos 1954, 320)

Next, Vlastos claims the second step of the regress, put in general terms, says the following:

> **(A2)** If a, b, c, and F-ness are all F, there must be another Form, F_1-ness, in virtue of which we apprehend a, b, c, and F-ness as all F. (1954, 321)

Vlastos notes that the text of the *Parmenides* suggests that (A2) is supposed to follow from (A1), but that is clearly not the case, as F-ness of (A1) is not identical with F_1-ness in (A2) (1954, 321). Vlastos takes *TMA* to assume the following claims:

> **(P)** The form of F-ness is itself F (324)

> **(NI)** If x is F, then x cannot be the Form of F-ness (*i.e.*, the Form of F-ness cannot be F in virtue of itself) (Vlastos 1954, 325)

To see how (A1), (SP), (NI), and (A2) are supposed to fit together for Vlastos, consider the following reconstruction of Plato's argument: take all the large things, a, b, c. Now since a, b, c are all large, there must be some single Form, *largeness* in virtue of which we apprehend a, b, c as all being large. But since every Form F-ness is itself F (SP), the Form of *largeness* is itself large. So, since a, b, c, and *largeness* are all large, by (NI) there must be a further Form of *largeness*$_1$ in virtue of which we apprehend a, b, c, and *largeness* as all being large. But by (SP) *largeness*$_1$ is itself large as well. So, since a, b, c, *largeness*, *largeness*$_1$ are all large, by (NI) there must be a further Form of *largeness*$_2$ in virtue of which we apprehend a, b, c, *largeness*, and *largeness*$_1$ as all being large. And so on.

But no matter how well Vlastos's original reconstruction captures the regress found at *Parmenides* 131a, Vlastos's interpretation makes *TMA* a non-starter, as (SP) and (NI) are contradictory. (SI) says "the form of F-ness is itself F," and (NI) says that "if x is F, then x cannot be the Form of F-ness." Therefore, it follows from (SP) and (NI) that if the Form of F-ness is F, which (SP) says it is, the Form of F-ness cannot be the Form of F-ness (1954, 326). So, by *reductio*, either (SP) or (NI) must be false. Therefore, the appeal to an infinite regress would be unnecessary to show that any view committed to (SP) and (NI) is false, as (SP) and (NI) are straightforwardly inconsistent (1954, 326).

So, Vlastos's interpretation makes *TMA* a non-starter:

> If Plato had identified all of the premises which are necessary (and sufficient) to warrant the second step of the argument [(A2)], he would not have produced the Third Man Argument at all. (1954, 329)

But Wilfrid Sellars (1955) suggests that the inconsistency between (SP) and (NI) lies in Vlastos's treatment of the variable 'F-ness.' Sellars notes that we can treat the variable

‘F-ness’ as either a “representative symbol” or as a “variable proper.” If the variable F-ness is used as a representative symbol,

> ‘F-ness’ would represent the name of a Form. To assert a formula which includes a representative name is, in effect, to assert each and every sentence which results from the formula by replacing the representative name by a name. Consequently to formulate an argument in terms of “F-ness” where “F-ness” represents the name of a Form is, in effect, to propound a class of arguments in each of which there occurs *not* “F-ness,” but the name of a single Form, e.g., “Largeness.” (Sellars 1955, 416)

Variables proper on the other hand are distinctive in that “it makes sense to say ‘for all values of v,’ ‘for some values of v,’ etc.” (416). So, Sellars notes, if we treated ‘F-ness’ as a variable proper, it would make sense to say things like “ ‘All F-nesses …,’ ‘Some F-nesses …,’ ‘The F-ness which …,’ ‘There must be an F-ness which …,’ etc.” (416–17).

Sellars suggests that F-ness must be both a representative symbol and a variable proper. That is, Sellars says that

> “F-ness” would *represent* a class of sentences in each of which there would occur, instead of “F-ness,” one of the following: “Largeness,” “Triangularity,” …, where the latter, however, are to be construed *not* as names of single Forms, but rather as *variables*. In other words, the latter would be used in such a way as to admit of such contexts as “All Largenesses …,” “There is a Triangularity …,” etc. And the substituends for these variables, e.g., “Largeness,” would be designated by some such device as the use of numerical subscripts, e.g., “Largeness$_1$,” “Largeness$_2$,” etc. (417)

Sellar concludes that Vlastos’s (SP) and (NI) are inconsistent only because they erroneously treat ‘F-ness’ as a representative name only, and not as a variable proper. Once we introduce quantifiers, (SP) and (NI) become consistent:

> **(SP′)** All F-nesses are F.
>
> **(NI′)** If x is F, then x is not identical with *the* F*-ness* by virtue of which it is F. (418)

Finally, Sellars gives two more principles that generate the regress, (G) and (P). The first principle is (G), which generates a Form for every character things have in common (replacing Vlastos's (A1)):

> **(G)** If a number of entities are all F, there must be an F-ness by virtue of which they are all F. (Sellars 1955, 417)

Next, (P) simply states the facts of resemblance hold as required by the antecedent of (G):

> **(P)** a, b, c, etc., particulars, are F.

Taken as premises, (P), (G), (NI′), and (SP′) generate an infinite regress, which S. Marc Cohen (1971, 454) puts very clearly in the following:

> The proof is a non-terminating sequence which proceeds in this way: (P) provides us with a stock of F's, (G) generates a Form by virtue of which they are all F, (NI′) establishes that none of the F's in the stock is identical with the form (G) has generated, and (SP′) establishes that the Form just generated is an F. Thus our stock of F's is increased by one, and we are ready for new applications of (G), (NI′) and (SP′) which will generate fresh Forms, ad infinitum.

So, now we can use Sellars's terminology to construct another version of *TMA*: take all the large things, a, b, c, and so on. By (G), there must be some *largeness* by virtue of which they are all large. Call this *largeness* '*largeness*$_1$.' By (SP′) *largeness*$_1$ is large. So, a, b, c, and so on, and *largeness*$_1$ are all large. So, by (G) there must be some *largeness* by virtue of which they are all large. Call this *largeness* '*largeness*$_2$.' And by (NI′), *largeness*$_1$ cannot be identical with the *largeness* by virtue of which it is large. Therefore *largeness*$_1$ cannot be identical with *largeness*$_2$. By (SP′), *largeness*$_2$ must also be large. And so on.

Sellars's reconstruction of *TMA* does lead to an infinite regress, unlike Vlastos's. The regress is problematic as transcendent realism was supposed to provide a single, unique Form of *largeness* that explains how large things come to be large. Rather than there being

a single, unique Form of *largeness*, the regress demonstrates that a multitude of *largenesses* are required to explain how large things come to be large. As a result, the regress shows that transcendent realism is incoherent: transcendent realism claims that there is only one Form of *largeness*, but if transcendent realism were true there would in fact be an infinite number of them. Contradiction. However, the conclusion that transcendent realism is incoherent follows only if transcendent realism is in fact committed to (G), (SP′), and (NI′) – a claim we should question.

Let's first consider whether transcendent realists are committed to (SP′). If not, transcendent realists can simply deny (SP′) and avoid Sellars's version of the paradox. Admittedly, (SP′) seems generally implausible. The Form of *braveness* is not itself brave in the same way Beowulf is brave; as Constance Meinwald puts it, "we can hardly imagine it performing deeds of valor or bearing up under adversity" (Meinwald 1992, 365). Nor is the Form of *largeness* large, as, according to transcendental realism, it is non-spatiotemporal. But even if we deny (SP′) as a general principle, there still are some Forms that would be self-predicating, if they exist. The most obvious example is the Form of Formhood, which features in what D. M. Armstrong calls the 'restricted third man':

> Consider the Forms. Each of them is its own unique self. But they have something in common. They are different tokens of the one type. They are all Forms. Formhood is a one that runs through this many. So must there not be a Form of Formhood? If the supporter of Forms does not acquiesce in this reasoning, he has the difficult task of explaining why he holds that the reasoning is valid in the case of ordinary particulars which have a common property. (Armstrong 1978, 1:73)

So now we have a case of a Form that is self-predicating, as the Form of Formhood is, by assumption, itself a Form. Now we can run the regress on this case as well. (P) gives us a stock of things with a common character – the Forms themselves. The principle (G) then generates a Form in which the first-order Forms all participate to explain their

common character, the second-order Form of *Formhood*. (NI′) tells us that *Formhood* is not identical to any of the Forms in the stock provided by (P). Now, by hypothesis, the second-order Form of *Formhood* is itself a Form, as are the first-order Forms that participate in it. (G) then generates a Form in which the first-order Forms and the second-order Form of Formhood all participate, the third-order Form of *Formhood*. And so on.

So, even if we deny (SP′) as a general principle, we still can generate the regress in the select cases of Forms that are inherently self-predicating. The underlying problem, then, is not (SP′) in particular, but (G) and (NI′). This, I think, reveals a plausible reply to the third man regress. (G) and (NI′) work together to tell us what Forms exist by giving us rules for constructing Forms out of their this-worldly participants, which we typically know better than the Forms themselves. (G) and (NI′) do not themselves *ontologically* determine which Forms exist; rather, the principles generate Forms in the sense that they give us a guide to which Forms exist. The Forms exist independently of any principle, although principles can accurately track which Forms exist, ideally in an informative manner. So, when such a principle or principles leads to an absurdity, it does not show that such absurdities follow from transcendent realism. Rather, when some principles lead to an absurdity, that shows that the principle cannot be an accurate guide to which Forms exist. And so (G) and (NI′) do not accurately track what Forms exist, as they would lead us to believe that absurdities hold of the Forms. Therefore, we must reject (G) and (NI′) as the rules we use to construct Forms. Therefore, the transcendent realist should discard (G) and (NI′) as the principles of generation for Forms.

But before the transcendent realists can rest easy, they must replace (G) and (NI′) with a principle or principles that can avoid *TMA*'s bite, yet tell us what Forms exist. The simplest way to do this would be to restrict (G) to particulars:

($\mathbf{G}_r$) If a number of *particulars* are all F, there must be an F-ness by virtue of which

they are all F.

So, unlike the unrestricted principle (G), (G_r) only generates Forms from resemblance between particulars. Accepting (G_r) and (NI′) blocks the restricted third man argument. For (G_r) cannot generate a Form of Formhood, as (G_r) only generates a Form to explain how particulars come to be alike.[10] (G_r) is silent as to whether there is a Form of Formhood that explains the fact that the Forms are alike in their Formhood: (G_r) does not say that the Form of Formhood exists, nor does it say that the Form of Formhood does not exist. It is a question whose answer is underdetermined by the principle. But since the principles that 'generate' Forms provide only a guide to what Forms exist, and do not themselves ontologically determine what properties exist, such underdetermination is unproblematic. (G_r) leaves us in the dark about what higher-order Forms exist, and how they relate to each other and particulars. But this consequence, at worst, requires transcendent realists to be skeptical about what higher-order Forms exist, as our guide to what Forms exist, (G_r), is silent about them. And so the facts about higher-order Forms, like so many things in this world, would be beyond human knowledge. And since there is nothing contradictory about human beings' inability to know what higher-order Forms exist, the third man argument does not show that transcendental realism is incoherent. Rather, *TMA* shows that transcendent realism in conjunction with several auxiliary hypotheses is incoherent. But since the transcendent realist has no independent reason to accept these auxiliary hypotheses instead of less problematic alternatives, *TMA* fails to show that transcendent realism is incoherent.

[10]We could take it a step further if we like, rejecting what Linsky and Zalta (1995) call 'principled Platonism,' in favor of 'piecemeal Platonism.' Principled Platonism accepts some principle or principles that generates which transcendent universals exist, while piecemeal Platonism rejects all such principles. Instead, Linsky and Zalta characterize piecemeal Platonism as the view that, like physical objects, Forms and other "abstract objects" must be discovered, not generated through a principle (532–33). How we would manage to discover such non-spatiotemporal and acausal entities without a principle of generation is another question.

2.4 Bradley's Regress

In his *Appearance and Reality*, F. H. Bradley argues that relations are unintelligible, as they lead to paradox.[11] First, Bradley argues that relations could exist only between terms – it makes no sense for a relation to be instantiated without its holding between some relata (1959, 28). The relation *taller than* cannot exist on its own; it needs at least two relata to stand between, the first taller than the rest (28). So, Bradley concludes, relations must have their feet in qualities: an instantiation of *taller than* must be in some sense grounded in the heights of its relata. A relation that was not so grounded would be "a false abstraction, and a thing which loudly contradicts itself" (28).

The paradox we are interested in arises once we consider the instantiation relation, which holds between a particular and its properties, and serves as a connection between the property and the thing that instantiates it. In other words, the instantiation relation (R_1) holds between a particular and a property. But what connects R_1 to the property and the particular? Even if the particular, property, and instantiation relation all exist, it does not follow that the particular instantiates the property. As Vallicella (2002, 207) puts it "the existence of two boards and some glue does not entail the existence of two-boards-glued-together." It would seem that R_1 is related to the property and particular, respectively, and so there must be more relations that connect R_1 to its relata – one connecting R_1 to the property, (R_2), and one connecting R_1 to particular, (R_3). But the problem clearly reiterates: what connects R_2 to its relata, the property and R_1? Another pair of instantiation relations, call them 'R_4' and 'R_5 respectively.' And what connects R_3 to its relata, R_1 and the particular? Another pair of instantiation relations, call them 'R_6 and 'R_7' respectively. And we can carry this on to infinity, and R_1 will never connect to its relata. Thus, Bradley says:

[11] For a fuller survey of the problem and the literature, see Anna-Sofia Maurin (2012).

> we are hurried off into the eddy of a hopeless process, since we are forced to go on finding new relations without end. The links are united by a link, and this bond of union is a link which also has two ends; and these require each a fresh link to connect them with the old…the problem is insoluble. (Bradley 1959, 28)

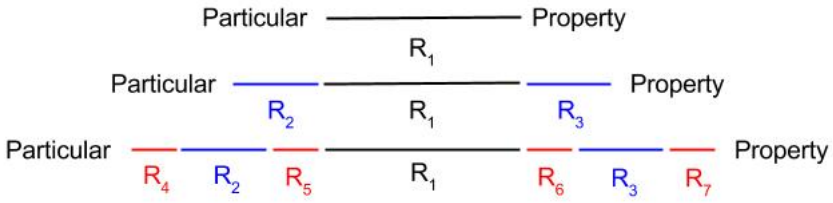

Figure 2.1: Bradley's Regress Illustrated

Every theory of properties seem to require something that connects the property to its particular[12]: parthood, transcendence, membership, and so on. Therefore, if instantiation is a relation, Bradley's regress applies to all traditional theories of properties alike; they all need an instantiation relation that connects properties to particulars. And since each theory would then lead to the paradox, the regress does not help us choose between the theories: they all equally fail, and for the same reason.

On the other hand, nothing forces the property theorist to say that a relation is what connects properties and particulars. For example, we can say properties are themselves 'unsaturated' or incomplete, saturated by a particular, as Frege (1997, 139) did with functions and proper names:

> Statements in general, just like equations or inequalities or expressions in Analysis, can be imagined to be split up into two parts; one complete in itself, and the other in need of supplementation, or 'unsaturated.' Thus, e.g., we split up the sentence
>
> 'Caesar conquered Gaul'

[12]Or a compresence relation that connects properties to one another in the case of bundle theories of particulars.

> into 'Caesar' and 'conquered Gaul.' The second part is 'unsaturated' – it contains an empty place; only when this place is filled up with a proper name, or with an expression that replaces a proper name, does a complete sense appear. Here too I give the name 'function' to the *Bedeutung* of this unsaturated part. In this case the argument is Caesar.

On this view, incomplete properties and completing particulars simply "[fit] together without need for an intermediary" (Newman 1992, 19).[13] But this solution may be problematic, as it is unclear what the metaphorical concept of 'unsaturated' comes to, and thereby provides little assurance that the problem has been coherently dealt with. But this solution is not obviously incoherent, and seems available to each traditional theory of properties. As a result, it seems to cast doubt on the claim that Bradley's regress can eliminate some, but not all, theories of properties as incoherent.

Another solution is to treat a particular and its properties as different aspects of a single thing. We could follow D. M. Armstrong and call these united things 'thick particulars' (1978, 1:114). We can then abstract from this thick particular a 'thin particular' – the thick particular with all of its properties abstracted away. On the other hand we can abstract from the thick particular a property – a feature of the thick particular with the rest of the thick particular abstracted away. But since the thin particular and its properties are in fact united, Bradley's regress cannot get off the ground.

But this solution seems to sacrifice the independence of properties as genuine entities in their own right. Rather, it seems there is only one kind of thing in such an ontology, thick particulars, and thin particulars and properties are mere mental abstractions from the thick particular. But Armstrong insists that thin particulars and properties are not numerically distinct, but *formally* distinct (1:110).[14] While numerically distinct things can be

[13] As Newman (1992, 17n9) and Max Black (1964, 66) note, Wittgenstein seems to have thought something similar with respect to the components of facts: "In the atomic fact [its component] objects hang one in another, like members of a chain" (Wittgenstein 1922, 2.03). No external relation is required as the objects just fit together, like links in a chain.

[14] Although Armstrong later accepted a different solution to Bradley's Regress, for which he credits

separated in reality, one thing being able to exist without the other, formally distinct ones cannot (Wolter 1962, 726). Although formally distinct things cannot be really separated in reality, like numerically distinct things, they can be separated by the mind through abstraction. Yet a formal distinction is not just a purely mental distinction with no basis in the thing itself, like the distinction between Hesperus and Phosphorus. Instead, formal distinctions have a real basis in the formally distinct things (726). Armstrong provides a useful clarification of the difference between numerical and formal distinctness with the example of size and shape (Armstrong 1978, 1:110): the size and shape of an object are not numerically distinct, as they cannot be separated in reality; but they are formally distinct, and so we can abstract them from each other *based upon the objective difference* between their size and shape.

So, we can say that properties and thin particulars are numerically unified as a thick particular, and therefore no relation holds between them; but they are formally distinct, as they can be abstracted from each other based on a genuine difference in them. And so this apparently dodges Bradley's regress: thin particulars and their properties are numerically unified, and so no instantiating relation holds between them, and properties remain independent entities because they are formally distinct from thin particulars. But the independence provided by the existence of a formal distinction is suspect. Philosophers, of course, are free to put a name to the phenomena of things like size and shape which are numerically unified but capable of being abstracted apart. But the mere fact that they are independent in this sense does not mean that they are independent in the sense we care

Donald Baxter (2001). As Armstrong puts it: "I thought that a particular, what I have in the past called a 'thin' particular, could be seen as a principle of unity, a one that runs through and collects its many properties, while the universal could also be seen as a principle of unity, a one that runs through and collects its many particulars. A state of affairs [a thick particular] becomes an intersection of the two principles" (Armstrong 2005, 317). Less mystically, the relation is the "one of intersection, intersection understood as a case of partial identity"(Armstrong 2004, 140). Therefore, the particular and universal are connected via overlap, and they are partially identical in virtue of this overlap (although this overlap between the particular and the universal is non-mereological (141)). I will not attempt to make sense of Armstrong's later view here.

about. Namely, this solution may be unacceptable to those who expect properties to be independent in the sense that things can change their properties, or could have different properties had things been otherwise. Because if thin particulars and their properties are numerically unified, neither of these are possible, and properties are independent only in that they can be abstracted from the thick particular. But why would this anemic sort of independence give us reason to think that properties are ontologically significant entities that exist in their own right, as this dissertation assumes?

