

Abstract

The causal theory of properties is standardly combined with a realist's ontology of universals or tropes. In this paper, I consider an uncharted alternative – a nominalist causal theory of properties. I discuss advantages and disadvantages of the resulting theory of properties, and explore the Rylean understanding of causal powers that emerges.

Causal Nominalism

If the causal theory of properties has a slogan, it is Shoemaker's claim that 'properties are causal powers' (1980: 210). But this eye-catching statement has been apt to mislead, as it seems to promise a reduction of some sort. This impression has been reinforced by expositions of the view. Armstrong, for instance, identifies the core of the causal theory of properties with the claim that 'properties are exhausted by their causal role'.¹

More recently, however, proponents of the causal theory have been quick to dispose of the whiff of reductionism. Shoemaker, for instance, is unequivocal about the matter:

I would want to reject the formulation of the causal theory which says that a property is a cluster of conditional powers. That formulation has a reductionist flavour to it. And the reduction it seems to promise is a cheat. We must make use of the notion of a property in explaining the notion of a conditional power, so there is no question here of reducing properties to some more fundamental sort of entity (1998: 64).

Causal theorists standardly distance themselves from statements that seem to propose a reduction of properties to causal powers, offering instead a more careful suggestion.² The essence of this is that 'properties are individuated by the contribution they make to the causal powers of their subjects,' so they provide transworld identity conditions for properties.³

Why the seeming shift? The reason, I want to suggest, although it is never made explicit, is simple and well motivated. If we are realists about properties (or their

¹ Armstrong 1999: 26. See also Segal 'the nature of a property is exhausted by the effects its possessors would bring about, given other properties they might have' (manuscript: 15) and Hawthorne (2001: 262).

² See, for instance, Shoemaker 1998, Elder 2001, Ellis 2001 and Chakravartty 2003.

³ Shoemaker 1998: 297.

instances), which I think all current causal theorists are, then properties are regarded as *sui generis* entities in their own right. In other words, they are basic, primitive items in our ontology. As a result, it is not at all clear what it could mean to say that these entities are exhausted by their effects, for there is an actual, existing primitive entity – a universal or trope – which is present in each bearer of the property. Consequently, we are left with the view that it is these universals or tropes which bestow powers onto their bearers. They are what make it true that these effects occur in such-and-such circumstances. What these causal theorists are offering us, then, is not a reduction, but rather a theory which locates the source of the world's power in the properties of objects.

But before we rest content with this non-reductive causal theory of properties, it is perhaps worth first considering whether there are any alternative, reductive readings of the slogan 'properties are causal powers'. Can causal theorists Ockhamize our ontology by nurturing the reductive pretensions of the original statement? My suspicion is that there is a reductive strategy that can be pursued at this point: one which reduces properties to causal powers and so offers an analysis of causal powers which does not appeal to *sui generis* properties or property instances.

Nobody, as far as I am aware, has laid claim to this nominalistic construal of the causal theory of properties. But two gestures towards such a view can be found. First, Chakravartty mentions the possibility of interpreting Shoemaker's causal theory of properties as 'a Rylean inference-ticket-type view', which takes a 'deflationary account' of powers.⁴ But this suggestion is quickly put to one side. Second, in a footnote, Hawthorne writes,

I shall not be calling the existence of universals into question. I shall leave the reader to judge to what extent the issues [regarding the causal theory of properties] are significantly affected by a shift to a set-theoretic conception of properties.⁵

My aim here is to explore these ideas. I think that there is an important connection between the two, for unless we embrace nominalism, we will be left with the distinctly unrylean claim that there are *sui generis* properties of objects grounding these causal powers. But more of that in part two. First, in part one, I shall attempt to do as Hawthorne suggests: consider whether a causal theory of properties could make do

⁴ Chakravartty 2003: 394.