Furthermore, this solution seems limited, as it is available only to theories of properties where properties are immanent in the particulars that instantiate them. This means that the Armstrongian solution is not available to transcendent realism and some versions of class nominalism. In the case of transcendent realism, Forms are not just formally distinct from the particulars that instantiate them; they are wholly distinct from them. Therefore Forms and their instances cannot be numerically united into a thick particular, but formally distinct, as the Armstrongian solution requires. Similarly, class nominalists cannot make use of the Armstrongian solution: sets and their members cannot be formed into a thick particular. But a similar solution is available to *some* class nominalists. For sets are in some sense dependent on the existence of their members. The set of the Ancient Greek philosophers would not exist if not for the existence of Socrates, Plato, Aristotle, and the rest. Yet take a Greek philosopher, say Plato, and ask whether Plato is numerically unified with the set of Greek philosophers but formally distinct. The answer depends upon the nature of sets. If sets exists where their members are, then the set of Ancient Greek philosophers partly exists wherever there is an Ancient Greek philosopher. On such a view about sets, perhaps the class nominalist could say that Plato is numerically united with, but formally distinct from, the set, blocking Bradley's regress. But not all class nominalists agree that sets are just their members. On another interpretation of sets, sets are wholly distinct from their members, existing outside of space and time, much like the

Forms. Therefore, on this kind of view about sets, class nominalist properties could not be numerically unified with, but formally distinct from, their members. Therefore, the Armstrongian solution is not a universally applicable solution to Bradley's regress. As a result, we will have to look elsewhere for a universal solution to the problem.

Luckily, there seems to be a simpler and more general fix to Bradley's regress than either of the Fregean or Armstrongian solutions. Namely, the property theorist can simply posit a non-relational 'tie' that binds properties to their particulars. This solution has had many venerable supporters in twentieth-century philosophy – W. E. Johnson (1921, 1:211–14), P. F. Strawson (1964, 167), and Gustav Bergmann (1960), for example.

But this solution is explanatorily unsatisfactory as it avoids Bradley's regress because the connection between properties and particulars is that it is: (a) not a relation, and (b) that this non-relation "ties" properties to their particulars. As a result, the non-relational tie solution seems to be an uninformative stipulation that properties are connected to their particulars in a non-relational way.[15]

Yet uninformativeness isn't incoherence! Positing a stipulative entity to avoid a regress is an explanatory cost, to be sure, but no theory can be ruled out as *incoherent* on this basis. Rather, it is a cost to be weighed against theoretical benefits that it provides; and perhaps if the posit of a non-relational tie is too costly, we can reject it on that basis.[16]

Despite its costs, all the traditional theories of properties can implement the non-relational tie solution. Therefore, Bradley's Regress cannot help us choose between the traditional theories of properties. On the other hand, if Bradley's regress succeeds, and there is no good solution to the problem, then all traditional theories of properties are incoherent. Therefore, Bradley's Regress cannot help us choose between the traditional theories of properties, because it eliminates them all alike. Therefore, whether it succeeds

[15]For similar comments, see Lewis (2002, 7).
[16]See chap. 4 for an evaluation of such explanatory value arguments.

or fails, Bradley's regress cannot help us choose between theories of properties.

Finally, before moving on, we should note that Bradley's regress may not be vicious as we have been assuming, as Nicholas Wolterstorff (1970) argues. Namely, the regress seems to just be analogous to Zeno's paradoxes of motion:

> Zeno already noticed that the movement from one place to another can also be made to look mysterious. Before one can go to B, one must go half the distance to B; but to do this, one must first go half *that* distance; and so on. But of course there is no incompatibility here. One can consistently hold both that space is infinitely divisible and that we sometimes move. One need not deny one or the other of these. So too John can love Mary, even though in so doing, he stands in the relation of loving to Mary, and he and Mary stand in the relation of R to loving, and he and Mary and loving stand in the relation of R′ to R, and so on *ad infinitum*. In short, I see no incompatibility between the claim that things are related, and the principle that for every relation, if some entities are to be in that relation, those entities must be in a certain relation. (102)

So, if Wolsterstorff's analogy holds, then the property theorist can consistently accept an infinity of instantiation relations as an explanatory cost, undermining the regress altogether.

2.5 Conclusion

So, it seems that none of the traditional theories of properties are obviously incoherent, since we can answer the common arguments that claim otherwise. Typically, the arguments we considered required a number of problematic auxiliary hypotheses that the defender of the theory in question can abandon (if they ever held it at all). Thus, the arguments we have considered fail to show that any of the traditional theories of properties are *inherently* paradoxical. They lead to paradox, and therefore incoherence, only in conjunction with these problematic auxiliary hypotheses. Obviously, better incoherence

arguments may be in the offing, but I can't argue against unborn arguments. However, this chapter shows that we currently have no reason to think any of the traditional theories of properties is incoherent.

CHAPTER 3

EXPLANATORY ADEQUACY

> An explanation was necessary, and was forthcoming; they always are; hypotheses are what we lack the least.
>
> *Science and Hypothesis*
> Henri Poincaré

No traditional theory of properties is obviously incoherent. But we want more of a theory of properties than mere coherence. A minimal requirement of a theory of properties is that it is explanatorily adequate: assuming it were true, it would explain resemblance, causal powers, and predication. Otherwise, the theory cannot accomplish what a theory of properties sets out to do, even when we grant its truth. And perhaps we can rule out some theories of properties as explanatorily inadequate, giving us good grounds for choosing between competing theories of properties. Considerations of explanatory adequacy, then, have the potential to ease or resolve the underdetermination between competing theories of properties.

Nevertheless, in this chapter, I argue that considerations about explanatory adequacy cannot ease or resolve the underdetermination between competing theories of properties. First, I give a brief account of the conception of metaphysical explanation and explanatory adequacy I will be using in this dissertation. I then argue that no traditional theory of properties is explanatorily adequate: no traditional theory has the resources to explain resemblance, causal powers, *and* predication. Each theory requires modification, taking primitives or positing further entities to do the explanatory work that properties were originally slated to do. So, in short, all seven traditional accounts require serious modifications to avoid inadequacy. This means that no traditional theory of properties can be ruled

out on this basis, or else they will all be ruled out. Since none of the traditional theories of properties are explanatorily adequate as they stand, we must allow for modified theories of properties, which fill the explanatory gaps of the original theories with primitives and additional posits. Since these modifications are easy to make, we have an abundance of explanatorily adequate theories of properties to choose between. As a result, explanatory adequacy greatly underdetermines which theory of properties we should accept. So, considerations about explanatory adequacy do not resolve the underdetermination between competing theories of properties.

3.1 Explanation and Explanatory Adequacy

Before I show that each traditional theory of properties is explanatorily inadequate, I will first outline the basics of metaphysical explanation and explanatory adequacy themselves. Theories of properties are supposed to explain resemblance, causal powers, and predication. Yet, when we consider all theories, regardless of subject or discipline, many are silent as to whether they provide an explanation or something else. In fact, some theories are not presented as explanations at all, but rather a descriptive account of the phenomena. The contrast between descriptive accounts and explanations is instructive, as the distinction reveals something important about the relevant concept of explanation. Stephen Nadler explains the difference between descriptive accounts and explanations in the case of scientific explanations well:

> A natural phenomenon is said to consist of the properties (physical, chemical, etc.), states, or behaviours of a body or system of bodies. Whereas a descriptive account of a phenomenon relates *what* these properties are, an explanation tells *why* they are as they are, or *how* the phenomenon in question came about .... To explain is to explain *causally*, and the kind of account sought in scientific understanding is usually a causal narrative. The content

> of the explanation of a phenomenon should provide, at the very least, an aetiology which both identifies the cause(s) of the phenomenon and, ideally, makes clear how that cause is productive of the phenomenon. (1998, 513)

So, in science, a good descriptive account accurately describes the target data at the level of appearances, but does not offer any explanation of the causes. But explanations go beyond the appearances, citing the causes or grounds for those phenomena, and telling a narrative that says how those causes or grounds give rise to the phenomena. As Duhem put it, explanations "strip reality of the appearances covering it like a veil, in order to see the bare reality itself" (Duhem 1991, 7). In short, descriptive accounts tell us what some phenomena are like; and causal and grounding explanations tell a story about how or why some phenomena came about.[1]

Returning to the metaphysical explanations we are interested in, theories of properties are clearly presented as explanations in Nadler's sense, replacing the causal talk with grounding talk. Each traditional theory of properties cites some entities that are supposed to serve as the ground of the properties phenomena – resemblance, causal powers, and predication. Then the theory, ideally, tells a narrative of how those entities give rise to the phenomena of properties. Theories of properties are thereby explanatory: they are meant to provide a picture of the reality that underlies the phenomena of resemblance, causal powers, and predication, and tell a story about how that reality grounds those phenomena.

I am careful to say that theories of properties are *meant* or *supposed* to explain the phenomena of resemblance, causal powers, and predication. Just because a theory aims to explain some target phenomena does not mean it succeeds in doing so. Theories of

[1] We should note that not all descriptive accounts or explanations are presented as theories. A naturalist who gives a detailed description of the anatomy of a newly discovered organism, generalizing from specimens he or she managed to collect, is not presenting a theory. The descriptive account will describe the facts with theoretical terms, and so assume a theory; and the facts it describes can certainly contribute to the content of a theory, or provide evidence for one. But the descriptive account is not presented as a theory. But since we are focused on theories of properties, we will set aside complications involving explanations and descriptive accounts that are not presented as theories.

properties that fail to explain resemblance, causal powers, and predication are *explanatorily inadequate*: even if we assume they are true, they lack the theoretical resources to fully explain their target phenomena. In contrast, an explanatorily adequate theory of properties does have the theoretical resources to fully explain the three core phenomena. Explanatorily adequate theories of properties are complete in that, if true, the grounds of the phenomena they cite are sufficient to give rise to the phenomena of resemblance, causal powers, and predication. An adequate theory thereby provides a complete explanatory framework, allowing us to work backwards from these phenomena to their ultimate grounds (as posited by the theory). On the other hand, explanatorily inadequate theories of properties are incomplete in that, even if they were true, the grounds of the phenomena they cite are insufficient to fully give rise to the phenomena we wish to explain. As a result, we cannot explain resemblance, causal powers, and/or predication in terms of the theory, as the theory's incomplete explanatory story prevents us from working backwards from the phenomena to their ultimate grounds.

To help illustrate this point, it's useful to think of explanations as answers to why-questions. Speaking schematically, when one asks "Why p?," an explanation of the proposition p is a proposition q that answers this question, having the form 'Because q.'[2] So, we can think of theories of properties as purporting to answer why-questions about resemblance, causal powers, and predication. But these theories aren't meant to answer very broad and vague why-questions, like 'why are there features of things?' or 'why are some predications true and others false?' Rather, philosophers develop theories of properties to provide a *framework* for answering large *classes* of related why-questions, including questions of the following form:

- Why does x resemble y in a certain respect F?

[2]For a detailed account of the pragmatics of explanation, given in terms of why-questions, see Bas van Fraasen (1980, §4.3) and Philip Kitcher (1989).

- Why is x disposed to ϕ in circumstances C?
- Why does the predicate 'is F' truly apply to x?

So now we have another way to get a grip on the concept of explanatory adequacy: an explanatory adequate theory of properties has the theoretical resources to give answers to specific why-questions about resemblance, causal powers, and predication. Take a very simple why-question about resemblance for example: why does this electron resemble that electron with respect to charge? That is, the question asks for the reason why these two electrons resemble each other with respect to charge, and why they would fail to resemble each other in this respect if the reason why were not present. This is a why-question that theories of properties are meant to answer, and any theory of properties that cannot answer it is explanatorily inadequate. So, in terms of why-questions, a theory is explanatorily adequate for our purposes if and only if it can give answers to large classes of why-questions about resemblance, causal powers, and predication. An explanatorily inadequate theory leaves some or all of these questions unanswered.

Finally, we should note well that an adequate explanation in our sense is not necessarily a satisfactory explanation. Perhaps the theory cites an overabundance of entities, tells an overly complicated narrative, is bizarre, or is just unlikely. These considerations about explanatory value are separate from considerations about explanatory adequacy.[3] Explanatory adequacy only requires that theory "saves the phenomena" one way or another; not that the theory provides a particularly good explanation. In terms of why-questions, explanatorily adequate theories have answers to the requisite why-questions, even if the answers are implausible.

But one might object: you say that a theory of properties is explanatorily adequate if it can provide answers to certain classes of why-questions. Yet you admit that theories can

[3]We will consider whether explanatory value provides a good basis for theory-choice in the next chapter.

give implausible answers to why-questions and remain adequate. But this is absurd: we could create a theory that answered every why-question about properties with "Because I said so."[4] This theory is clearly explanatorily inadequate, yet you would have to count it as adequate on your account.

To reply to this objection, I must clarify what I mean by an implausible answer to a why-question. I here take implausible answers to have the faults that I listed above: they are answers that are needlessly unparsimonious, overly complicated, bizarre, or unlikely. Nonetheless, they answer the why-question. So what's the difference between these implausible answers and the theory that answers every why question with "Because I said so"? The difference comes down to pragmatics: the kind of answers to why-questions that count towards the adequacy of a theory are *appropriate* answers to those why-questions, whether or not those answers are plausible. To better understand what makes an answer an appropriate response to a why-question, let's look at the pragmatics of explanation.

Bas van Fraassen (1980) presents an influential pragmatics of explanatory acts, which was meant to replace more substantial accounts of scientific explanation like the deductive-nomological account. Van Fraassen's (1980, §4.3) model represents why-question Q as an ordered triple: $Q = \langle P_k, X, R \rangle$ (1980, 143), where P_k is the topic of the question, X is a contrast-class of alternatives (and $P_k \in X$), and R is a relevance relation (143). Let's unpack each member of the triplet in turn. First, we have the topic of Q, P_k, which is simply what the question is about. The topic of the question "why is this apple red?" is the proposition 'this apple is red.' Asking Q presupposes that P_k is true; it is inappropriate to ask 'Why P_k?' if one thinks P_k is false (Kitcher 1989, 414). Next we have X or the contrast-class. The model includes a contrast-class of alternatives as the model treats why-questions as essentially contrastive. As Kitcher puts it, " 'Why P?' is elliptical for 'Why P rather than P*, P**, …?" (414). So, the contrast-class $X = \{P_1, \ldots, P_k, \ldots\}$ (van

[4] I thank Jennifer McKitrick for this objection and example.

Fraassen 1980, 143), where P_k is the topic proposition. In the simplest case, 'why P_k?' is elliptical for 'why P_k rather than its negation?' (that is, $X = \{P_k, \sim P_k\}$). So, asking Q not only presupposes that P_k is true, it also presupposes that the remaining members of X are false; it is inappropriate to ask 'Why P_k (rather than $P_1, \ldots$)?' if one thinks a member of X besides P_k is true. Finally, and most importantly for our discussion, the relevance relation R says what "[counts] as a possible explanatory factor" (1980, 142) in explaining P_k; if a proposition A does not bear R to the topic P_k and its contrast class X (that is, if A does not bear R to $\langle P_k, X \rangle$), it is a misguided response to Q – it is irrelevant to explaining P_k.

It should be obvious that answers like "Because I said so" do not bear the appropriate relevance relation R to the topics and contrast classes of why-questions about resemblance, causal powers, and predication. This is where explanatorily adequate theories and "I said so" theories differ: explanatorily adequate theories answer these why-questions with answers that are relevant to each question's topic and contrast class. They are thereby appropriate, whether or not they are particularly plausible. On the other hand, "Because I said so" is not a relevant response to these questions, given their topics and contrast classes. But what exactly is the basis for saying an answer is or isn't relevant? How do we know when an answer bears R to the topic and contrast class of a why-question involving resemblance, causal powers, or predication? The answer, I suggest lies in our discussion of metaphysical explanation earlier in the section.

Recall the claim that traditional theories of properties are explanatory in the sense that each cites some entities that are supposed to serve as the ground of the properties phenomena – resemblance, causal powers, and predication. Ideally, the theory also gives a narrative of how these entities give rise to the phenomena of resemblance, causal powers, and predication. Any *appropriate* answer to a why-question about particular cases of resemblance, causal powers, and predication will cite some grounds for the phenomenon

and (ideally) tell an explanatory narrative of how the grounds give rise to the phenomenon in question. Any other answer is pragmatically inappropriate: it is not the kind of answer that is relevant to why-questions about resemblance, causal powers, and predication given the context of metaphysical investigation.

So, it is appropriateness that explains why *appropriate* implausible answers contribute to the adequacy of the theory, while the *inappropriate* answers like "Because I said so" do not. In light of this, we should update our conditions for an explanatorily adequate theory of properties: a theory is explanatorily adequate for our purposes if and only if it can give *appropriate* answers to large classes of why-questions about resemblance, causal powers, and predication.

One might think that explanatory adequacy is not a good basis for theory-choice, as it seems too easy to meet. But as simple as explanatory adequacy seems, no traditional theory of properties is explanatorily adequate as it stands. Even if we suppose they are true, the grounds they cite for the phenomena of resemblance, causal powers, and predication are insufficient to fully capture these phenomena; they leave some or all of the requisite why-questions unanswered.

3.2 The Inadequacy of Traditional Theories of Properties

I now turn to the first of the two key tasks of this chapter, showing that each traditional theory of properties is explanatorily inadequate. I will do this by surveying the some prominent arguments for each traditional theory's inadequacy, which are sufficient to show that each theory is inadequate. Afterwards, I show that the traditional theories are easily modified, repairing these and any other forthcoming inadequacy. As a result, we are faced with an abundance of explanatorily adequate theories of properties. Therefore, con-

siderations of explanatory adequacy deeply underdetermines which theory of properties we should accept.

First, as Lewis (1983) famously noted, abundant theories cannot fully explain causal powers and resemblance, while sparse theories of properties cannot fully explain predication. Since all seven theories of properties are abundant or sparse, no traditional theory is explanatorily adequate.

If properties are abundant, and there is a property for every predicate, then "almost all properties are causally irrelevant, and there is nothing to make the relevant ones stand out from the crowd" (346). For example, suppose the young Theaetetus grows taller than Socrates overnight, while Socrates' height stays the same (Shoemaker 1980, 110). If properties are abundant, Socrates gains and loses properties merely because *Theaetetus* grows taller: 'Socrates is shorter than Theaetetus' is false one day and true the next. So, Socrates loses the property of *being at least as tall as Theaetetus*, and gains the property of *being shorter than Theaetetus*. But Socrates' causal powers with respect to height remain unchanged, as Socrates height remains the same through the night. So, properties like *being at least as tall as Theaetetus* and *being shorter than Theaetetus* seem causally irrelevant, and abundant theories of properties have no theoretical resources to differentiate the causally relevant properties from the irrelevant ones. As a result, abundant theories cannot fully explain causal powers, and are thereby explanatorily inadequate, as they do not give a principled explanation why things have the causal powers they do in terms of properties.

Nor can the abundant theories of properties fully explain resemblance, as even intrinsic duplicates will have different properties (Lewis 1983, 346). For example, take two electrons. In themselves, the electrons are apparently duplicates: they have the same charge, spin, and rest mass. But if properties are abundant, the two electrons will fail to share infinitely many properties. For example, take the set of real numbers, $\mathbb{R}$. For every real number n, the first electron (a) is a member of the union of the sets containing a and

n ($\{a \cup n\}$), while the other electron (b) is not; and b is a member of the union of b and n ($b \cup n$), while a is not. So, the two electrons, a and b, have properties corresponding to each of these true, set-theoretic predications. So, the first electron has uncountably many properties that the second lacks, and vice versa. So, if properties are abundant, then almost all properties would be irrelevant to resemblance, and abundant theories of properties have no theoretical resources to differentiate the properties that make for resemblance and those that do not. As a result, abundant theories cannot fully explain resemblance, as there is no principled connection between two things sharing a property and their resembling each other; the question whether two things share a property is therefore independent of the question of whether they resemble each other. So, abundant theories of properties are explanatorily inadequate as they cannot explain why things resemble each other in terms of properties.

Conversely, sparse theories of properties are suited to explain causal powers and resemblance, as they can posit only properties that are causally relevant and make for resemblance and no more. As Lewis puts it:

> The guiding idea [behind sparse theories of properties], roughly, is that the world's [properties] should comprise a minimal basis for characterising the world completely. [Properties] that do not contribute at all to this end are unwelcome, and so are [properties] that contribute only redundantly. A satisfactory inventory of [properties] is a non-linguistic counterpart of a primitive vocabulary for a language capable of describing the world exhaustively. (Lewis 1983, 346)

These restrictions forbid properties like the following examples Lewis provides:

not golden,	owned by Fred,
golden or wooden,	belonging to class C,
metallic,	grue,
self-identical,	first examined before 2000 A.D.,

being identical,
being alike in some respect,
being exactly alike,
being part of,
owning,
being paired with by some part in R

(Lewis 1983, 345)

But if sparse theories are correct, then there is no property that corresponds to the predicates 'is metallic,' 'is self-identical,' 'is grue,' and so on. How can the sparse theory adequately explain these predicates applying to some things and not others? In the ideal case, a predicate will directly correspond to a genuine property, predicates that Alan Donagan (1963, 216) calls 'primitive predicates.' But some predicates, like those in Lewis's list, will not correspond directly to any single property. And sparse theories of properties provide us with no theoretical explanation of what makes applications of these predicates true or false. Perhaps every true predication is ultimately grounded in a particular instantiating some sparse property(s), as Russell seemed close to thinking in logical atomist days.[5] But if this is the case, since there is not a property for every predicate, some predicates will not be primitive. Such predicates apply to a subject (or not) in virtue of a chain of definitions in terms of primitive predicates. For example, 'is metallic' applies to something iff one of the following primitive predicates apply to it: 'is gold' or 'is silver' or... However, we would have to take it as an article of faith that such definitional chains are always available, for any predicate whatever. So, sparse theories of properties cannot fully explain predication, as predicates can apply to something without there being any property that explains the reason why. Therefore, sparse theories of properties are explanatorily inadequate as they cannot explain predication in terms of properties.

Due to these problems, both sparse and abundant theories of properties are explanatorily inadequate. The dilemma between sparse and abundant properties shows that all seven traditional views of properties cannot fully explain predication, resemblance,

[5]See Russell (1956), especially Lectures I through III.

and causal powers, as each of the seven traditional views are either sparse or abundant. Therefore, every traditional theory needs serious modifications to avoid explanatory inadequacy. But traditional views are explanatorily inadequate for further, independent reasons. Namely, immanent realism, transcendent realism, trope theory, and class nominalism all fail to fully explain the requisite phenomena.

First, we shall consider the two realist theories, immanent realism and transcendent realism. Both immanent realism and transcendent realism have the theoretical resources to explain *perfect* resemblance. While transcendent realism can explain *imperfect* resemblance, immanent realism cannot. On the other hand, transcendent realism cannot explain causal powers, while immanent realism can. Therefore, neither of the traditional realisms are explanatorily adequate without modification. First, let's look at how each kind of realism deals with resemblance.

As I have discussed in the previous two chapters, immanent universals are repeatable, and so different instances of a single universal literally share that universal in its entirety. As Lewis (1983, 345) memorably puts the point: "Things that share a universal have not just joined a single class. They literally have something in common. They are not entirely distinct. They overlap." So, when two things perfectly resemble each other in some respect they literally share an immanent universal. Instances of a single immanent universal share a common part, and their similarity is explained in terms of their common part's self-identity: two instances of an immanent universal F are perfectly similar with respect to F, because the selfsame universal F is in each, and F perfectly resembles F by the indiscernibility of identicals.

But immanent realism fails to capture *imperfect* resemblance. Suppose *scarlet* and *claret* are two perfectly determinate immanent universals.[6] Clearly scarlet things and

[6]I owe this example to Andrew Newman (1992, 102–3). Whether colors constitute genuine properties is controversial, but color properties are useful because it gives us a hierarchy of colors with three clear levels: *color*, *red*, and *scarlet*/*claret* (103).

claret things resemble each other, although imperfectly, as claret things and scarlet things are all red. So, instances of *scarlet* resemble instances of *claret*, because *scarlet* itself resembles *claret* itself. But how can immanent realism explain this imperfect similarity between instances of *scarlet* and *claret*? Scarlet things and claret things do not share a universal: *scarlet* and *claret* are distinct. Nor can we say that scarlet things and claret things resemble each other because they share a single universal *red*. Determinate shades of red like *scarlet* and *claret* are not just the property *red* with some differentia (Newman 1992, 103), just as *red* is not the property *color* with some differentia.[7] Scarlet things and claret things imperfectly resemble each other, and immanent realism cannot explain this fact in terms of shared universals. Therefore, immanent realism cannot explain all cases of resemblance and is thereby explanatorily inadequate.

Transcendent realism, on the other hand, can explain both perfect and imperfect resemblance, because transcendent realism has resources that immanent realism lacks. Transcendent realism says properties are Forms that exist apart from their instances, and different instances of a Form all participate in that one Form. Instances of a Form F are perfectly similar because they participate in *the* Form of F. So, when two things perfectly resemble each other in a single respect they participate in a single Form. Forms unite their instances through participation: two instances of a Form F are perfectly similar with respect to F because they each participate in the selfsame Form of F, and F perfectly resembles F by the indiscernibility of identicals.

Transcendent realism can explain imperfect resemblance because transcendent realism allows for hierarchies of Forms. Again, take the case of scarlet things and claret things. Scarlet things and claret are not instances of a single Form: *scarlet* and *claret* are distinct. But we can say that the Forms *scarlet* and *claret* are instances of a higher-order Form, *red*; and *red* is an instance of the higher-order Form of *color*. So, *scarlet* and *claret*

[7] See R. I. Aaron (1939, 172–73) for further argument.

are not perfectly similar, because they are not the same Form; but they are imperfectly similar because they are instances of a single, higher-order Form. So, scarlet things are dissimilar in color because *scarlet* and *claret* are distinct, but similar because *scarlet* and *claret* both participate in, or 'fall under,' a more general color-Form, *red*. So, the separation between Forms and their instances allows for transcendent realism to adequately explain resemblance.

But this separation between Forms and their instances prevents transcendent realism from satisfactorily explaining causal powers. For example, something having a mass of 1 kilogram grants it certain causal powers: something being 1 kilogram in mass settles how that thing is disposed to behave with respect to its mass. But how does the Form *being 1 kilogram* grant its instances these causal powers? Forms are divorced from the immanent, causal world of particular things. So, the Form *being 1 kilogram* cannot directly play a role in its instances' causal interactions. Therefore, it is not clear how transcendent realism could explain causal powers. Transcendent realists cannot cite Forms as the cause or grounds of causal powers so long as we take causal powers to be immanent in the world, as Forms are not present in their instances.

Immanent realism, on the other hand, avoids this problem, because immanent universals are wholly present in their instances. *Being 1 kilogram* is wholly present in every thing that is 1 kilogram, and so the universal of *being 1 kilogram* is wholly present in the immanent, causal world of particular things. *Being 1 kilogram* is wholly present in its instances, and so the immanent universal *being 1 kilogram* can play a direct role in its instances' causal interactions.

Next, let's consider trope theories. Like immanent universals, tropes are wholly present in their instances. So, like immanent realism, trope theories are equipped to explain causal powers, because tropes are wholly present in their instances. On the other hand, tropes cannot explain resemblance. For two things are perfectly similar in a respect F, because

they each possess an F-trope. But these two, perfectly similar F-tropes are distinct particular entities that are perfectly similar. But what makes these two distinct F-tropes perfectly similar? The two tropes are wholly distinct, so the trope theorist cannot explain their perfect similarity through overlap, like immanent realists can. Nor can the trope theorists explain their similarity through the F-tropes participating in a Form of F, because trope theory would then just be a kind of transcendent realism. So, trope theories cannot adequately explain resemblance: particular things resemble each other because they have perfectly similar tropes, but this similarity between tropes remains unexplained. Therefore, trope theories are explanatorily inadequate.

Finally, let's consider class nominalism. Class nominalism cannot adequately explain resemblance or causal powers for the same reasons any abundant theory cannot, and can explain predication for the same reasons any abundant theory can. For there are an abundance of sets, which can provide a basis for predicates, but many of these sets are miscellaneous and gerrymandered. And we have no way to tell which are the sets that make for resemblance and causal powers, and which ones are not (Lewis 1983, 346). Therefore, class nominalism can account for predication, but not resemblance or causal powers.

So none of the traditional theories of properties can adequately explain resemblance, causal powers, *and* predication. As a result, we cannot use explanatory adequacy as grounds to choose between the traditional theories of properties, as none of them are even minimally adequate. To sum up the results:

- abundant theories of properties can adequately explain predication, but not resemblance or causal powers;
- sparse theories of properties can adequately explain causal powers and resemblance, but not predication;

- immanent realism can adequately explain causal powers, but not resemblance;
- transcendent realism can adequately explain resemblance, but not causal powers;
- trope theories can adequately explain causal powers, but not resemblance;
- class nominalism can adequately explain predication, but not resemblance or causal powers (due to problems of abundance).

Since no traditional theory of properties is explanatorily adequate *as they stand*, considerations concerning explanatory adequacy rule out every traditional theory of properties (but not, as we'll see, their modified successors). Therefore, we must modify these theories, else we will have no theory of properties at all.

3.3 Making Inadequate Theories of Properties Adequate

Although the seven traditional theories of properties cannot explain resemblance, causal powers, and predication, the situation is not hopeless. Philosophers have modified each of the traditional theories to solve the problems peculiar to them. In fact, although no traditional theory of properties can explain the requisite phenomena, we can easily make these theories to be explanatorily adequate through modifications. That is, we can modify the traditional theories of properties in ways that fill their explanatory gaps, supplementing the traditional theories' theoretical resources so that they can answer why-questions about resemblance, causal powers, and predication in terms of properties.

For example, abundant theories of properties can adequately explain causal powers by positing a primitive distinction between causally relevant and causally irrelevant properties; and for resemblance with an analogous primitive distinction between properties that do and do not make for resemblance. Sparse theories of properties can posit an abundance of another kind of entity, such as sets, to play the role of predication. Immanent realists

can posit a primitive relation of imperfect resemblance, and trope theorists a primitive relation of general resemblance, to patch their incomplete accounts of resemblance.

Such modified theories may be ad hoc and undesirable, but they are not inadequate. Lewis puts this point well:

> Any effort at systematic philosophy must indeed give an account of any purported fact. There are three ways to give an account. (1) 'I deny it' – this earns a failing mark if the fact is really Moorean. (2) 'I analyse it thus' .... Or (3) 'I accept it as primitive'. Not every *account* is an *analysis*! A system that takes certain Moorean facts as primitive, as unanalysed, cannot be accused of failing to make a place for them. It neither shirks the compulsory question nor answers it by denial. It does give an account. (Lewis 1983, Lewis 1983, 352)

So, theories of properties are not inadequate just because they cannot fully analyze every theoretical role we expect properties to play. Ontological analysis must end somewhere; so adequate theories may (and must) take some primitives, and may posit additional entities to fill any theoretical gaps. Partisans in the properties debate must agree to this, or else every theory of properties will be inadequate. A theory's primitives might be ad hoc, inelegant, or superfluous, but that theory still can provide an adequate account, so long as the theory explains the phenomena one way or another. So, we cannot decide between theories of properties on the basis of adequacy alone, as every traditional theory is inadequate, and so none stand out from the crowd. Each theory must take on primitives or posit new entities to fill the theoretical gaps outlined above.

There are a number of different solutions to each of the problems I discussed above, but I cannot go through them all here, as the literature is extensive. It will be sufficient, I think, to give an example of an adequate solution to each problem. This limited survey of solutions will prove my claim that we can build adequate theories of properties from the failed traditional theories through modification and supplementation.

The problems for the traditional theories of properties began with sparseness and abundance. Namely, the sparse traditional theories cannot account for predication, while the abundant cannot account for resemblance and causal powers. There are two general strategies to solve these problems: either to posit two kinds of entities, one to play the sparse role, and the other to play the abundant role; or to make properties abundant with a primitive distinction between the properties that make for resemblance and causal powers, and those that do not. Lewis suggests these two strategies for making immanent realism, trope theories, and class nominalism adequate; where immanent realism and trope theory use the former strategy, and class nominalism uses the latter (1983).[8] Lewis does not consider transcendent realism, although I think a variation on his solution for class nominalism can be extended to solve the problem with transcendent realism as well. Let's turn to how these strategies can solve the problems of sparseness and abundance, resulting in four adequate theories of properties, solving the problems from the previous section along the way.

Let's begin with immanent realism. The sparse version of immanent realism cannot account for predication, while the abundant version cannot account for resemblance or causal powers. The solution, Lewis thinks, is to make immanent universals sparse – positing only the minimum number of universals needed to account for objective resemblance and causal powers – and then accept an abundance of sets of possibilia to avoid problems involving coextensive properties (1983, 346–47). Call the immanent realist entities 'universals' and the class nominalist entities 'properties' for the duration of this section. The resulting view, then, is a hybrid between immanent realism and class nominalism. Now, the reason why class nominalism could not account for resemblance and causal powers is that we have no theoretical resources to distinguish between properties (sets) that make for resemblance and causal powers, which Lewis calls "natural properties," and properties

[8]See also Lewis (1986b, §1.5), and (1984).

that do not, "unnatural properties" (1983, 346–47).[9] However, universals can help us pick out which of the properties are natural and which ones are unnatural. To begin, for every universal, take the set of all and only the things that instantiate that universal. Call these sets the 'perfectly natural properties.' So, through universals, the perfectly natural properties make for perfect resemblance and mark out the causally relevant features of things. Preferably naturalness should admit of degree: the property of *having negative unit charge* (the set of all and only things that instantiate the universal *having negative unit charge*) is more natural than *being negatively charged* (the set of all and only things that instantiate any negative charge universal), which is more natural than the property of *being charged* (the set of all and only things that instantiate either negative or positive charge universals) (347). Properties like *being negatively charged* and *being charged* are natural, albeit not perfectly so, because "even though they may be somewhat disjunctive or extrinsic, are at least somewhat natural in a derivative way, to the extent that they can be reached by not-too-complicated chains of definability from the perfectly natural properties" (Lewis 1986b, 61). Therefore, the immanent realist has everything she needs to account for resemblance, causal powers, and predication in the class nominalistic framework.[10]

We can use the same general strategy, *mutatis mutandis*, for making an adequate trope theory. Both sparse and abundant trope theory already admitted that properties were sets of tropes, and so Lewis's strategy does not require any new ontological posits for the theory. But the Lewisian solution for an adequate theory of tropes requires that we make tropes sparse – positing the minimum number of tropes required to make for objective resemblance and account for causal powers. We begin by positing a primitive resemblance relation. This is a cost to be sure, but required if trope theories are to account for resem-

[9]For a critique of the natural-unnatural distinction, see Barry Taylor (1993).

[10]So long as the immanent realist deals with the problem of imperfect similarity. See below for two possibilities: a primitive resemblance relation, or positing higher-order Forms alongside universals. I explain at length how to incorporate each of these solutions into an immanent realist framework.

blance. Then we can organize tropes by how much they resemble each other. Call each maximal set of perfectly resembling tropes a duplicate set. The set of all and only unit negative charge tropes form a duplicate set, for example, as every member perfectly resembles every other, and nothing outside the set perfectly resembles anything in the set. Then we can use the kinds of tropes to tell us which properties are natural and which ones are unnatural. For every duplicate set, take the set of all and only the things that instantiate one of the tropes in that duplicate set. Call these sets the 'perfectly natural properties.' The perfectly natural properties make for perfect resemblance and mark out the causally relevant features of things. Now, as we did in the case of immanent universals, we can let less-than-perfect naturalness admit of degree, where the property of *having negative unit charge* (the set of all and only things with a negative unit charge trope) is more natural than the property of *being negatively charged* (the set of all and only things with any negative charge trope), which is more natural than the property of *being charged* (the set of all and only things that have any of the negative *or* positive charge tropes). And since sets are abundant enough to account for predication, the natural and unnatural properties together can account for predication, while the natural properties can account for resemblance and causal powers. Therefore, the trope theorist has everything she needs for an adequate theory of properties.[11]

The class nominalist who refuses to posit anything other than set-theoretic entities must use the second general strategy I mentioned above to avoid inadequacy: posit an abundance of properties to account for predication, and then make a primitive distinction between them to account for resemblance and causal powers. In Lewisian terms, we need to posit an abundance of properties, and then make a primitive distinction between the

[11]So long as the trope theorist deals with the problem of imperfect similarity. There are at least three possible solutions: a primitive predicate that applies to sets, a primitive resemblance relation between tropes, and positing higher-order Forms alongside tropes. I explain at length how to incorporate each of these solutions into an trope-theoretic framework. See below, this section.

natural and unnatural properties.[12] Lewis says the class nominalist can do this in the following way:

> take it as a primitive fact that some classes of things are perfectly natural properties; others are less-than-perfectly natural to various degrees; and most are not at all natural. Such a Nominalist takes 'natural' as a primitive predicate, and offers no analysis of what he means in predicating it of classes. His intention is to select the very same classes as natural properties that the user of universals [or tropes] would select. But he regards the universals [and tropes] as idle machinery, fictitiously superimposed on the primitive objective difference between the natural properties and the others. (Lewis 1983, 347)

Lewis's solution may seem unprincipled and uninformative, but these shortcomings do not threaten adequacy, so long as they don't get in the way of the theory giving *some* explanation or other of resemblance, causal powers, and predication.