⁵ Hawthorne 2001: 376-7 (the brackets are added).

without an ontology of sui generis universals (or tropes). Despite the lack of nominalist causal theorists, I hope the rationale for this investigation is clear. If this view faces insurmountable difficulties, it would be good to know what these are so we can confidently conclude that the causal theory of properties requires sui generis properties or property instances. If, on the other hand, it escapes such objections, then we have another position whose merits and demerits should be considered.

Part One: Setting out Causal Nominalism

1. Introducing Causal Nominalism

A nominalist causal theory of properties, as well as being an ungainly mouthful, may sound like an oxymoron. How could we have a causal theory of properties, if properties do not exist? This can be easily accounted for, however, by explaining what is meant by ‘nominalism’. In this paper, it is taken to be the conjunction of two theses. The first is the standard claim that everything that exists is particular, so there are no entities that exist in more than one place at the same time. The second asserts that there are no basic property instances or tropes. All the sui generis particulars are multi-faceted. In other words, the basic particulars are not instances of redness or roundness, but rather entities that exemplify a number of different features. Importantly, this characterisation of nominalism does not commit one to an eliminative view of properties. Nominalists can say that there are such things as properties – they are real things that exist. It is just that properties aren’t among the basic entities of our ontology, as they are reducible to facts about particulars. So if properties could be reduced to facts about particulars and causation, the way is open for a nominalist causal theory of properties (or, for short, a brand of causal nominalism).

Like all forms of the causal theory of properties, at the heart of causal nominalism lies the claim that the identity conditions for properties, and so facts about what properties objects exemplify, are determined by the causal powers of objects. But how can this be rendered consistent with nominalism? Take, for starters, the sentence that ‘*a* is *F*’: what is it that makes this sentence true? According to causal nominalism, *a* is *F* if and only if *a* has certain causal powers. Put another way, we can say that *a* is *F* if and only if *a* would stand in certain causal relations, given certain circumstances. For

instance, the fact that the vase (*a*) is fragile (*F*) has certain causal ramifications. To take one, the vase would most likely break if a ten stone boulder were dropped upon it. Of course, the occurrence of this event (or the manifestation of this causal power) is not just conditional upon the fragility of the vase or the weight of the boulder. For the vase would not have broken in a gravity free zone or if there had been an obstacle shielding the vase from the boulder, and so on. But, the thought is, we can nevertheless characterise what it is for *a* to be *F* by all the complicated and particular causal relations *F* objects could contribute to.

Another way of expressing this idea is via the familiar language of functional roles. To illustrate, suppose that the property of being 100°C is characterised by this very simple, toy theory:

(T) For all substances, if that substance is water and is heated to 100°C, then this will cause that substance to boil and it will scald human skin on contact.

Despite not being expressed in the counterfactual form, the conditional nevertheless has counterfactual force since it implies that if this water were ever heated to 100°C (even if it never is) then it would have certain outputs. In addition, it is presumed that the conditional is not truth-functional, because there must be some causal connection(s) between the state of affairs described by the antecedent and the consequent. It may be possible to have some other functional dependence which is not causal (perhaps, for instance, if the dependence were underwritten by some non-causal law). But here I shall assume that the notion of a functional and causal role can be used interchangeably, since the dependences between the inputs and outputs are always causal.⁶

Our toy theory, (T), is obviously just a placeholder. The theories we are really interested in (although they may only exist ‘in the way never-to-be-written poems do’⁷), are complete, substantive theories about what *F*, *G*, *H* etc. objects can do. They are not conceptual analyses that characterise what we mean by ‘*F*-ness’ or ‘*G*-ness’. But the toy theory at least offers us a taster. According to this, *a* is 100°C just in case, if it is water and is heated to 100°C, it will cause boiling and scald human skin on contact. Causal nominalism then makes the further claim that this is all it is for the property of being

⁶ If this assumption is wrong, then the causal theory of properties will not be well-named. In order to accommodate these non-causal dependences, it would be better to refer to it as ‘a functionalist theory of properties’ or perhaps ‘a nomic theory of properties.’

⁷ Lewis, manuscript: 20.