Another, perhaps less artificial solution, is to take the relation of similarity as primitive, and then define the perfectly natural properties "in terms of the mutual resemblance of their members and the failure of resemblance between their members and their non-members" (347). But spelling out such a primitive resemblance relation is difficult. First of all, the resemblance "relation" is not a relation at all, because the resemblance is itself primitive. As Gonzalo Rodriguez-Pereyra puts it, "although there are resembling particulars, there is no entity over and above them that is their resemblance" (2002, 62), like a relation. Instead, resemblance between particulars is a primitive fact: the objective fact that two things resemble each other is not capable of further analysis; they just do (63). Speaking (loosely) in relation terms, resemblance is reflexive, symmetrical, and non-transitive[13]; comes in degrees; is dyadic, and so has at most two terms; terms which need not exist at the same time, or even the same possible world (62). But there is no such relation, so we need to say these features of resemblance in terms of facts. First, for any particular thing

[12] Anthony Quinton pursues this strategy in his (1957) and (1973).
[13] Although *perfect* resemblance is transitive.

x, x resembles x (reflexive); for any particular things x and y, x resembles y iff y resembles x (symmetrical); for any particular things x, y, and z, the fact that x resembles y and y resembles z does not entail that x and z resemble each other, nor does it entail that they fail to resemble each other (non-transitive). Further, every case of resemblance involves at most two particular things, which may exist at different times or even different possible worlds, and some pairs of things resemble each other to a greater or lesser degree than other pairs do. However, a "resemblance relation" is a useful fiction, and since it can be reduced to talk about facts about resembling particulars, I will use this fiction without further comment.

The second challenge for a primitive relation of resemblance that takes particular things as its terms is that it must be a relation of overall resemblance, not resemblance in a particular respect (Rodriguez-Pereyra 2002, 64). For on this version of class nominalism, there are only particular things. They have features, but these features are not ontologically significant. As a result, they cannot *ultimately* resemble each other in virtue of said features, because strictly speaking, no such features exist. But resemblance is supposed to be objective: things resemble each other independently of our language or thought. Therefore, the facts of resemblance must ultimately rest on ontologically respectable facts, which (for this solution anyway) are only particular things. As a result, we cannot simply say that the property of F-ness is perfectly natural because F is the set of all and only things that perfectly resemble each other in some respect F. Rather, we must begin with a relation of overall resemblance holding between particular things, and then use this to explain resemblance in virtue of a particular respect. But how are we to pick out the perfectly natural properties using a relation that seems so coarse-grained?

We begin by saying that a particular property is perfectly natural because its members resemble each other, and nothing outside the set resembles every member of the set. These two conditions are meant to guarantee that *all* and *only* the members of the set resemble

each other in some one respect. But these conditions fail to pick out perfectly natural properties. Suppose for the sake of illustration that there are only three objects, a, b, and c; and six basic natural features of things, *being red*, *being blue*, *being round*, *being square*, *being hot*, and *being cold*.[14] Now suppose that a is red and round and hot; b is red and square and cold; and c is blue and square and hot (see Table 3.1). So, a, b, and c all resemble each other. In fact, each particular thing perfectly resemble the other two in various respects. And nothing thing outside the set resembles every member of the set, as they are the only things that exist. But the fact that they resemble each other in these ways does not entail that they have any perfectly natural property in common, as the three things fail to share any of the six features in common.

Table 3.1: Imperfect Community

	being red	*being blue*	*being round*	*being square*	*being hot*	*being cold*
a	1	0	1	0	1	0
b	1	0	0	1	0	1
c	0	1	0	1	1	0

Nelson Goodman (1966, 164) calls this the "the difficulty of imperfect community," which he presents as an objection to Carnap's (2003) resemblance nominalism. The general lesson of the imperfect community problem is this: the mere fact that every member of a set resembles every other member of the set *pairwise* (and no non-member of the set resembles every member of the set) is not enough to say that the set is a perfectly natural property. To solve this problem, we need to develop a stronger set of conditions for sharing a property than mere resemblance between any two members of the set.

The solution Lewis (1983, 347–48) suggests is to alter the resemblance relation, making it contrastive and variably polyadic, rather than merely dyadic.[15] That is, we make it so

[14]This example, and the Table 3.1 below, are taken from Rodriguez-Pereyra (2002, 142).

[15]For an alternative, Rodriguez-Pereyra develops an ingenious solution that allows the resemblance relation to remain dyadic. Put very simply, the solution is to say that resemblance can hold not only between

that the resemblance relation is capable of holding between any number of particular things (even infinite), rather than pairwise. The relation is contrastive in that it explicitly mentions every thing that resembles each other *and* contrasts this with the things that do not resemble these things. The result is the following:

> $x_1, x_2, \ldots$ resemble one another and do not likewise resemble any of $y_1, y_2, \ldots$ (Lewis 1983, 347)

That is, $x_1, x_2, \ldots$ resemble each other, and no $y_1, y_2, \ldots$ resembles every member of the set of $x_1, x_2, \ldots$. Put slightly differently, every member of the set of $x_1, x_2, \ldots$ collectively resemble each other in virtue of a single polyadic relation, and every non-member of the set of $x_1, x_2, \ldots$ fails to resemble at least one of the members of the set of $x_1, x_2, \ldots$. This makes the set a maximal set of resembling particular things. Lewis uses this relation to identify which sets are natural properties by first defining a variably polyadic predicate N, which applies to some $x_1, x_2, \ldots$ iff $x_1, x_2, \ldots$ are "all and only the members of some perfectly natural property" (348n9). Then Lewis defines $Nx_1, x_2, \ldots$ as the following:

$$\exists y_1, y_2, \ldots \forall z\{z, x_1, x_2, \ldots Ry_1, y_2, \ldots \equiv [(z = x_1) \vee (z = x_2) \vee \ldots]\} \text{ (348n9).}$$

In plain(er) terms, $Nx_1, x_2, \ldots$ is defined as: for any z that resembles $x_1, x_2, \ldots$, and there exist some things, $y_1, y_2, \ldots$, that fail to resemble at least one of the $z, x_1, x_2, \ldots$, then and only then is z is identical with one of $x_1, x_2, \ldots$. This is really just a logical regimentation of the intuitive idea outlined above: we can identify whether a property is natural if it is a set whose every member resembles every other, and any non-member fails to resemble at least one of the members of the set. Therefore they are maximal sets of resembling par-

pairs of individuals in a given set, but also between pairs of pairs of individuals, and between pairs of these pairs, all the way up (Rodriguez-Pereyra 2002, 11). This ensures that every member of the set resembles every other. The full solution, however, is too complex to reproduce here. See Rodriguez-Pereyra (2002) for his full treatment of the topic, especially chaps. 4 and 9–11.

ticular things, as they include every particular thing that resembles every other member of the set, and bar any particular thing that fails to resemble every member of the set.

But this, at best, accounts only for perfectly natural properties. How do we build less-than-perfectly natural properties using this definition of naturalness? It doesn't seem we can without some relation of imperfect resemblance, or resemblance to a lesser degree than the relation R, which picks out only the perfectly natural properties. We need to say that resemblance is not only contrastive and variably polyadic, but capable of coming in different degrees (or perhaps there are a plurality of contrastive and variably polyadic resemblance relations, one for each degree of resemblance). That is, we take it as a primitive fact that some sets are such that every member perfectly resembles every other, and they are identified by way of the R relation. And we take it as a primitive fact that some less-than-perfectly resemble each other to degree n, and they are identified by way of the R_n relation. We then can define a less-than-perfectly natural property as a set whose every member resembles every other to degree n, and any non-member fails to resemble at least one of the members of the set to degree n. So, the members of the property of *being metallic* are similar in many respects, but not perfectly similar. Rather, each metal thing resembles every other to a certain, less-than-perfect degree. And every non-metal thing fails to resemble at least one metal thing to their particular degree of resemblance. And so, for any x, if x resembles the metal things and no non-metal thing resembles every member of the set of all metal things and x, then and only then is x identical to one of the metal things.

So, we can develop an adequate class nominalism that can account for both natural and unnatural properties by taking resemblance as primitive, and then use resemblance relations to pick out which sets are perfectly natural, and to what degree. Of course, we could have just taken natural to be a primitive predicate of classes, but the time spent working out primitive resemblance relations for particular things is instructive. Not only

does it provide a way to develop a class nominalism that adequately explains the sparse-abundant distinction, it will be helpful when we discuss how trope theory and immanent realism can account for resemblance and imperfect resemblance respectively. And the simplest way for them to do so is to posit a primitive resemblance relation. Luckily, in the case of tropes and universals, primitive resemblance relations are much easier to construct, due to the fact that overall resemblance holding between sparse tropes or sparse immanent universals is much simpler than particular things with many distinct features.

Let's consider the problem of resemblance for trope theory. We have two routes that are analogous to the class nominalist strategy above. First, we can take 'duplicate set' to be a primitive predicate that applies just to sets of perfectly resembling tropes such that no non-member perfectly resembles any member of the set. For every duplicate set of tropes, we can define a corresponding perfectly natural property as the set whose members are all and only the things that have one of those tropes. For the less-than-perfectly natural sets, we could posit further primitive predicates that apply to the various degrees of less-than-perfect naturalness, without any further explanation of why those predicates apply to these less-than-perfectly natural properties.

This solution seems needlessly clunky and mysterious, as we have a better way to pick out the perfectly natural properties – by positing primitive resemblances between tropes.[16] First, we begin with our sets of tropes. We need to use tropes to pick out which sets are perfectly natural properties. To do this, we need to identify the duplicate set that contains only tropes that perfectly resemble each other, and where no non-member of the set perfectly resembles any of the members of the set. To do this, we need a primitive resemblance relation that holds between tropes. We then can then explain how particular things resemble each other in a certain respect, in terms of them having resembling

[16]This is the standard solution to the problem among trope theorists, although the details are rarely worked out. See, for example, Campbell (1990, 32–40), Heil (2003, chap. 14) and (2012, §5.4).

tropes. As in the case of class nominalism, the resemblance relation is variably polyadic and contrastive, but takes tropes as its terms:

> $t_1, t_2, \ldots$ perfectly resemble one another and do not likewise perfectly resemble any of $u_1, u_2, \ldots$

We then can use this relation to identify which set of tropes are duplicate sets. A duplicate set is a set of tropes where every member perfectly resembles every other member, and no non-member trope perfectly resembles any member of the set. Therefore they are maximal sets of perfectly resembling tropes, as for any trope t in the set, the set has as a member every other trope that perfectly resembles t, and no members of the set fail to perfectly resemble t.[17]

So, the primitive relation of perfect resemblance gives us a way to account for perfect resemblance in trope theory. But of course, we also need to account for less-than-perfect resemblance. We again turn to our earlier discussion of primitive resemblance in class nominalism for the solution. We begin by taking as primitive the fact that some tropes less-than-perfectly resemble each other: electric charges of different magnitudes, for example, resemble each other, but imperfectly. That is, there are sets of tropes that are not duplicate sets, yet they still resemble each other to a certain degree, and this resemblance is a primitive fact. Call the primitive relation holding between members of a given set of imperfectly resembling tropes 'imperfect resemblance to degree n,' a variably polyadic and contrastive resemblance relation that takes tropes as its terms:

> $t_1, t_2, \ldots$ resemble one another to degree n and do not likewise resemble any of $u_1, u_2, \ldots$ to degree n.

[17] We could formalize all this as we did above, but that seems unnecessary given they are essentially the same, *mutatis mutandis*. Therefore, I will spare the reader further formalization.

We then can use this account of imperfect resemblance between individual tropes to explain how things come to imperfectly resemble each other – namely, by having imperfectly resembling tropes.

Therefore, I think we can explain resemblance in trope theory using primitive resemblance relations. The situation with immanent universals is more complicated. We can easily explain two particular things' perfect resemblance in a certain respect on immanent realism: two things perfectly resemble each other in some respect iff they literally share an immanent universal. The similarity between the two particular things is explained in terms of their common part's self-identity: two instances of an immanent universal F are perfectly similar with respect to F, because the universal F is wholly present in each, and F perfectly resembles F by the indiscernibility of identicals. But, as we noted above, this cannot account for imperfect resemblance holding between distinct universals. Let's return to our example of *scarlet* and *claret*. Again, scarlet things and claret things resemble each other, as they are all red, but this resemblance is less than perfect. And scarlet things resemble claret things because *scarlet* and *claret* resemble each other. But we cannot explain this similarity in terms of a shared part or identity, as the universals are wholly distinct entities. So, immanent realism cannot explain all cases of resemblance and is thereby explanatorily inadequate.

One way to solve these problems for immanent realism is to accept the existence of higher-order entities. We begin with the fact that transcendent realism is able to account for imperfect resemblance between Forms through the existence of higher-order Forms. For example, the Forms of *scarlet* and *claret* imperfectly resemble each other in virtue of participating in the higher-order Form of *red*. We can mimic this account in an immanent realist theory as well, replacing the first-order Forms like *red* and *claret* with immanent universals. So, scarlet things instantiate the immanent universal of *scarlet*, and claret things instantiate the immanent universal of *claret*. And scarlet things and claret things

imperfectly resemble each other in virtue of the immanent universals they instantiate imperfectly resembling each other. And those immanent universals of *scarlet* and *claret* resemble each other, albeit imperfectly, in virtue of their "falling under" the higher-order Form of *red*, as well as any even higher-order Forms that *red* participates in, and so on.

This view, then, is first-order immanent realism, and higher-order transcendent realism.[18] So, looking at the other sign of the coin, we can take this view to be a new form of transcendent realism as well, and one that gets around the problem of explaining the causal powers of things. For the immanent universals exist fully in the immanent, causally connected world around us, and that explains why their instances have the causal powers they do. And the theory disjunctively explains resemblance: the sparse immanent universals can explain perfect resemblance through identity; transcendent realism can explain imperfect resemblance through higher-order Forms. Finally, the Forms and immanent universals taken to together provide a basis for predication. But this is not obvious, as the third man paradox showed us that we could not simply say that there was a Form for every higher-order universal. As a result, I said the transcendent realist could be skeptical of what higher-order Forms exist. But those are the very Forms we need for this solution.

But this response was perhaps too strong. We may not have a *principle* that tells us what higher-order Forms exist, but we *can* have good reason to think a higher-order Form exists independently of any general principle of generation. For example, we have good reason to think that there exists a higher-order Form of *red* that exists over all determinate shades of *red*, like *scarlet* and *claret*. Why? Because there's a group of determinate

[18] John Bigelow and Robert Pargetter (1990) present an influential view along these lines (although they think some first-order universals are transcendent, and others immanent but non-repeatable—namely, the "individual essences" of particulars, also known as "haecceities" (1990, 38–9)). Peter Forrest (1986) holds that universals are immanent in their *actual* instances, but he argues that we can construct possible worlds from this-worldly properties and uninstantiated universals that are non-spatiotemporal. However, Forrest hints in a footnote (1986, 15n3) that these universals might not exist, but have some other kind of being instead. As a result, Forrest's view is something of a cross between immanent and transcendent realisms, with two modes of existence corresponding to each kind of universal. For a similar approach to uninstantiated universals, see Newman (1992).

Forms whose instances all resemble each other. The problem with the principle is that it allowed us to posit higher-order Forms without restriction, which led to paradox. But if we begin with the ground-floor and build our way up, rather than conjuring a Form from the existence of a (possibly paradoxical) predicate, we avoid problems like the Third Man. And this hierarchy of Forms gives us a sufficient basis for cases of predication that we care about. We can truly apply predicates in virtue of the immanent universals the thing instantiates, and in virtue of the hierarchy of Forms that those immanent universals fall under.

But suppose that this is wrong, and the hierarchy of Forms is not enough to account for predication. We can still develop a working hybrid of immanent and transcendent realism, if we include sets alongside immanent universals and Forms. First, we posit immanent universals and make them sparse. We also posit *higher*-order Forms, but make no principled claims about which exist. In addition, we accept an abundance of sets of possiblia. To begin, for every immanent universal, take the set of all and only the things that instantiate that universal. Call these sets the 'perfectly natural properties.' Through the immanent universals, the perfectly natural properties explain *perfect* resemblance and causal powers. On the other hand, we still need to account for less-than-perfectly natural properties. Less-than-perfectly natural properties contain all and only instances of highly-related, but distinct, immanent universals. But without an account of imperfect resemblance, we cannot pick these sets out. That is, if we do not have something to pick out which universals are imperfectly similar, then we have no way of explaining why sets of those imperfectly similar things should count as natural, albeit less than perfectly so. To solve this problem, we turn to our hierarchy of higher-order Forms. To visualize how this hierarchy accounts for imperfect resemblance, let's use the metaphor of a family tree. Immanent universals form the current generation of children. Suppose that *scarlet*, *claret*, *crimson*, and all the other determinate shades of red are included in the

sparse number of immanent universals we posited. Each of these universals' instances resemble the others' in virtue of those universals sharing a parent Form – that is, they imperfectly resemble one another in virtue of participating in a single first-order Form. In this case, the parent Form is *red*. And universals whose instances resemble each other even less do so in virtue of sharing a common but distant 'ancestor.' So, universals whose instances resemble each other even less than *scarlet* and *claret* things do, like *crimson* and *lavender* things, do so in virtue of their (second-order) parent Forms falling under a third-order Form (their grandparent), or their grandparent Forms falling under a fourth-order Form (their great-grandparent), and so on. The more distantly related the two universals, the more imperfect the resemblance. In this way we can pick out which properties are less-than-perfectly natural: those sets of all and only things that are instances of not-too-distantly-related universals. And with this abundance of properties, whose naturalness admits of degree, we can account for predication as well. Therefore, the universal-Form hybrid theory is explanatorily adequate, as it can account for resemblance, causal powers, and predication.