100°C to be true of *a*. In particular, there are not any sui generis tropes or universals that make it the case that *a* realises this functional role. So, generalising, *a* is *F* if and only if the theory which charts out the functional role of *F*-particulars is true of *a*.

In the philosophy of mind and elsewhere, Ramsey sentences are utilised to help clarify the analysis further. Following Block (1978), our theory for 100°C can be written as $T(S_1 \dots S_n, I_1 \dots I_n, O_1 \dots O_n)$, where *S*'s are various states, such as being water and being 100°C, *I*'s are the inputs, such as heating the water, and *O*'s are the causal outputs, such as boiling and scalding human skin. The Ramsey sentence of this theory is then formulated by replacing the *T*-terms with variables and prefixing existential quantifiers to the theory. Suppose that *F*₁ replaces the *T*-term 'is 100°C' in our theory, we can say that *a* is 100°C iff there is a set of entities, $\exists F_1 \dots \exists F_n$, that satisfies this formula: $T(F_1 \dots F_n, I_1 \dots I_n, O_1 \dots O_n)$ and *a* is *F*₁.

The advantage of these Ramsey sentences is that, with them, we can avoid vicious circularity.⁸ Like all causal theories of properties, causal nominalism looks vulnerable to obvious circularities. For just as fragile particulars will be characterised in terms of ten stone particulars, ten stone particulars will be characterised in terms of fragile particulars. But Shoemaker and others have argued that by employing Ramsey sentences, we get round this problem, since the right-hand side of the bi-conditional contains no occurrences of the terms, *S*₁ to *S*_{*n*}, we are analysing.⁹ The idea is that Ramsey sentences are like 'equations' that we 'solve'.¹⁰ By formulating a mammoth theory, in which all the predicates of properties appear and Ramsifying that theory, all of its terms get their designations concurrently.

But, it might be objected, surely causal nominalists cannot avail themselves of Ramsey sentences? For these quantify over properties – they say that there is a property *F* such that any object which instantiates *F* stands in such and such causal relations. This objection, however, fails to distinguish between those forms of nominalism which wish to eliminate properties and those which wish to reduce them. Causal nominalists, being in the latter category, can legitimately quantify over properties. For they are not denying the existence of properties, they are just claiming that they are not sui generis entities. Consequently, since Ramsey sentences do not presuppose any particular

⁸ See Lewis 1970 & 1972.

⁹ See, for instance, Lewis 1972 and Shoemaker 1981.

¹⁰ Yablo 1993: 151.

ontological analysis of properties, causal nominalists can utilise them just as other causal theorists can. At least, they can if they explain what a property is, granted it is not a *sui generis* universal or a set of tropes.

At this point, causal nominalists can respond by appealing to the aforementioned set-theoretic conception of properties, employed alike by trope theorists, resemblance nominalists and, of course, by set nominalists. The property of *F-ness* can be construed as the set of particulars all of which realise the functional role definitive of *F-ness*. The *F-ness* in the analysans is dispensable, as it is merely short hand for the functional formula spelt out in the Ramsey sentence for *F-ness*. So it is abbreviating the claim that if *a* is *F* then it would do *X* in circumstance *C*₁, *Y* in circumstances *C*₂ and so on. The property of *F-ness* can then be identified with all those objects which realise or satisfy this functional role.

But what does it mean to say that an object realises or satisfies a certain functional role? At this point, all a causal nominalist can say is that the object in question must do *X* in circumstance *C*₁, *Y* in circumstances *C*₂ etc, as specified by the Ramsey sentence. There is no ‘real’ relation picked out by the predicate ‘realisation’ or ‘satisfaction’. Rather, this is a primitive predicate which does not have a functional role of its own and so does not count as a property, according to the standards of the causal theory of properties. In this, causal nominalists, like other property theorists, find themselves on familiar territory. Trying to analyse away all predicates, such as *a* ‘instantiates’ *F* or *a* ‘participates’ in *F*, is a doomed project.¹¹ But whilst these predicates cannot be defined in terms of anything else, causal nominalists can plausibly maintain that we have a firm understanding of what this predication involves and when we can apply these terms. Although epistemological difficulties arise when trying to decipher whether a certain object satisfies a functional role, we nevertheless grasp that it satisfies this role if and only if it would do *X* in circumstance *C*₁, *Y* in circumstances *C*₂, and so on.