We can develop a related, alternative form of transcendent realism using tropes instead of immanent universals. Call this the trope-Form hybrid theory.[19] First, we be-

[19]Several philosophers of this and the last century present theories of properties that resemble the trope-Form hybrid theory, including Kemp Smith (1927, 408ff.) and Jerrold Levinson (1980) (retracted in his (2006)). But two contemporary views seem to be particularly similar to the trope-Form hybrid I present here – namely, E. J. Lowe's (2006) four-category ontology and Brian Ellis's (2001) six-category ontology. Instead of calling them Forms, Lowe and Ellis posit 'non-substantial universals' and 'property universals' respectively, and posit tropes as well. Lowe (2006, 100) and Ellis (2001, 71, 89) think tropes account for causal powers of things, and think that qualitatively identical tropes perfectly resemble each other in virtue of those tropes being instances of the same Form (see (Lowe 2006, 92) and (Ellis 2001, 23–25, 98)). Ellis acknowledges a hierarchy of universals (2001, 19, 68–74), while Lowe diverges from the trope-Form theory by only acknowledging first-order universals (2006, 42). However, in effort to distance themselves from Plato, both Lowe and Ellis deny their universals are transcendent. But Lowe and Ellis's universals are transcendent, as both Lowe (2006, 92) and Ellis (2001, 25) deny that they are immanent in their instances, making them non-spatiotemporal and acausal. Lowe claims that calling a universal immanent "implies that this universal must have particular instances which exist 'in' space and time, but it doesn't imply that the universal itself must literally exist 'in' space and time" (2006, 99). Ellis agrees (2001, 19). But a sparse transcendent realist may well reject uninstantiated universals, so instantiation requirements cannot be what distinguishes transcendent from immanent realism. Rather, what distinguishes them is that immanent universals are

gin by positing tropes, immanent in their instances, as well as a transcendental realm of Forms. We make the *first*-order Forms sparse, but make no principled claims about which *higher*-order Forms exist. In addition, we accept an abundance of sets of possibilia to avoid problems involving coextensive properties. To begin, we say that every trope participates in exactly one of these first-order Forms. And since first-order Forms are sparse, tropes will be as well. Including tropes allows us to have a particular, immanent representative of each first-order Form in the world, allowing for the theory to account for the causal powers of things. And we can use the Forms the tropes participate in to pick out the duplicate sets of tropes, which are those sets of tropes where every member perfectly resembles every other member, and no non-member trope perfectly resembles any member of the set. Namely, a set of tropes is a duplicate set iff that set is the set of all and only tropes that participate in a single perfectly natural Form. And we can explain perfect resemblance between particular things in this way: two things perfectly resemble each other in a given respect iff they each have a trope that is a member of a single duplicate set. For example, suppose that *scarlet* is one of the sparse number of first-order Forms. Then every *scarlet* trope participates in this Form, and thereby each of the scarlet tropes perfectly resemble every other. And scarlet things perfectly resemble each other in that respect because every scarlet thing has a trope that is a member of the duplicate set of *scarlet* tropes. Now we can use duplicate sets to pick out which sets of possibilia are perfectly natural properties. For every duplicate set, take the set of all and only the things that have one of those tropes. These sets are the perfectly natural properties. Therefore, the theory now has an account of both causal powers and perfect resemblance.

Yet we still have to account for less-than-perfectly natural properties. Less-than-perfectly natural properties, on this account, are sets of possibilia that have all and only

spatiotemporal and causally powerful, and transcendent universals are neither. Lowe and Ellis can call transcendent universals 'immanent' all they like, but calling a tail a 'leg' doesn't make the dog five-legged.

things that instantiate imperfectly similar, but highly-related, families of tropes. But without an account of imperfect resemblance, we cannot pick these sets out. For if we do not have something to pick out which kinds of tropes are imperfectly similar to the right degree, then we have no way of explaining why sets containing all and only things that have those tropes count as (less-than-perfectly) natural properties. To provide this explanation, we again turn to our hierarchy of higher-order Forms. To visualize how this works, let's return to our metaphor of a family tree. Tropes constitute the current generation of children, each duplicate set being a group of identical twins, triples, quadruplets, and so on. And these perfectly resemble each other in virtue of having a single parent – that is, participating in a single first-order Form. And tropes that imperfectly resemble each other do so in virtue of sharing a common but distant 'ancestor.' That is, tropes who share a parent Form are perfectly resembling; but tropes with different parent Forms resemble each other only if their parent Forms fall under a single second-order Form *or* their grandparent Forms fall under a third-order Form *or* their great-grandparent Forms fall under a fourth-order Form *or*.... The more distantly related the two tropes, the more imperfect the resemblance. In this way we can pick out which properties are less-than-perfectly natural: those sets of all and only things that have tropes that are not too distantly related. And with this abundance of properties, whose naturalness admits of degree, we can account for predication as well. Therefore, the trope-Form hybrid theory is explanatorily adequate, as it can account for resemblance, causal powers, and predication.

3.4 Conclusion

So it seems that we can make multiple explanatorily adequate theories of properties through modification and supplementation of the traditional theories of properties. But as Lewis notes, some modifications do seem more natural than others:

> a theory may be faulted for its overabundant primitive predications, or for unduly mysterious ones, or for unduly complicated ones. These are not fatal faults, however. They are to be counted against a theory, along with its faults of overly generous ontology or of disagreement with less-than-Moorean commonsensical opinions. Rival philosophical theories have their prices, which we seek to measure. (Lewis 1983, Lewis 1983, 353)

So, some theories' primitives and ontological posits are more agreeable than others, and so each primitive and posit comes with its own explanatory 'price.' Perhaps Lewis is right, and we can use these explanatory prices to decide between theories of properties. In fact, many philosophers take these explanatory virtues to be truth-conducive in metaphysical inquiries, including the inquiry into the nature of properties. We shall now investigate the merits of this line of reasoning.

CHAPTER 4

EXPLANATORY VALUE

> And the invention of a hypothesis, founded on some slight probabilities, which accounts for many appearances of nature, has been considered as the highest attainment of a philosopher. If the hypothesis hangs well together, is embellished by a lively imagination, and serves to account for common appearances; it is considered by many as having all the qualities that should recommend it to our belief; and all that ought to be required in a philosophical system.
>
> *Essays on the Intellectual Powers of Man*
> THOMAS REID

THE LAST CHAPTER ASKED whether any of the traditional theories of properties were adequate, where adequacy was defined as the ability to adequately explain the phenomena of resemblance, causal powers, and predication. But we learned that none of the traditional theories had the theoretical resources to explain these phenomena, and so all are inadequate as they stand; each theory must posit more entities or theoretical primitives to fill its explanatory gaps. Since these modifications are easily made, we face an abundance of adequate theories of properties. So considerations about explanatory adequacy cannot settle the properties debate, as explanatory adequacy greatly underdetermines which theory we should accept. But the underdetermination is perhaps not hopeless. For we expect theories of properties not only to explain the phenomena adequately, but explain them well. And presumably some theories of properties explain resemblance, causal powers, and predication more satisfactorily than others. So, perhaps differences in explanatory value could remove the underdetermination between competing accounts of

the nature of properties.

In this chapter, I argue that considerations about explanatory value cannot ease or eliminate the underdetermination problem, because we lack good reason to think that explanatory value is a reliable guide to the truth about the nature of properties. For the common justification for the use of explanatory value to choose between philosophical theories is that explanatory virtues, such as simplicity and unity, are truth-conducive. And philosophers typically argue that we should think explanatory virtues are truth-conducive in ontological theories, including theories of properties, because these same explanatory virtues have proven truth-conducive in scientific theories. But this line of reasoning, which I call 'the argument from analogy,' is faulty. For even if we grant *both* that metaphysics and science are methodologically similar enough to ground the analogy, *and* that explanatory virtues are sometimes truth-conducive in scientific theories; we still have no good reason to think that this (granted) reliability of explanatory value as a grounds of scientific theory-choice carries over to metaphysics. Therefore, I conclude that the argument from analogy does not establish its conclusion.

4.1 The Appeal to Science

Metaphysicians often argue that we should accept an ontological theory because that theory exhibits an explanatory virtue like parsimony or informativeness particularly well.[1] These arguments have the following form: we should prefer some theory, all else being equal, because that theory exhibits some explanatory virtue or virtues better than

[1]There is no standard list of explanatory virtues. To this list we might add the five virtues Kuhn (1977, 321–22) suggests: accuracy (the theory should be consistent with empirical data), consistency (both internally consistent and with other accepted theories), scope (the theory can explain more phenomena than it was originally designed to explain), fruitful (the theory should lead to further explanations and research), and simplicity (a theory should be as simple as possible – for more, see my discussion of ontological parsimony versus theoretical simplicity in §4.2 below).

its competitors. A classic example of this kind of argument in ontology is David Lewis's overarching argument for Modal Realism:

> Why believe in a plurality of worlds? – Because the hypothesis is serviceable, and that is a reason to think that it is true. The familiar analysis of necessity as truth at all possible worlds was only the beginning. In the last two decades, philosophers have offered a great many more analyses that make reference to possible worlds, or to possible individuals that inhabit possible worlds. I find that record most impressive .... It offers an improvement in what Quine calls ideology, paid for in the coin of ontology. It's an offer you can't refuse. The price is right; the benefits in theoretical unity and economy are well worth the entities. (Lewis 1986b, 3–4)

Such arguments from explanatory value are a favorite of twentieth-century and contemporary metaphysicians, and the properties debate is no exception. I present the following merely to demonstrate the banality of this kind of reasoning in the properties literature:

- Keith Campbell argues that trope theory allows us to collapse the categories of properties and particulars into a single category of particular properties. More specifically, accepting Campbell's trope theory over theories of universals allows us to exchange an ontology of universals and substances for an ontology of tropes alone. Campbell argues that Ockham's razor provides motivation for replacing the two-category system of universals and substances:

  > it is always a fault in theorizing to use more in the way of basic materials where less will suffice; metaphysics is no exception. So the search for ways of reducing the category of substance, or that of universal property (or even of both), is perfectly appropriate (1990, 17).

  Therefore, Campbell's trope-based ontology is simpler than a universal-based ontologies, which require the additional category of substance.

- George Molnar (Molnar 2003) argues that tropes are 'non-transferable.' To introduce the distinction between transferability and non-transferability of tropes, Molnar in-

troduces the concept of OWNERSHIP: "the principle that properties and relations are ontological dependent on bearers" (2003, 43). If OWNERSHIP is true, then tropes are non-transferable, because they are dependent on their instances in a strong sense: a trope belongs to its instance necessarily; nothing else could instantiate that particular trope other than what in face does instantiate it. On trope theories that reject OWNERSHIP, tropes are transferable. Nothing prevents the charge of one particle from becoming the charge of another particle, because tropes are not ontologically dependent on their instances. Molnar argues that theories of non-transferable tropes are both simpler and more powerful than their competitors, as theories of non-transferable tropes do not require states of affairs to exist alongside particulars and tropes. Molnar argues that ontologies that posit universals or transferable tropes for properties require states of affairs to explain the connection between properties and their instances. Molnar thinks this follows from what he calls the "Master Argument" (2003, 55). Molnar cites D. M. Armstrong as providing the best formulation of the argument, which Armstrong puts in terms of universals:

> If a is F, then it is entailed that a exists and that the universal F exists. However, a could exist, and F could exist, and yet it fail to be the case that a is F (F is instantiated, but instantiated elsewhere only). a's being F involves something more than a and F. It is no good simply adding the fundamental tie or nexus of instantiation to the sum of a and F. The existence of a, of instantiation, and of F does not amount to a's being F. The something more must be a's being F – and this is a state of affairs. (Armstrong 1989, 88)

But, Molnar concludes, if OWNERSHIP is true, then the existence a and the F-trope unique to it are all we need to make the proposition 'a is F' true.[2] So, Molnar's theory does not require states of affairs, "[making] do with, at most, objects, properties, and relations: a significant saving in ontological cost!" (Molnar 2003, 45–6).

[2]Both Armstrong (1989, 116) and Molnar (2003, 46n33) attribute this argument to C.B. Martin.

- Armstrong (1989, 117) also considers Molnar's Master Argument, and argues that the cost of accepting a third category of states of affairs is worth the loss of simplicity, as a theory of non-transferable tropes *without* states of affairs is less powerful than the tripartite ontology of universals, particulars, and states of affairs. Note that Armstrong is not merely criticizing Molnar's argument from explanatory value, but is providing his own argument from explanatory value: that the tripartite theory is as good an explanation as Molnar's trope-theoretic alternative, because the tripartite theory is more powerful and that consideration offsets the loss of simplicity. So, Molnar and Armstrong agree that explanatory value is an acceptable way to solve the dispute between the two views, but they disagree on how we should weigh the costs of simplicity against explanatory power in this particular case. Namely, Armstrong provides two ways the tripartite ontology is more powerful than Molnar's theory of non-transferable tropes without states of affairs. First, including states of affairs allows for a recombinatorial theory of possibility, where "Possibilities that are not actual are given by any recombination of the elements of states of affairs (these elements being thin [or 'bare'] particulars, properties, and relations) in a way that respects the form of states of affairs" (118). But if tropes are non-transferable, then they can only be instantiated by the particulars that in fact instantiate them. So, we cannot recombine particulars and tropes if OWNERSHIP is true, and so we cannot accept a recombinatorial theory of possibility (118). Second, Armstrong argues that non-transferability of tropes is "a mysterious necessity of the world" (1989, 118), and so is ad hoc, a cost that we should weigh against the cost of including states of affairs in our ontology. Armstrong seemingly thinks the costs of positing states of affairs and the mystery of non-transferability is roughly equal:

  > States of affairs have their cost: One has to accept that it is at least possible that different states of affairs contain exactly the same constituents.

> Martin's necessities have their cost also: Given the world's particulars, properties, and relations, then the nature of the world is ineluctably fixed … Which poison should the boys in the back room choose? (1989, 118)

As a result, Armstrong agrees that a theory of non-transferable tropes is simpler than his tripartite ontology, but that non-transferability is unduly mysterious; and calls it a wash.

- John Heil (2003) argues that his theory of tropes (which he calls 'modes' to avoid associating himself with bundle-theorists (2003, 138)) is a better explanation than immanent realism in two steps. First, Heil argues that immanent realism's reliance on "the seemingly balmy idea" (138) that properties are repeatable is a serious cost to the immanent realist. Since tropes, or modes, are not repeatable, trope theories are preferable explanations in this respect, since they are unmysteriously particular. In the second step of his argument, Heil argues that the supposed explanatory advantage of immanent realism, avoiding primitive similarity, is illusory (chap. 14; see also my discussion of this topic in §3.2), as immanent cannot account for imperfect similarity:

> Advantages alleged to attach to universals boil down to this one advantage: properties regarded as universals provide an account of similarity in terms of strict identity; properties regarded as modes yield a conception of similarity as a primitive, irreducible phenomenon. A proponent of universals would consider the absence of an account of similarity as a steep price to pay for embracing the thesis that properties are modes. The question is whether every case of similarity can be explained in terms of identity. If not, if brute similarity is ineliminable, then this is a price that must be paid in any case; the chief selling point of universals evaporates. (2003, 151)

So, since immanent universals come with the high explanatory cost of repeatability, and the one supposed advantage immanent realism has over trope theories turns out

> to be illusory, Heil concludes that his theory of tropes is a better explanation than immanent realism.

These examples show how banal it is for philosophers to assume explanatory virtues are good grounds for preferring one theory of properties over others. But why should we think explanatory virtues are good grounds for choosing between ontological theories, like theories of properties, as these arguments assume? The standard answer to this question is that explanatory virtues are truth-conducive: we should prefer ontological theories that exhibit explanatory virtues, because theories that exhibit explanatory virtues are more likely to be true. And we should think that explanatory virtues are truth-conducive in theories of properties, and ontological theories more generally, because these same explanatory virtues have proven truth-conducive in scientific theories. Call this *the argument from analogy*.

In this chapter I will raise several arguments against what I call *the key conditional* of the argument from analogy, as it relates to theories of properties:

> KEY CONDITIONAL: if explanatory virtues are truth-conducive in scientific theories, then they are truth-conducive in theories of properties.

To do this, I first give a brief exposition of explanatory virtues in theory-choice. Next I reconstruct L. A. Paul's (2012) appeal to scientific practice to defend the use of explanatory virtues in ontological theory-choice. I then argue that the key conditional is unjustified: *even if* we grant that metaphysics and science are methodologically similar enough to ground the analogy, as well as the controversial claim that explanatory value is a reliable guide to theory choice in science; we still have no reason to think that this reliability carries over to theory-choice in metaphysics. For *even if* we have good reason to think explanatory virtues are sometimes truth-conducive in scientific theories, then that is only so because we have good reason to think the parts of the world that those theories quan-

tify over really are simple, unified, and so on. But the (alleged) reasons why we should think that explanatory virtues are truth-conducive in the scientific case are empirical. But, I argue, these empirical reasons cannot transfer to theory choice about properties, as theorizing properties does not have the benefit of empirical feedback. I conclude that the analogy cannot be established, and so considerations of explanatory value cannot resolve the underdetermination between the theories of properties.

4.2 Explanatory Virtues

Explanatory virtues philosophers cite include simplicity, strength, unity, fruitfulness, fit, non-ad-hocness, and so on. Like all virtues, explanatory virtues are prized traits. Compare explanatory virtues with human virtues like courage, compassion, honor, and tolerance. In human beings, we think that when one has a virtue, such as courage, it makes one a better person; it is a character trait that is morally valuable. Analogously, theorists consider some features or traits of theories to be virtuous. Explanatory virtues are traits or theoretical features that make a theory a better explanation; it is a theoretical trait that is explanatorily valuable.

Although philosophers prize many theoretical traits as virtues, I will consider only ontological parsimony and theoretical simplicity in any detail, as they are instructive for reasons I discuss below. The virtue of ontological parsimony is usually expressed through Ockham's Razor: do not multiply entities beyond necessity.[3] But the Razor's advice is ambiguous: should we minimize the number of *individual* entities we posit? Or should we minimize the number of *kinds* of entities? The answer is controversial, some philosophers say that we should only worry about the latter kind of ontological parsimony (Lewis 1973,

[3]Interestingly, William of Ockham never said "entia non sunt multiplicanda, præter necessitatem," which is the basis of our modern translation. See Thorburn (1918).

73), and others that both kinds of ontological parsimony are explanatory virtues (Nolan 1997). For present purposes I will assume that Ockham's Razor advises that we do not multiply (irreducible) *kinds* or *categories* of entities beyond necessity. So ontologically parsimonious theories, in our sense, posit fewer categories than their rivals. And since ontological parsimony is an explanatory virtue, we should accept the theory that posits the fewest categories as possible, all else being equal.

But we must weigh this ontological parsimony against the virtue of theoretical simplicity, also known as 'ideological parsimony.' Namely, sometimes adding entities to our ontology, and thereby complicating it, makes our theories more theoretically parsimonious. Quine gives a the helpful example from mathematics. Mathematicians have complicated the ontology of mathematics in order to better systematize mathematical theory:

> Classical examples [include] the positing of ratios to make division generally applicable, the positing of negative numbers to make subtraction generally applicable, and the positing of irrationals and finally imaginaries to make exponentiation generally applicable .... Man's drive for system and simplicity leads, it seems, to ever new complexities. (1976, 263)

So, at the cost of some ontological parsimony, mathematicians have posited new kinds of numbers in order to simplify mathematical theorizing. Namely, it makes the theory itself simpler and easier to use. Quine describes the competition between ontological parsimony and theoretical simplicity in the following:

> multiplication of entities can make a substantive contribution to theory. It does not always contribute. *Of itself* multiplication of entities should be seen as undesirable, conformably with Occam's razor, and should be required to pay its way. Pad the universe with classes or other supplements if that will get you a simpler, smoother overall theory; otherwise don't. Simplicity is the thing, and ontological economy is one aspect of it, to be averaged in with others. We may fairly expect that some padding of the universe is in the interest of the overall net simplicity of our system of the world. (274, emphasis mine)

So, increases in theoretical simplicity sometimes require complicating our ontology with more entities, thereby decreasing the theory's ontological parsimony. And practitioners certainly find theoretical simplicity worth the cost of increases in ontology, where mathematics is a particularly prominent example. But, as Quine notes, ontological parsimony is only a prima facie, not conclusive reason to reject an ontologically unparsimonious theory. If decreasing a theory's ontological parsimony increases its theoretical simplicity, then theoretical simplicity also provides a competing prima facie reason – they give us reason to accept that theory *all else being equal*.

So, ontological parsimony and theoretical simplicity are illustrative, as they show us that explanatory virtues provide prima facie, rather than conclusive, reasons to accept a theory. Further, they illustrate that virtues can compete with each other, giving us competing reasons that must be weighed against each other to see which wins the day, all things considered. For ultimately we are looking for the theory that has the best *overall balance* of explanatory virtues, all things considered, not the theory that embodies the highest number of virtues, or some single, all-important virtue. If all this is right, with enough care, we could determine how well each theory exhibits the various explanatory virtues, balance them accordingly, and see which theory has the best overall balance of virtues.[4] It is this overall explanatory value that tells us which theory is the most likely to be true, if explanatory virtues are truth-conducive.

[4]This is, I think, very optimistic. How we should compare and balance distinct virtues against each other is unclear. As is how we could make virtues precise enough such that it is clear when a particular theory exhibited the virtue (and to what degree); yet make them general enough that the same virtue could apply to theories in wholly different domains (such as using the one and the same criterion of theoretical simplicity to choose between interpretations of quantum mechanics, between theories of composition, and theories of properties). I cannot press these issues here, as they are outside the scope of this chapter, but I do briefly return to these worries in my discussion of methodological fineness-of-grain in §4.7 below.

4.3 The Argument from Analogy

So now that we have a grip on explanatory virtues, we can turn to the argument from analogy. The argument from analogy says we should think explanatory virtues are truth-conducive in theories of properties because these same explanatory virtues have proven truth-conducive in scientific theories. L. A. Paul (2012) presents a detailed, more general version of the argument from analogy, as part of her response to James Ladyman and Don Ross's (2007) naturalist critique of traditional metaphysics. Ladyman and Ross argue that metaphysics should be naturalized, such that metaphysical theorizing should be "motivated exclusively by attempts to unify hypotheses and theories that are taken seriously by contemporary science" (2007, 1). There is no other work for metaphysics to do, as science is the only epistemologically respectable inquiry into the nature of the world: "science respects no domain restrictions and will admit no epistemological rivals (such as natural theology or purely speculative metaphysics)" (Ladyman and Ross 2007, 28). But, Paul argues, Ladyman and Ross's naturalism is wrong twice over. First, metaphysics has a unique subject matter, and so science could never fully do the work of metaphysics. Second, not only is metaphysics autonomous, its methodology is legitimate by analogy to science: metaphysics and science use "relevantly similar" methods of theory-development and theory-choice (Paul 2012, 3) . Namely, Paul thinks science and metaphysics have two key methodological similarities: "[1] both fields can be understood as relying on modeling to develop and defend theories, and [2] both use a priori reasoning to infer to the best explanation and to choose between empirical equivalents" (2012, 9).

If (1) and (2) are correct, and scientists and philosophers use the same methods when developing and choosing between theories, then science and philosophy are methodologically analogous. And this methodological analogy, Paul thinks, warrants the key conditional's move from truth-conduciveness of explanatory virtues in scientific theories, to

their truth-conduciveness in theories of properties. Paul writes,

> metaphysics has a distinctive subject matter, not a distinctive methodology. The questions metaphysicians address are different from those of scientists, but the methods employed to develop and select theories are often relevantly similar. And just as with natural and social-scientific theorizing, as long as we construct and evaluate our theories appropriately, we are justified in inferring conclusions using inference to the best explanation. (2012, 3)

But now we have three questions. First, are metaphysical and scientific methodology really analogous enough to underwrite the key conditional, as the above quotation suggests? Second, *even if* metaphysics use similar enough methodology, is the scientific use of explanatory value reliable in the first place? If not, the argument from analogy does not get off the ground, as the argument from analogy's basis for the reliability of theory-choice (its reliable use in science) would be undermined – the antecedent of the key conditional would be false. Finally, *even if* science and metaphysics use similar methodology, and the use of explanatory value in theory choice is reliable in the scientific case, what guarantee is there that that same methodology will be reliable in metaphysics?

To answer these questions, I shall first present Paul's argument that science and metaphysics use similar enough methodologies to ground the methodology. Next, I grant that their methodologies are similar enough to ground the analogy, but I argue that the analogy may well fail anyhow, as it is questionable whether using explanatory value in scientific theory choice is reliable in the first place. Finally, I will argue that, even if we grant that metaphysics and science are methodologically similar enough to ground the analogy, as well as the controversial claim that explanatory value is a reliable guide to theory choice in science, we still have no reason to think that the reliability of its use in science carries over to its use in metaphysics.

Let's now answer each of these questions in turn, beginning with whether science and metaphysics use a similar enough methodology to ground the analogy.

4.4 Are Scientific and Metaphysical Methodologies Really Similar?

Paul characterizes scientific and ontological theory development using the semantic view of theories, which talks about theories in terms of models.[5] Tarski (1971, 11) defines a model as follows:

> A possible realization in which all valid sentences of a theory T are satisfied is called a *model* of T.

Tarski's definition gives us a clear concept of a model to help us understand Paul's account. Models are abstract entities (Paul 2012, 11) whose structure represent one way the theory could be realized, one way every sentence of the theory could be made true. Paul takes this a step further, saying that theories are just sets of models (2012, 10). Intuitively, the set of a theory's models represent all the different ways the theory could be made true. A theory is in fact true if the world is isomorphic to a model of the theory (Paul 2012, 10). That is, the theory is true if it has a model whose structure accurately represents the structure of the world in the relevant respects.

So, Paul thinks that scientific theorizing is model-building, or at least that model-building is a legitimate conception of scientific theorizing. Once scientists have developed a set of models, they have constructed a theory, and we can begin comparing it with competing theories. First, scientists compare theories' empirical adequacy – how well each theory can predict observations – weeding out empirically inadequate theories in favor of empirically superior theories. In other words, at this stage scientists would rightly reject empirically inaccurate theories in favor of more accurate ones. In cases where multiple theories survive empirical testing, Paul claims scientists must resort to armchair methods:

[5] Paul is "not wedded to the semantic view" (2012, 12), but uses it to formulate her views on metaphysical and scientific theorizing because it is the "dominant approach to scientific modeling" (12). Paul admits other views of modeling could serve her purposes just as well.

> [when] competing scientific theories are approximately empirically equivalent, or at least empirically acceptable, selection of a theory over its competitors is determined by a mix of desiderata, including its overall explanatory value, which is evaluated in part by its simplicity, elegance, and fit with already accepted theories, intuitions and assumptions. (2012, 11)

Paul must stress scientists "use a priori reasoning to infer to the best explanation and to choose between empirical equivalents" (2012, 9), in order to connect the methodologies of scientific practice and metaphysics. Let's now turn to Paul's argument that metaphysicians use these very same methods to develop and choose between ontological theories.

First, Paul argues that scientific and ontological *theories* are essentially the same *qua* theories. Like scientific theories, ontological theories are sets or families of models, each of which represents the world as being some way (Paul 2012, 12).

Second, Paul argues that the similarities between scientific and metaphysical *theorizing* also run deep. Admittedly, metaphysics and science have different subject matters, and metaphysics privileges ordinary experience in a way that science usually does not (16–17). But, Paul argues, the core methodologies are analogous. Just like scientists do, metaphysicians develop ontological theories about the world through model-building, and an ontological theory reaches full development once metaphysicians have a complete set or family of models (2012, 12). Once metaphysicians have a number of competing theories, Paul says

> theories are compared with respect to the elegance, simplicity and explanatory virtues of their models, and theories are chosen over their competitors using inference to the best explanation. (2012, 12)

Like scientists, metaphysicians select their theory using explanatory virtues, and accept the theory with the best overall explanatory value.

Paul concludes that, despite differences in their subject matter, metaphysics and science are "methodological peas in a pod" (2012, 9): "We use theoretical desiderata as guides

to truth in metaphysics just as we use such desiderata as guides to truth in science, since the method is fundamentally the same even when the subject matter is different" (Paul 2012, 21). And since it is the very same method in both science and metaphysics, Paul concludes

> If such theoretical desiderata are truth conducive in science, they are also truth conducive in metaphysics (and in mathematics, and in other areas). The main point I want to make here is that if the method can lead us to closer to the truth in science, it can lead us closer to the truth in metaphysics. (2012, 21)

But even if we grant Paul's claim that metaphysics and science are "methodological peas in a pod" (2012, 9), we have two remaining questions. First, are explanatory values truth-conducive in scientific domains, thereby making explanatory value a reliable guide to scientific theory choice in the first place? If not, then it hardly matters whether or not metaphysics is analogous to science, as the antecedent to the key conditional will be false, leaving the consequent unestablished. Second, even if we grant the key conditional's antecedent, does the consequent of the conditional really follow? That is, what reason do we have to think that the (granted) reliability of the scientific use of explanatory value in science carries over to its use in metaphysics? Let's consider the former question, and then turn to the latter.

4.5 Is Scientific Use of Explanatory Value Reliable?

Are considerations about explanatory value really a reliable way to choose between scientific theories? To answer this question we must first explicate how such a method of theory choice works.

To begin, suppose we are choosing between a number of scientific theories. The theories under consideration form a pool of options from which we will select (ideally) exactly one theory. For now, let's set aside the method of theory-choice and treat it as a black-box process, where we input the hypotheses under consideration, and the process outputs the single best hypothesis, as set by some pre-defined metric of theoretical goodness. The outputs of this black-box process are only as good as its inputs: the process outputs a true scientific theory only if the true theory is in the pool of options we input into the process. For the process can hardly select a true theory from a pool of theories that are all false. And we are justified in believing the output is true only if we have good reason to think that one of the theories in the pool is true. In turn, we have good reason to think that the pool contains the true theory only if we have good reason to think that we have considered all the plausible alternatives (Stanford 2006, 29). And here is where our justification for using explanatory value in scientific theory choice is most vulnerable. For as P. Kyle Stanford points out, the history of science testifies to the fact that such distance between theorists and the subjects of their inquiry allows for serious conceptual blind spots in developing theories:

> we have, throughout the history of scientific inquiry and in virtually every scientific field, repeatedly occupied an epistemic position in which we could conceive of only one or a few theories that were well confirmed by the available evidence, while subsequent inquiry would routinely (if not invariably) reveal further, radically distinct alternatives as well confirmed by the previously available evidence as those we were inclined to accept on the strength of that evidence. (19).

Stanford calls this recurrent shortcoming of scientific imagination "the problem of unconceived alternatives."

The problem of unconceived alternatives casts doubt on using explanatory value to choose between scientific theories in highly theoretical scientific contexts. For inference

to the best explanation, or most explanatory valuable theory, is "implicitly restricted: it is always an inference to the best (or only) explanation *we have managed to come up with so far*" (2006, 31). In ordinary situations, we can ignore this implicit provision, as usually "we are rightly confident in our ability to have exhausted the space of likely or plausible explanations in the first place" (2006, 34). Take a simple application of eliminative reasoning, for example: a dog has run past here, because only dogs and wolves leave tracks like these, and wolves rarely come this far south (34). We should accept the explanation that the tracks are there because a dog ran past: a wolf running past is the only other plausible explanation of the tracks, and the wolf-explanation is eliminated due to considerations about their typical behavior. We have exhausted the space of plausible explanations for the tracks, and so the implicit provision is of little consequence. But in highly theoretical scientific contexts, we often cannot ignore the question of whether we have adequately exhausted the space of likely or plausible explanations, as the historical record confirms that scientific communities routinely fail to conceive of all the plausible explanations of their inquiry's target data when investigating hidden or inaccessible domains of nature. Therefore, the problem is not with eliminative reasoning itself, but with the use of eliminative reasoning in contexts where we cannot reliably exhaust the space of plausible explanations.

Stanford (2006) gives convincing historical evidence that past scientific communities have consistently failed to conceive of alternative explanations for the target data of their inquiries. The unconceived alternative explanations Stanford cites were at least as plausible as the explanation the relevant scientific community accepted at the time, and that the scientific communities could have, but failed to, conceive of these alternative explanations:

> For example, in the historical progression from Aristotelian to Cartesian to Newtonian to contemporary mechanical theories, the evidence available at

> the time each earlier theory was accepted offered equally strong support to each of the (then-unimagined) later alternatives. To be sure, the theory of relativity might never have been developed were it not for the evidential anomalies that emerged for Newtonian mechanics, but the radically different theoretical account of gravitational motion offered by the former was nonetheless equally well supported by the many phenomena for which the latter already provided a convincing account. In a similar fashion, I suggest, we have repeatedly found ourselves encouraged or even forced under the impetus provided by recalcitrant phenomena, unexpected anomalies, and other theoretical pressures to discover new theories that had remained previously unconceived despite being well confirmed by the evidence available to us. (Stanford 2006, 19)

Thus, the problem of unconceived alternatives is a real-world problem for scientific practitioners. Past scientific communities failed to conceive of alternative, plausible explanations of the data, including the theories that those communities went on to accept (20-21), as was the case with the physics community during the Newtonian paradigm failing to conceive of relativity. Stanford provides a convenient list of other examples from the history of science (2006, 19–20):

> [**chemistry:**] from elemental to early corpuscularian chemistry to Stahl's phlogiston theory to Lavoisier's oxygen chemistry to Daltonian atomic and contemporary chemistry
>
> [**embryology:**] from various versions of preformationism to epigenetic theories of embryology
>
> [**heat:**] from the caloric theory of heat to later and ultimately contemporary thermodynamic theories
>
> [**electricity and magnetism:**] from effluvial theories of electricity and magnetism to theories of electromagnetic ether and contemporary electromagnetism
>
> [**disease:**] from humoral imbalance to miasmatic to contagion and ultimately germ theories of disease
>
> [**light:**] from eighteenth century corpuscular theories of light to nineteenth century wave theories to the contemporary quantum mechanical conception

> [**inheritance:**] from Darwin's pangenesis theory of inheritance to Weismann's germ-plasm theory to Mendelian and then contemporary molecular genetics
>
> [**origin of species:**] from Cuvier's theory of functionally integrated and necessarily static biological species and from Lamarck's autogenesis to Darwin's evolutionary theory

The later items of each list were available but unconceived-of explanations of the target data that scientific communities later accepted as true. But each of these later theories were available when earlier items of the list were erroneously accepted as the true explanations of the data.

And these alternatives that scientists left unconceived were genuine rival theories, not artificial variants on the theory as philosophers are wont to construct. As Lawrence Sklar puts it, the alternatives that the problem of unconceived alternatives worries about are not

> variants of the original theory which a positivist would declare trivial semantic alternatives. . . .[or] alternatives constructed by manipulation of the theoretical apparatus which leaves observational consequences invariant, [or] …those quaint alleged alternatives which one gets by switching from talk of objects to talk of time-slices, from things to modes of spacetime points and the like. (Sklar 1985, 151)

Rather, the alternatives are genuine and distinct alternatives to our best theories; alternatives that are plausible and available, but we that we have failed to think up due to a lack of scientific imagination, just as relativistic physics was a genuine, but unconceived, alternative to Newtonian physics.

Furthermore, the problem from unconceived alternatives is not just Humean skepticism about induction, which Sklar notes is based on the

> fact that all the possible data are never in. I ought not to believe all crows are black on the basis of the observed sample of crows, for nothing in the nature

> of the sample assures me that the very next crow won't break the pattern. (Sklar 1985, 150)

The problem of unconceived alternatives, however, is not based on the possibility of bizarre future observations; nor is it based on "the existence of outlandish pseudohypotheses cooked up by the philosophical manipulation of predicates" like 'is grue' (150). Rather it is based on the recurrent and well-documented shortcomings of scientific imagination in past scientific communities. As Sklar colorfully puts it, the problem of unconceived alternatives is illustrated by

> a Newton [who is] dubious of the inverse square law not because objects might obey it up to 1700 and cease to do so thereafter, but because he imagines the possibility of an array of genuine alternatives to his theory even though, of course, he can't imagine just what such alternative theories would be like." (150–51)

Nor is the problem of unconceived alternatives just the pessimistic metainduction, which argues that false scientific theories were widely accepted in the past, and so currently widely-accepted scientific theories are likely false as well. The pessimistic metainduction extrapolates from the falsity of past theories to the falsity of contemporary theories, which is a dubious inference at best. The problem of unconceived alternatives, however, extrapolates from the imaginative limitations of human beings in the past to the claim that those same limitations are present in contemporary human beings. And this extrapolation is plausible. For past scientific communities' failing to conceive of these explanations was due to *cognitive* shortcomings, as those scientific communities had all the evidence they needed to reach those explanations, but not the imagination. Despite all our theoretical advances, contemporary scientific communities are not better cognitively equipped than past scientific communities; contemporary scientists are just as limited in their ability to conceive of explanations, even when they have all the resources necessary for conceiving of those explanations (Stanford 2006, 44). In short, the problem is with

theorists, not theories. Therefore, we have good, *prima facie* inductive reason to believe that "some of the very best [*contemporary*] theoretical explanations of the data are among those we have yet to even consider" (Stanford 2006, 31).

So, to sum up, the problem of unconceived alternatives says that eliminative inference is unreliable in contemporary scientific inquiries into hidden or inaccessible domains of nature, because contemporary scientists working in these inquiries have probably failed to exhaust the space of plausible or likely alternative explanations. And we have *prima facie* inductive reason to think contemporary scientists' scientific imagination is faulty in this respect, because earlier scientific communities have

> repeatedly occupied an epistemic position in which [they] could conceive of only one or a few theories that were well confirmed by the available evidence, while subsequent inquiry would routinely (if not invariably) reveal further, radically distinct alternatives as well confirmed by the previously available evidence as those we were inclined to accept on the strength of that evidence. (19)

And since this lack of scientific imagination is a problem with theorists and not with theories, and theorists are not better cognitively equipped than their predecessors, we have *prima facie* inductive reason to think eliminative inferences are unreliable in contemporary scientific inquiries into hidden or inaccessible domains of nature, as scientists have probably failed to exhaust the space of likely or plausible alternatives to our best theories.