We have, then, the bare bones of a nominalist theory. According to this, *a* is *F* if and only if *a* satisfies the functional role of *F-ness*. Because different particulars can satisfy this functional role, many particulars can instantiate the very same property. Similarly, since one particular can realise more than one functional role, one particular

¹¹ See Lewis 1983: 20-25.

can instantiate many different properties. So we get the causal nominalist's solution to the one over many problem and the many over one problem.¹²

This view deserves the title 'nominalism' since it does not postulate any *sui generis* properties or tropes, just particulars that do things. But does it warrant being classified as a causal theory, in the tradition of Shoemaker et al.? I think it does because it preserves two related theses that are absolutely central to the causal theory of properties. The first of these is the claim that properties are individuated by their causal features. This is preserved by causal nominalism since, on this view, the property of *F-ness* is determined by what *F*-particulars can do. If an object instantiates *F-ness* then it must partake in the functional role specified by its Ramsey sentence, thus providing us with transworld identity conditions for *F-ness*. This commitment results in the second of the causal theorist's theses. For, granted the laws are taken as charting these causal relations between properties,¹³ the metaphysical necessity of laws follows.

Causal nominalism, therefore, is an anti-Humean form of nominalism. According to the doctrine of Humean Supervenience, a Humean property is one whose 'instantiation requires no more than a spatiotemporal point and its instantiation at that point has no metaphysical implications concerning the instantiations of fundamental properties elsewhere and elsewhen'.¹⁴ The properties of causal nominalism certainly fail this requirement, since what property an object instantiates has consequences for what happens elsewhere. If, for instance, *a* is *F* and in circumstances *C*₁, then it will *X*, according to causal nominalism, because this is what it is for *a* to be *F*. As a result, I fear that causal nominalism will find few friends. For, recently at least, nominalists have tended to be of a Humean bent, while non-Humeans have been attracted to realism. This, of course, comes as no surprise, for those attracted to the desert landscapes tend to err towards nominalism and Humeanism. But causal nominalism illustrates that we need not buy into this package.

2. How Causal Nominalism Compares

Causal nominalism clearly bears close affinities to resemblance and set nominalism. But it nevertheless should be regarded as a distinct position, as it avoids some of the

¹² For more details about these problems, see Rodriguez-Pereyra 2002.

¹³ Or non-causal relations, if a broader construal of the theory is embraced (see footnote 8).

¹⁴ Loewer 1996: 102.

objections that these other forms of nominalism are vulnerable to. Let us begin by considering causal nominalism's relation to resemblance nominalism.

According to resemblance nominalism, what makes a particular *F* is that it resembles all the *F*-particulars. So this dress is red because it resembles all the other red particulars.¹⁵ Causal nominalism endorses a seemingly similar thesis, since it claims that all *F*-particulars must bear certain causal resemblances to each other. But we should not draw too much from this point. For one thing, it should be a consequence of any analysis of properties that if two particulars instantiate the same property, then they resemble each other in a certain way. And, conversely, if two particulars resemble each other in some respect, then they have some property in common.¹⁶ More importantly, however, resemblance nominalists claim that what makes it the case that *a* is *F* is that *a* resembles all the other *F*-particulars. Whereas causal nominalists claim that *a* is *F* in virtue of the fact that *a* occupies such and such a functional role. So, unlike resemblance nominalism, causal nominalism does not claim that *a* is *F* because *a* resembles other *F* particulars. This is just a consequence of its analysis of what makes '*a* is *F*' true. Rather, all *F*-particulars bear certain causal resemblances to each other, because a particular is *F* if and only if it realises such and such a functional role.