Therefore, I think we have good reason to doubt the reliability of eliminating scientific theories in favor of others using explanatory value. As a result, the argument from analogy has a questionable basis, as the reliable use of explanatory value to choose between scientific theories is questionable at best. Therefore, I think we have good reason to think that the antecedent of the key conditional is false, and that the argument from analogy thereby fails to establish its conclusion.

4.6 Does the Reliability Carry Over?

But perhaps the problem of unconceived alternatives fails to show that the antecedent of the key conditional is false. If so, it matters little. For even if we grant Paul that metaphysics and science use the same methods, and that its scientific use is reliable, her conclusion still does not follow. For even pseudo-science can use scientific tools and methods incorrectly, using them in contexts beyond their legitimate scope. I shall argue that we have no good reason to think explanatory virtues are truth-conducive in theories of properties, even if they are so in scientific theories. I begin this argument with an illustrative analogy.

Scientists and technicians use Geiger counters to detect radiation levels; paranormal investigators use them to detect the presence of ghosts. We think the Geiger counter is a reliable tool for detecting radiation only because we think the world cooperates: ionizing radiation is such that it reliably causes changes in the detector's Geiger-Müller tube. And we are confident in Geiger counters' ability to track radiation within a certain range, as Geiger counters' reliability to do so has been vindicated by independent testing and understanding of the physical phenomena at work. On the other hand, we have no good reason to think the Geiger counter can detect ghosts. The reliability of Geiger counters to do so has not been vindicated by independent testing. Nor do we have any understanding of ghosts, or what characteristic effects they would produce in the instrument. So, we have no good reason to think that Geiger counters are a reliable tool for detecting ghosts, because we have no reason to think the world cooperates with the paranormal investigator's use of the tool. Further, the Geiger counter's reliability in detecting radiation says nothing about its reliability in detecting ghosts.

Scientists use explanatory values to choose between theories; metaphysicians do as well. We think explanatory virtues like simplicity, unity, and so on, are (we are granting)

a reliable guide to scientific theory-choice only because we have good reason to think the world cooperates – that the entities and processes that the theory quantifies over really are simple, unified, and so on. That is, we have good reason to think explanatory virtues are truth-conducive in a theory because we have good reason to think the entities and processes that the theory quantifies over cooperate with explanatory virtues to make it so. And the reason why we should be confident in explanatory virtues' reliability as a guide to scientific theory-choice is because (we are granting that) the use of explanatory virtues in science has been vindicated by the empirical success of scientific theories that maximize explanatory virtues. Furthermore, (we are granting that) empirical research has given us understanding of the nature of the underlying causes of these scientific phenomena, which further justifies our belief that they cooperate with the explanatory virtues. But these reasons for confidence in the scientific use of explanatory value does not give us good reason to think explanatory virtues are truth-conducive in theories of properties. For the truth-conduciveness of explanatory virtues have not been vindicated by the empirical success of theories of properties that maximize explanatory value, nor have we gained further understanding of the nature of properties through empirical research, as theorizing about properties does not have the benefit of empirical feedback.

Consider the following case. Assume we have the following assurances concerning our data about properties. First suppose that we observe instantiations of properties directly and veridically. Second suppose that we can individuate instantiations of properties flawlessly: we identify something as an instantiation of a property only if it is in fact an instantiation of that property, and we take two or more instantiations of properties to be qualitatively identical only if they are indeed qualitatively identical.

Suppose one's only property-instantiation data was the following distribution of three, qualitatively identical property instantiations:

$$F_1 \qquad F_2 \qquad F_3$$

Given our assumptions, one would correctly judge F_1, F_2, and F_3 to be three, qualitatively identical property instantiations. Even granting these generous assumptions, empirical methods cannot determine whether F_1, F_2, and F_3 are a single entity that is wholly present in each instantiation (that is, $F_1 = F_2 = F_3$); or whether F_1, F_2, and F_3 are instantations of a single, otherworldly Form; or whether F_1, F_2, and F_3 are qualitatively identical but numerically distinct property instantiations whose similarity is not explained by a further entity. For these hypotheses about the nature of properties have no empirical consequences. The data would be the same whether F_1, F_2, and F_3 are a multi-located immanent universal, participations in a transcendent universal, distinct tropes, or merely members of the set of F-things.

So, even with generous assumptions, empirical methods cannot determine the nature of properties, because no matter what theory of properties is true, the data will be identical. If one begins one's inquiry undecided between the hypotheses about the nature of properties, empirical methods cannot answer which, if any, are true. On the other hand, if one begins one's inquiry assuming the truth of one of the hypotheses, empirical methods could never disabuse one of the assumed hypothesis. Therefore, theorizing about properties does not have the benefit of empirical feedback.

Therefore, although (we granted) we are justified in thinking that the facts do cooperate in the scientific case, we cannot thereby infer that we are justified in thinking that the ultimate grounds of the properties phenomena also cooperate with explanatory virtues. For the reason why we should supposedly think explanatory virtues are a reliable guide to theory choice in science is the empirical vindication of such methods, and our empirically-gained understanding of the nature of the underlying causes of scientific phenomena. But we lack empirical feedback in the case of properties, preventing either of these routes to

justification. Therefore, we lack good reason to think that the ultimate grounds of the properties phenomena cooperate with the explanatory virtues, as we supposed we do in the scientific case. To further illustrate these points, consider the use of parsimony in evolutionary biology.

4.7 Parsimony in Evolutionary Systematics

One of the most discussed scientific uses of explanatory virtues is the use of parsimony in evolutionary biology. According to Paul, the scientific use of explanatory virtues "as a means to grasp scientific truths about the nature of the world is well confirmed, at least when we look past the context of fundamental physics to wider scientific contexts, for example, to the context of evolutionary biology" (2012, 12). But, contrary to Paul, I think that the justification for evolutionary biology's use of parsimony illustrates why metaphysicians cannot appeal to the evidence for the truth-conduciveness of explanatory virtues in scientific theories as evidence for their truth-conduciveness in ontological theories, including theories of properties. First, however, we need to understand how parsimony is supposed to serve as grounds for model-choice in evolutionary biology.

Elliott Sober has written a great deal on the methodological role of parsimony in evolutionary biology, and he brings much of this research to bear in his lecture "Parsimony Arguments in Science and Philosophy: A Test Case for Naturalism$_p$."[6] Like Paul, Sober holds that "there are important types of scientific argument in which parsimony has a

[6]Sober (2009) argues that some scientific uses of parsimony are epistemically reliable, but that this justification doesn't carry over to the uses of parsimony in particular philosophical debates. This differs from my argument here, as Sober argues (quite convincingly) that the methodological similarities between parsimony arguments in biology and parsimony arguments philosophy are merely superficial; scientists and metaphysicians are using different methods, contrary to the argument from analogy. My argument, on the other hand, grants that scientists and philosophers use the very same methodology, as I think the argument from analogy still fails. Further, my argument is broader in scope than Sober's, as his argument focuses on parsimony alone, while mine applies to explanatory virtues in general.

demonstrable epistemic relevance" (2009, 118), and that one context where considerations about parsimony are justified is in the theory of evolution.[7]

The Darwinian theory of evolution says "natural selection has been an important cause of the traits we see in present day organisms *and* that the species we find today trace back to common ancestors" (Sober 2009, 119). And the key evidence for common ancestry follows from "the similarities that organisms bear to each other" (Sober 2009, 121). Biologists use data about similarity to choose between trees, which are models that represent evolutionary history and the phylogenetic relationships between different groups. A phylogenetic inference chooses one tree as the true representation of the evolutionary facts over the many other trees that fit the data. Sober uses the following toy example to show how phylogenetic inferences work (2009, 119): we observe that human beings and monkeys have tailbones. Now consider two hypotheses: the common-ancestor hypothesis (CA) says that human beings and monkeys have a common ancestor; the separate-ancestor hypothesis (SA) says that they do not. (CA) and (SA) present two different pictures of how human beings and monkeys evolved: (CA) says that each group is a tip at the end of a branching tree, where their common ancestor is at the tree's root; (SA) says that each group is a tip of two distinct trees, and thereby share no common ancestor. Which model should we choose?

One way to choose between (CA) and (SA) would be to pick the most parsimonious model, a method that many biologists endorse. First assume that human beings have a tailboneless ancestor, and that monkeys do as well (and each group's tailboneless ancestor may or may not be identical) (Sober 2009, 121). If (CA) were true, there would only be one change in evolutionary history – a *common* ancestor of human beings and monkeys developed a tailbone. And if (SA) were true, there must have been two evolutionary changes:

[7] We should note well that the use of parsimony is controversial among biologists who work in systematics. For a philosophical take on the dispute, see Sober (2004).

one change in human beings' tree (tailboneless ancestor of human beings to more recent ancestor of human beings with a tailbone), and another, analogous change in monkeys' tree. So, (CA) is more parsimonious than (SA), because (CA) requires fewer evolutionary changes than (SA).

So now we are in a position to return to the argument from analogy. In cases like Sober's toy example about human beings and monkeys, biologists can use parsimony as a guide to choose between competing models of the evolutionary facts. I grant for the sake of argument the controversial claim we have good reason to think that parsimony is a legitimate guide to phylogenetic inference, because we have good reason to think it is truth-conducive in evolutionary biology. And we have reason to think that it is truth-conducive in biology, because it is has been vindicated by the empirical success of using parsimony to choose between trees. But what does this say about parsimony in ontology? Not much. However the most parsimonious trees manage to track the true evolutionary facts, parsimony is only a good guide to phylogenetic inference in so far as the evolutionary facts cooperate.[8] That is, the truth-conduciveness of parsimony in phylogenetic inference turns on facts about how evolutionary processes work. So, is the parsimony used in evolutionary biology really the same as the parsimony used in ontology? The answer depends on how we characterize parsimony in evolutionary biology.

We can characterize parsimony in evolutionary biology as being fine- or coarse-grained. On the fine-grained characterization, parsimony is essentially a phylogenetic method of inference: parsimony is a virtue had by trees, and is maximized when the changes in traits are minimized. The fine-grained characterization of parsimony in phylogenetic inference says nothing about the truth-conduciveness of parsimony as a method of theory-choice in

[8]In fact, a common criticism of using parsimony as a guide in phylogenetic inference is that it requires that evolutionary facts cooperate, which requires a pretheoretical assumption that evolutionary processes "proceed parsimoniously" (Sober 2004, 644). Not all biologists and philosophers think that such an assumption is justified.

ontology, as parsimony would be a unique method for phylogenetic inference. Whatever resulting justification we have for using parsimony in the fine-grained sense in biology, would not carry over to philosophy: parsimony is a virtue had by trees, not theories of properties. On the other hand, the coarse-grained characterization of parsimony applies to both the use of parsimony in evolutionary biology and the uses of parsimony in philosophy. The coarse-grained characterization makes parsimony into an extremely broad category of methods, where the uses of parsimony in different domains all fit a very general characterization of parsimony but with some differentia. But whether we have reason think parsimony is truth-conducive in a particular theory turns on whether we have good reason to think that the facts in that theory's domain cooperate. And so, what evolutionary systematics' species of parsimony can tell us about parsimony *in general* is that a given, specific method of parsimony is truth-conducive when the conditions are right. But whether the conditions are right for parsimony to be truth-conducive in theories of properties is the very question we are trying to answer. And the reason we are supposed to think that the facts cooperate in the case of evolutionary systematics are empirical. But we have no such empirical reasons in the case of theories of properties, as theorizing about properties does not have the benefit of empirical feedback. Nor do we have any reason to think that the facts about how evolutionary processes work analogous to facts about properties. So, the truth-conduciveness of parsimony in evolutionary biology does not give us reason to think that parsimony is truth-conducive in theories of properties.

The example of parsimony used in phylogenetic inference illustrates my general point: the appeal to scientific use of explanatory virtues is problematic, as the only generalization we can draw from explanatory virtues being truth-conducive in one domain is that explanatory virtues are truth-conducive when the world cooperates by being simple, unified, and so on. And although (we granted) we are justified in thinking that the facts do cooperate in the scientific case, it does not follow that we are justified in thinking that the

ultimate grounds of the properties phenomena also cooperate. For the reason why we are supposed to think explanatory virtues are a reliable guide to theory choice in science is the empirical vindication of such methods, and our empirically-gained understanding of the nature of the underlying causes of scientific phenomena. But we lack empirical feedback in the case of properties, which blocks off these supposed sources of justification. Therefore, the key conditional remains unjustified: it gives us no good reason to think that we can infer that explanatory virtues are truth-conducive theories of properties because we have reason to think they are truth-conducive in scientific theories. As a result, the argument from analogy fails to establish its conclusion.

4.8 Conclusion

The argument from analogy plays on the wise sentiment that philosophers should not teach scientists their business. I agree that philosophers are in no position to scold scientists, but it hardly follows that metaphysicians who claim to use the same methods as science are beyond philosophical reproach by association. But despite its superficial plausibility, I conclude we should reject the argument from analogy. As a result, the argument from analogy does not give us any reason to think that explanatory virtues are truth-conducive in theories of properties. Therefore, considerations about explanatory value cannot resolve the underdetermination between the theories of properties without some further argument. Of course, plenty of philosophers have accepted metaphysical principles that claim that, *a priori*, the world was simple, unified, and so on. But such principles are just as controversial, if not more so, as the debate over the nature of properties. Appeals to such controversial principles can hardly settle the properties debate. So, I conclude that, since the argument from analogy fails, considerations about explanatory

value do not resolve the underdetermination between competing accounts of the nature of properties.

CHAPTER 5

INSTRUMENTAL PLURALISM

> Let us grant to those who work in any special field of investigation the freedom to use any form of expression which seems useful to them; the work in the field will sooner or later lead to the elimination of those forms which have no useful function. *Let us be cautious in making assertions and critical in examining them, but tolerant in permitting linguistic forms.*
>
> "Empiricism, Semantics, and Ontology"
> RUDOLF CARNAP

IN THE LAST CHAPTER, we considered whether explanatory value could give us good reason to accept any one theory of properties as *true*. On such a view, the justification for choosing a theory as true on the basis of explanatory value was *realist* in nature: Paul thought explanatory value tracks the truth, because explanatory virtues are generally truth-conducive. Therefore, if a theory exhibits explanatory virtues, then we have good reason to think that theory tracks the truth. Therefore, explanatory virtues give us good reason to prefer theories that exhibit those virtues, as those theories are more likely to be true. Yet we concluded, despite Paul's arguments, that we lack good reason to think that explanatory value could reliably determine which theory of properties is true. But one can drop the goal of truth, and argue that explanatory virtues give us good *pragmatic* reason to prefer theories of properties that exhibit those virtues: explanatory value track how useful a theory is, given our goals. Perhaps, then, we can take a pragmatic, instrumentalist approach: use considerations about explanatory value to weigh how useful each theory of properties is, and accept the one theory that proves to be the most useful. But what,

exactly, is the difference between realists and instrumentalists with respect to explanatory value?

Realists and instrumentalists about explanatory value agree that explanatory value is a good guide to theory choice. And so long as realists and instrumentalists agree on the facts about the phenomena, and what theoretical traits count as explanatory virtues, they will accept the same theories. Yet the realist and instrumentalist have very different attitudes toward the theories they accept on the basis of explanatory value. The instrumentalist *accepts* the theory that exhibits the best balance of explanatory virtues because she judges that theory will thereby best serve her purposes. The realist, on the other hand, takes a stronger stance on the theories she accepts on the basis of their explanatory value. Namely, according to the realist, explanatory virtues are truth-conducive and thereby give us prima facie reason to believe the theory is true on the basis of explanatory value. So, not only does the realist accept the most explanatorily valuable theory, she *believes it*.

For example, some astronomers historically thought astronomical theories were merely mathematical tools for accurately representing and predicting the *apparent* motions of heavenly bodies. These astronomers accepted the explanations of astronomical theories because they fulfilled these functions better than their competitors, but did not believe that they provided the *true* explanation of how heavenly bodies moved. But some astronomers took astronomical theories to provide genuine explanations of their movements, in addition to providing accurate predictions about them.

This difference in attitudes is illustrated by the publication of Copernicus's *On the Revolutions of the Heavenly Spheres*. Andreas Osiander, who prepared Copernicus' *Revolutions* for publication, ghostwrote an unauthorized preface that tells readers the theory of *Revolutions* was meant only to save the appearances:

> I have no doubt that certain learned men, now that the novelty of the hypotheses in this work has been widely reported – for it establishes that the

> Earth moves, and indeed that the Sun is motionless in the middle of the universe – are extremely shocked . . . . But if they are willing to judge the matter thoroughly, they will find that the author of this work has committed nothing which deserves censure. For it is proper for an astronomer to establish a record of the motions of the heavens with diligent and skillful observations, and then to think out and construct laws for them, or rather hypotheses, *whatever their nature may be* . . . . [It is not] necessary that these hypotheses should be true, nor indeed even probable, but it is sufficient that they merely produce calculations which agree with the observations. (1976, 22, emphasis added)

But Osiander's unauthorized preface misrepresents Copernicus' attitudes (Copernicus 1976, 317n1). Copernicus not only thought that his theory's explanation was useful, he thought that it was *true*. Copernicus states in his dedicatory letter to Pope Paul III that the solar system *is* heliocentric, which *truly* explains the apparent motions of heavenly bodies:

> I shall describe all the positions of the spheres, along with the motions which I attribute to the Earth, so that the [first] book will contain as it were the structure of the universe. In the remaining books I relate the motions of the remaining stars, and all the spheres, to the mobility of the Earth, so that it can be thence established how far the motions and appearances of the remaining stars and spheres can be saved, if they are referred to the motions of the Earth. (26)

Copernicus thought *Revolutions* not only gave a useful explanation for predicting the apparent motions of heavenly bodies, using calculations based on careful observation; in addition, he thought that theory explained the real motions of the heavenly bodies, as encapsulated in heliocentrism, which explains the apparent motions of the heavenly bodies, once they are considered with reference "to the motions of the earth" (26).[1]

This difference in attitudes, as embodied in the disagreement between Osiander and Copernicus, is possible because one theorist can accept (and present to others) a theory as a true explanation of some phenomena, while another can accept (and present) the very

[1]Duhem considers Osiander's preface at length in chap. 6 of his (1969).

same theory as something weaker – a pragmatic idealization, a deflationary framework, a conjecture, and so on. As we discussed in §3.1, a metaphysical explanation of some phenomena cites grounds for those phenomena, and then tells a narrative about how those grounds give rise to those phenomena. More specifically, when inquiring into the nature of properties, the realist begins with the phenomena to be explained, and then considers possible explanations for those phenomena. In the case of the inquiry into the nature of properties, the possible different explanations are the different theories of properties. When successful, theories of properties explain the various properties phenomena. But since there are an abundance of these explanatorily adequate theories to choose from (see chapter 3), the realist's work is not done. To choose between these explanatorily adequate theories of properties, the realist about explanatory value chooses the most explanatorily valuable theory, and accepts that theory as the *true* explanation: that theory's entities are the real grounds of the properties phenomena, and that theory's narrative is the true story of how those entities give rise to the phenomena.

The instrumentalist proceeds similarly, working backwards from the phenomena to possible explanations of those phenomena, and then choosing the most explanatorily valuable theory. Yet the instrumentalist accepts the selected theory not as the true explanation of the phenomena, but as the most pragmatically useful explanation of the phenomena. Although the instrumentalist does not present a theory of properties as true, the theory remains an explanation of the properties phenomena nevertheless. For even when a theory is presented as being merely useful, the theory still cites grounds of the properties phenomena and tells a narrative about how those grounds give rise to the nature of properties. But unlike the realist, the instrumentalist does *not* present that theory's entities as being the real or actual grounds of the properties phenomena, nor does she present its narrative as the true story of how those phenomena arise (although she might not rule out its truth). Instead, the instrumentalist accepts the theory's entities and explanatory

narrative as theoretically useful tools, and accepts the theory on that basis. So, although realists and instrumentalists about explanatory value select theories in much the same way, they take different attitudes towards that theory as explanation: the realist believes that the theory's entities exist, and its narrative is true; the pragmatist sees the theory's entities and narrative as useful tools, whether or not they are true.

The instrumentalist's attitude toward the accepted theory is easier to justify than the realist's, as we are the best judges of what theoretical traits best suit our purposes, and we decide what pragmatic goals to accept. If our goal is purely pragmatic, the theoretical traits we will prize as virtues will just be those traits that we think make a theory better suited to our purposes. So, for instrumentalists, explanatory virtues provide a decisive reason for accepting one theory over another, because explanatory virtues are by definition theoretical traits the instrumentalist judges to make a theory better suited to her purposes. For example, if ontologically parsimonious theories are better suited to our purposes than ontologically complicated ones, then ontological parsimony is an explanatory virtue; if not, it isn't. We can of course be wrong about whether a theoretical feature really does make a theory better suited to our purposes, but the proof is in the pudding: we can easily verify how well a theory is meeting our expectations, as we have access to how well certain theoretical traits help us meet our goals. Thus we have a fruitful feedback loop where we can use different theories of properties in different domains and see how well they help us achieve our pragmatic goals, and continually fine-tune our explanatory framework as needed.

Yet, even when our goals are merely pragmatic, it seems considerations about explanatory value cannot force all inquiries to converge on any *one* theory of properties. Consider the following argument: different inquiries often have different criteria for what counts as a good explanation in their domain, because inquiries can vary in their goals, assumptions, and target data. Evolutionary biology, meteorology, materials engineering, and particle

physics, for example, are wildly different in their goals, assumptions, and target data. So, theoretical features that are important explanatory virtues in one inquiry may be ignored altogether in an inquiry with different goals or background assumptions or target data. And an inquiry's goals, assumptions, and target data can shift over time. So, we should not think there is any standard balance of what theoretical traits are more explanatorily valuable than others. And since different inquiries can disagree about which theoretical features count as explanatory virtues, they can disagree about what makes a theory explanatorily valuable. As a result, there is no guarantee that different inquiries will accept the same theory of properties on the basis of its explanatory value, because they disagree about what makes a theory valuable in the first place. Therefore, considerations of explanatory value cannot force inquiries to converge on a single theory of properties, even when their goals are purely pragmatic.

Let's explore this argument more fully. First, we should note that, when the goals of inquiry are pragmatic, what makes a theory explanatorily valuable is relativized to the current and foreseeable pragmatic goals of a given inquiry; that is, when the goals of inquiry are pragmatic, what a theory's explanatory value depends upon what our current and foreseeable goals are. And we cash this out in terms of explanatory virtues: what theoretical traits count as explanatory virtues, which is determined by which theoretical features best serve the current and foreseeable goals of the inquiry. Since inquiries have different goals, there is no single, inquiry-independent, privileged set of theoretical features that are the explanatory virtues: different inquiries will find different theories of properties useful at different times given their current and foreseeable goals, assumptions, and target data at that time.[2] For once we go pragmatic, we are beholden only to

[2]I thank Luke Elwonger for providing objections that showed me I need to include 'foreseeable' in this definition. For we can't accept a particular set of explanatory virtues just because they're valuable now, but also how they will affect future goals of the inquiry. On the one hand, practitioners may foresee that certain sets of explanatory value might frustrate or block off pragmatic goals they would all agree are valuable, in exchange for a short-sighted payoff. I should note that Elwonger firmly rejects instrumentalisms of all

considerations about a theory's usefulness for a given purpose, and the practitioners in that inquiry are the best judges of what theoretical features count as explanatorily valuable theoretical traits (*i.e.*, virtues). Therefore, the various inquiries may use whatever set of explanatory virtues that suits their current and foreseeable pragmatic goals, allowing them to diverge on what theories of properties they accept on the basis of those theoretical traits they prize. Otherwise, there would be a single privileged set of explanatory virtues that every inquiry must prize. As a result, some inquiries would be required to use theories of properties that are suboptimal at serving their purposes. But using worse theories when better ones would do is not pragmatic at all. As a result, different inquiries may accept different theories of properties from one another, because different theories of properties have different virtues, and what counts as an explanatory virtue can differ from inquiry to inquiry.

This conclusion is the central claim of instrumental pluralism about theories of properties, the view I think we should accept. Instrumental pluralism gets its name as follows. It is instrumentalist because it says only the usefulness of a theory should influence our choice in one theory of properties over another. And it is pluralist because it allows inquiries to accept different theories of properties, depending on their goals, assumptions, and target data.[3]

In this chapter, I argue that instrumental pluralism is the best available way to choose between theories of properties we have. I argue that we should reject a more conservative instrumentalist approach that I call 'instrumental imperialism,' which says we should prize a privileged set of theoretical traits, regardless of inquiry, so that every inquiry

stripes.

[3] 'Allows' is normative: I don't mean to say that my opponents want to coerce practitioners into accepting a particular methodology or theory. Philosophers thankfully cannot enforce what they think practitioners ought to do or ought not to do. Rather, the instrumentalist views I consider in this chapter make *normative* claims about how practitioners should use theories of properties. My view, instrumental pluralism, is particularly permissive: practitioners should use whatever theory of properties they find useful. Thanks to Mark van Roojen for pointing out this ambiguity.

settles on the same theory of properties. That is, we should reject the view that every inquiry should prize the exact same set of theoretical traits as explanatory virtues, using those virtues to choose between explanations regardless of the inquiry's current and foreseeable goals. I argue that we should reject this rival instrumentalism, as instrumental imperialism is either just instrumental pluralism in disguise, or is not pragmatic at all. After I have shown that instrumental imperialism is inferior to instrumental pluralism, I then consider some further consequences of instrumental pluralism.

But before we turn to my arguments for instrumental pluralism, I must first point out a few things instrumental pluralism is *not*. First, instrumental pluralism is not a sweeping view about theory choice itself, nor is it a weaker view about how we should choose between ontological theories in general. That is, I resist the temptation to generalize my claims about theories of properties to ontological theories generally, thereby making instrumental pluralism a sweeping metametaphysical view. Rather, I am arguing only that instrumental pluralism is the right approach for choosing between theories of properties. Perhaps my arguments show that we should be instrumental pluralists about theory-choice more broadly, at least when certain conditions hold. But I withhold judgment with respect to this possibility, and so this chapter is limited to showing that we should accept instrumental pluralism about the theories of properties.

And unlike many sweeping pragmatic, instrumentalist, and deflationary views, instrumental pluralism is *not* motivated by some prior views about epistemology or semantics. Rather, we should be instrumental pluralists about the nature of properties because, as I hope to have shown, the other grounds for theory-choice are unacceptable. In earlier chapters, we have seen that the evidence for the nature of properties deeply underdetermines which theory of properties we should accept as *true*, as we lack grounds for choosing any one theory of properties as the true theory over its competitors. I take this to show that the truth-based approach to choosing between theories of properties is

doomed. Yet properties talk seems indispensable, and the various ways we talk in both inquiry and everyday life seems to assume various theories of properties. This demands a philosophical account, albeit not an account that tries to get to the bottom of whether any one theory of properties is true. Thus we are necessarily driven to instrumental pluralism about theories of properties by argument, and not by some prior ideological motives.[4]

5.1 Against Instrumental Imperialism

As was noted in the previous section, instrumental pluralism makes two core claims: we should choose between theories of properties on the basis of how useful they are for our purposes (instrumentalism), and that we must allow inquiries to use different theories of properties (pluralism). I take myself to have sufficiently motivated the instrumentalist claim of instrumental pluralism: the previous three chapters have shown that we have no basis for accepting any one theory of properties as *true*. So, we must turn to other methods of theory choice, namely, ones that do not necessarily aim at truth. But even those philosophers who accept the 'instrumentalist' half of 'instrumental pluralism' may deny its pluralism. Namely, some instrumentalists could deny that different inquiries may prize different theoretical traits as explanatory virtues, which allows for pluralism about theories of properties. Instead, these philosophers – instrumental imperialists – claim that we should privilege *one* set of theoretical traits as the determiners of explanatorily value, across all inquiries. But I shall argue that instrumental imperialism is not pragmatic at all or collapses into instrumental pluralism, the view I favor. Therefore, instrumental pluralism is the superior view.

[4]This is not to say, however, that the following chapter was not *influenced* by philosophers with strong ideological motives. Instrumental pluralism is a metaontological thesis, but it primarily takes its inspiration from instrumentalist views in the philosophy of science. I have benefited most from the works of Pierre Duhem, especially his (1991) and (1969); and Henri Poincaré, especially chaps. 9 and 10 of his (1952).

Consider a case where the pluralist and imperialist disagree about which theory of properties practitioners in a particular inquiry should accept. Suppose practitioners are faced with a choice between theory A, which on balance best embodies the imperialist's privileged set of theoretical traits; and theory B, which instead embodies a distinct, unprivileged set of theoretical traits which better serve the inquiry's current and foreseeable purposes. The imperialist will say that practitioners of that inquiry should accept A over the more explanatory valuable (and thereby more useful) theory of properties B. But pragmatic considerations seem to demand that we choose B over A. But if we choose B over A, this implies that the imperialist's privileged set is not privileged after all: whenever a theory of properties is more useful to an inquiry's current and foreseeable purposes, we should prefer that theory to a less useful theory of properties *even if* that less useful theory better embodies the privileged theoretical traits. And it is unclear how the imperialist's demand that the practitioners stick to the privileged set, and use the suboptimal theory A, is pragmatically motivated: B is more useful than A for our current and foreseeable purposes. So instrumental imperialism fails to be pragmatic, or at least fully so, as it sometimes requires practitioners use suboptimal theories. On the other hand, if the instrumental imperialist agrees that we must abandon the privileged set whenever another set better serves our current and foreseeable purposes, instrumental imperialism collapses into instrumental pluralism.[5] So either the privileged set is not privileged after all, or instrumental imperialism is not pragmatic.

Presumably, the instrumental imperialist will resist this conclusion, arguing that using A over the currently more useful theory of properties B is only suboptimal *in the short run*, but universally using the privileged set will be vindicated by some greater pragmatic gain in the long run. Although it is certainly true that we should forgo short-sighted gains

[5]This argument is highly analogous to the collapse argument against rule consequentialism. Instrumental imperialism corresponds to rule consequentialism, while my instrumental pluralism corresponds to maximizing act-consequentialism. See Hooker (2000).

in favor of greater, long-term gains, this response to my argument fails. Suppose that at the present time, a theory C better embodies the privileged set of theoretical traits than D, although D better serves the practitioners of a particular inquiry's purposes. Now suppose that some time in the future that C will become more useful than D, and will remain so for the rest of time. So, in the long run, we are better off just using the privileged set throughout, as it will give us a greater pragmatic gain over time. So, according to the imperialist, we should accept the theory that the privileged set endorses, C, rather than the currently more useful theory, D.

But why shouldn't we use the theoretical traits that are currently better trackers of usefulness until the time that the privileged set of traits surpasses them? That is, we *should* use the privileged theoretical traits to choose the most explanatory valuable theory of properties, but only when the theoretical traits actually begin to track usefulness. Until they do, we should use the explanatory virtues that do in fact track usefulness.[6] Presumably, we would, by the instrumental imperialist's lights, foresee that the privileged explanatory virtues will track usefulness at some point, as otherwise we would not know to use the privileged set in the first place, starting now. If we do in fact foresee exactly when the privileged explanatory virtues will begin tracking usefulness, then the instrumental pluralist can pursue the following strategy, unavailable to the imperialist: if using the unprivileged set blocks off the route to the point where the privileged set begins tracking usefulness, then we use the imperialist's privileged set starting immediately. If it does not close off that avenue, we stick to the set of theoretical traits that currently track usefulness until the time that the privileged set of theoretical traits begins to better track them. The instrumental pluralist can can make this choice, because pluralism says that, when deciding what theoretical features are explanatorily valuable, we are beholden only to pragmatic considerations. As a result, instrumental pluralism allows practitioners to

[6] I thank Shane George for this point.

use whatever theory of properties they judge most useful for achieving both the current and the *foreseeable* goals of their inquiry. And this is why instrumental pluralism is much more plausible than instrumental imperialism: it would take a very strong reason indeed for the imperialist to justify his or her claim that a privileged set of theoretical traits will be more valuable in a theory of properties for *every* inquiry in the long run, even when we have good reason to think a different set of theoretical traits will better serve an inquiry's purposes for the foreseeable future. And even if the instrumental imperialist can provide such an overriding reason, this is perfectly compatible with instrumental pluralism: instrumental pluralism agrees with the imperialist in so far as they admit that practitioners of an inquiry may use the theory of properties they find most useful, where the most useful theory is judged by what set of explanatory virtues they accept. And perhaps every inquiry will accept the same balance of explanatory virtues as the imperialist demands, leading all inquiries to converge on a single theory of properties. According to instrumental pluralism, such a convergence on a single theory across inquiries, however, can only occur if it just so happens that practitioners in each individual inquiry independently judge that a particular theory of properties best suits their purposes; that is, practitioners will converge on a single theory only if the practitioners of every inquiry judge that the theory of properties in question is the most explanatorily valuable theory – the theory that best exemplifies the theoretical features that inquiry prizes as explanatory virtues.

This picture importantly differs from the instrumental imperialist's demand that every inquiry use a single theory of properties. In that case, the inquiries must accept a single theory of properties because the imperialist has chosen what standard of usefulness they should accept *a priori*. But according to instrumental pluralism, the convergence on a single theory of properties is a piecemeal affair. Each inquiry democratically elects a theory of properties, and if they all elect the same theory, then so be it. Instrumental pluralism is pluralist in that it allows for pluralism about theories of properties, although

it also allows for the possibility that practitioners will democratically converge on a single theory. Thus, it allows for the possibility that inquiries will accept the same theory of properties, but respects the possibility of pluralism as well. Therefore, we should accept instrumental pluralism, not instrumental imperialism.

5.2 Consequences of Instrumental Pluralism

So what exactly does instrumental pluralism about properties look like in practice? The core tenet of instrumental pluralism tells us: each inquiry should accept whatever theory of properties best embodies the theoretical traits it considers explanatory virtues. And since there is no privileged set of explanatory virtues, there is no guarantee that every inquiry will converge on a single theory of properties, as they may value different theoretical traits to different degrees. The only feasible restrictions on practitioners is that they must accept a consistent and explanatorily adequate theory. We need not place any methodological constraints upon practitioners with respect to explanatory value: practitioners are the best judges of what theory best suits their purposes, and inferior theories will be quickly weeded out in favor of better theories.

But instrumental pluralism must be qualified, as we cannot allow every inquiry to use whatever theory of properties it finds most useful. For some inquiries turn on the nature of properties. For example, inquiries into the nature of mental properties is in part a debate over the existence of higher-order mental properties. Therefore, if the goal of such an inquiry is truth, and the conclusions of that inquiry turn on the nature of properties, it will not do to allow practitioners to accept any theory of properties they find useful. That would introduce an unacceptably unreliable process into a truth-seeking inquiry.

So what are we to do about truth-seeking inquiries that turn on the nature of properties? The past three chapters have shown that the nature of properties is hopelessly

underdetermined by our evidence. As a result, the answer to any question that turns on the nature of properties will be underdetermined as well: the problem facing the inquiry into the nature of properties are transmitted to any inquiry that depends upon it. Therefore, any inquiry that turns on the nature of properties is afflicted with the rot of underdetermination. Such inquiries, like the inquiry into the true nature of properties, should be abandoned (unless the conclusions of this dissertation are overturned). This of course has serious implications for many philosophical debates, but we must follow the argument where it leads.

This of course means that instrumental pluralism only permits inquiries that do not turn on the true nature of properties to use whatever theory of properties that they find the most useful. But this raises the question: how could theories of properties be of any use to inquiries that do not turn on the nature of properties? Why think, for example, that treating properties as universals rather than tropes could ever be of any use to anyone? When would it ever be more useful to think of properties as numerically unified universals rather than qualitatively identical but numerically distinct tropes when the properties phenomena will turn out the same?[7] What good is instrumental imperialism then?

These are difficult questions for the property theorist to answer, and I admit it does seem unlikely that theories of properties will be of any use to inquiries that do not turn on the nature of properties. One way to answer these questions is to abandon instrumental pluralism for a kind of quietism about properties, where properties talk requires no further analysis. Quietism seems plausible at first glance, but it is not the right approach to the underdetermination between theories of properties. For quietism does not respect the possibility that accepting a particular theory of properties might in fact be useful to some inquiries. That possibility may seem far-fetched, but we shouldn't simply rule it out *a priori*. Rather, we should first say that every inquiry that does not turn on the nature

[7] Cf. Wolterstorff (1960, 199-200).

of properties is free to use whatever theory of properties they find useful. This prescription does not ban quietism about properties, although quietism rules out the possibility of instrumental pluralism. Practitioners whose inquiries do not turn on the nature of properties can accept quietism, so long as accepting a theory of properties does not help them reach their goals.

So where does that leave us? First, the arguments of chapters 2, 3, and 4 show that the inquiry into the true nature of properties is hopelessly underdetermined. As a result, I think we should limit ourselves to accepting theories of properties as merely useful tools, allowing practitioners of the various inquiries to decide which theory of properties best suit their purposes. I suggest further research on the topic should focus on showing that the inquiry into the true nature of properties is, contrary to the argument of this dissertation, viable after all.

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