This difference between the two views is significant, as it enables causal nominalists to answer objections that have plagued resemblance nominalism.¹⁷ Take, for instance, the claim that it is possible for a particular to exist alone in a possible world, so a particular is not *F* in virtue of resembling other *F*-particulars. Although there are ways of dealing with this, causal nominalism is not subject to such a difficulty. For, on this view, *a* is *F* if and only if *a* satisfies such-and-such a functional role. Bearing causal resemblances to other particulars is not part of what makes it the case that this *a* is *F*. So the question of whether there are any other particulars in the world that also satisfy this functional role is irrelevant.

¹⁵ An alternative formulation, which Rodriguez-Pereyra calls 'Aristocratic resemblance nominalism', states that what makes a particular *F* is that it resembles some paradigms of *F*. As Rodriguez-Pereyra persuasively argues that there is nothing to be gained except problems from this formulation of resemblance nominalism, I shall compare causal nominalism to what he calls the 'Egalitarian' form of resemblance nominalism (see 2002: chapter 7).

¹⁶ At least that is the case if we are dealing with sparse, rather than abundant, properties (see Lewis 1983).

¹⁷ I do not wish to claim that these objections are unanswerable, as Rodriguez-Pereyra (2002) has provided us with a thorough defence of this view. However, I do think that causal nominalism is at least worth considering as a possible alternative to resemblance nominalism.

Because of this, causal nominalism escapes Goodman's more serious imperfect community objection.¹⁸ A resemblance nominalist cannot say that a set of particulars all resemble each other because they share a common property. Rather, the reverse must be the case – they share a common property because they all resemble each other. But we can have a set of particulars whose members all resemble each other, which fail to have a property in common. For instance, suppose that we have a set of particulars, *a*, *b* and *c*. *a* is *F*, *G* and *H*, *b* is *F*, *J* and *K* and *c* is *G*, *J* and *L*. All of these particulars resemble each other, but they do not have any property in common. So if resemblance is what makes these particulars share a property, why do these particulars not share one?

Causal nominalists have this response to make: *a*, *b* and *c* do not form a property set (i.e. there is no one property which all these particulars have), as they do not satisfy the functional role of any one property. In other words, although *a* and *b* would do *X* in circumstances *C*₁ and *Y* in circumstances *C*₂, etc. *c* would not. And although *b* and *c* would do *U* in circumstances *C*₃, *V* in circumstances *C*₄, etc. *a* would not, and so on.¹⁹ It might be objected that this is circular. To say that the set {*a*, *b*, *c*} does not form a property set because its members fail to satisfy the functional role of any one property is making a blatant appeal to properties. But, as I mentioned earlier, the claim that *a* is *F* iff *a* satisfies the functional role of *F*-ness is merely short hand for saying that *a* would do *X* in circumstances *C*₁, *Y* in circumstances *C*₂ etc. Moreover, the talk of other properties which would inevitably arise when spelling out the circumstances, can, in principle, be dispensed with by employing a gigantic Ramsey sentence.

The ease with which causal nominalists escape Goodman's objection makes it a worthy rival of resemblance nominalism. But causal nominalism arguably has another advantage over its rival, as it seems to offer a more perspicuous account of what resemblance between objects involves. Resemblance nominalists, in order to deal with such difficulties as one-off instances, need to appeal to possible particulars.²⁰ So an *F* particular must resemble all possible as well as actual *F* particulars. But, we might wonder, in what way will these actual and possible *F*-particulars resemble each other? Suppose that *F* is a fundamental property of physics, which is wholly characterised by

¹⁸ Goodman 1966: 162-4.

¹⁹ This also answers Goodman's similar companionship difficulty, a case in which all the *F*-particulars are *G*-particulars but the reverse is not the case (see Rodriguez-Pereyra 2002: chapter 10). For *a* is *F* not because it resembles a certain set of particulars, but rather because it satisfies a specific functional role.

²⁰ See Rodriguez-Pereyra 2002: §4.10 & §5.3.

what *F*-particulars can do. In the actual world, all the *F*-particulars will resemble each other because they would do X in circumstances *C*₁, Y in circumstances *C*₂, and so on. But in worlds with different laws (granted the laws are contingent), this will not occur. So in what way will these *F*-particulars resemble each other? In response, resemblance nominalists can say that *F*-particulars all resemble each other in that they will all act in such and such a way in worlds with laws of type 1, in such and such a way in worlds with laws of type 2, and so on. But what is it that binds these sets together now? How do these *F*-particulars resemble the *F*-particulars in our world?

Resemblance nominalists can fairly point out that they are taking resemblance to be a primitive. So it is not incumbent upon them to offer an explanation of what the resemblance between these actual *F*-particulars and these possible *F*-particulars amounts to. They just do resemble each other and that is all that can be said about the matter. But whilst I accept this point, I think that the query raised still undermines much of the intuitive force of resemblance nominalism. For resemblance nominalists, such as Rodriguez-Pereyra, claim that this view is preferable to set nominalism because there is something about the set which accounts for the fact that it is a property set, namely, the fact that all the particulars resemble each other. This idea seems strikingly intuitive, for we imagine a set of red particulars that all resemble each other and so which share a property. But once we are dealing with possible individuals in worlds with different laws, our homely grasp of what this notion of resemblance consists in (for instance, when and where the notion can be used) disintegrates. Why does this matter? Unless we can give some account of how these *F*-particulars across possible worlds resemble each other, the suspicion is that we are left with just another version of set nominalism. For we lack an understanding of what it is about these particulars that makes them members of the *F*-set, so their being *F* just seems to amount to their being members of the *F* set.

In contrast, causal nominalism offers a very clear idea of what it means to say that all the *F*-particulars resemble each other. Although causal nominalism still employs the notion of resemblance, since it appeals to the idea that particulars behave in similar ways in similar circumstances, we nevertheless have a firmer grasp of what resemblance between the *F*-particulars consists of. According to causal nominalists, all the *F*-particulars resemble each other in certain, functional respects. In other words, they all belong to the set of *F* particulars because they would do X in circumstances *C*₁, Y in circumstances *C*₂, and so on. This analysis coheres with our every day conception of

resemblance, and thus in this respect at least, the account has the edge over resemblance nominalism.

This feature of the analysis is also what makes causal nominalism a more intuitive form of nominalism than set nominalism. Set nominalists state that a is F iff a is a member of the set of F -particulars. So the property of being F is identified with the set of all and only F -particulars. But this seems to put the cart before the horse. For, as Armstrong comments, it seems intuitively clear that the relation between a and the set of F s ‘does not *constitute* a ’s being F but rather depends upon a ’s being F ’ (1978: 36). Set nominalism renders a ’s membership in the F -set a primitive and unanalysable fact – it is unaccounted for in terms of anything else. But this strikes many as an unsatisfactory stopping point – surely some explanation should be offered of why these particulars constitute the F -set?

This is what causal nominalism provides. a ’s belonging to a certain set is not taken to be a primitive fact on this view. It is accounted for in terms of what its members – the particulars – can do. a , b and c are all members of the F -set because they all satisfy a certain functional role. So causal nominalism gets the order of explanation the right way round. These particulars are not F because they are part of the F -set. Rather, they are members of the F -set because they stand in certain causal relations, and thus bear important functional similarities to each other.

Causal nominalism, therefore, warrants consideration, since it avoids some significant difficulties that other forms of nominalism are subject to. But why might causal theorists, with realist tendencies, be interested in it? The most obvious reason for preferring causal nominalism is that it promises to offer a sparser ontology. Moreover, the entities which it endorses are familiar. They are the concrete particulars which we are greeted with everyday: the dog, the TV, the tree etc. Even those of us who are not particularly concerned with inhabiting a barren landscape might still be disinclined towards the weird world of tropes or universals. Whilst Mackie’s ‘queer entities’ (1977: 38) consideration is not an argument against realism, it is a powerful motivating factor underlying philosophers’ choices. Recently, for instance, this motivation has been seen at work in discussions concerning the ‘intrinsic natures’ or ‘quiddities’ of properties.²¹ In addition to ontological qualms regarding these strange metaphysical posits, Langton (1998) and Lewis (manuscript) have argued that we can have no knowledge of these

²¹ See, for instance, Robinson (1993) and Black (2000).

intrinsic natures or quiddities. Elsewhere (forthcoming) I have argued that a realist form of the causal theory of properties eases these sceptical worries. But they are not eradicated completely, since concerns remain regarding our lack of knowledge of the intrinsic nature of the entity bestowing these causal powers – the quiddity of the universal or trope if you will. Causal nominalism neatly eradicates such misgivings by simply denying that there are *sui generis* universals or tropes that bestow these causal powers.

The real battle between realist and nominalist versions of the causal theory of properties, however, is to be found elsewhere – in the causality debate. Right at the start, I suggested that only nominalist causal theories of properties could avoid commitment to the irreducibility of causal powers.²² This commitment brings with it the irreducibility of causality more generally, for causal relations depend upon the powers of their relata.²³ Many think that theories which postulate irreducible facts of any kind should be employed only as a last resort. So causal nominalism is attractive in that it keeps these reductive hopes alive. Whether or not this will transpire into a substantial benefit, depends upon the success of these reductive accounts – an issue which I shall only begin to scratch in part two. But the carrot, for the causal theorist, is clear: we can have the transworld criterion of identity for properties, the metaphysical necessity of laws and all the advantages these commitments (arguably) bring, combined with a reductive analysis of causality. Now, however, it is time for the bad news.

3. Difficulties for Causal Nominalism?

Whilst escaping some of the objections that other forms of nominalism are subject to, causal nominalism does not dodge them all. Two objections, in particular, loom large. The first concerns the issue of naturalness. Causal nominalism does not result in such ‘gerrymandered’ and ‘undiscriminating’ properties as set nominalism,²⁴ for not just any old set is a property. A set of particulars only constitutes a property if (1) every particular in that set satisfies a particular functional role, and (2) all particulars that

²² For more on this, see Part 2: §1.

²³ A realist causal theorist could argue that our concept of causation is analysable in terms that do not make reference to causation. For instance, they may argue that *a* causes *b* just in case *a* raises the probability of *b*. However, given their view of properties, it is still the case that irreducible causal facts make it true that *a* raises the probability of *b*. So we can separate claims about conceptual and ontological reduction.

²⁴ Lewis 1983: 12-13.

satisfy that functional role are members of that set. But, still, it is extremely implausible to claim that this criterion fixes upon those natural properties which ‘comprise a minimal basis for characterising the world completely’.²⁵ Given this analysis, sets such as {pencil, table, flower, rainbow, axe, skirt...}, (if we keep extending it indefinitely) will constitute a property, since they have a shared functional role, namely that of all being visible to the naked eye. Similarly, predicates such as ‘being poisonous’ and ‘being fragile’ will designate properties, even though it seems unlikely that such properties ‘carve nature at its joints’.²⁶ So how do we distinguish between causal nominalism’s more abundant properties and those natural properties which, in Lewis’s words, ‘ground the objective resemblances and the causal powers of things’ (1983: 12)?

In the absence of an elite band of tropes or universals, causal nominalists are left with a familiar set of choices. If they appeal to the primitive relation of objective resemblance, and say that a set is natural if and only if all its members exactly resemble each other, causal nominalism collapses into resemblance nominalism. Alternatively, causal nominalists could make Quinton’s move (1957), and help themselves to a primitive distinction between those sets of particulars that are natural properties and those that are not. But this seems to get things backwards, for causal nominalists do not claim that particulars instantiate certain (special) properties because they are members of certain (privileged) sets. The reason that a particular instantiates a property is because it satisfies a particular functional role, so it is certain functional roles, not sets, that should be privileged.

How should this privileging be done? A natural way of dealing with this problem, especially given that this is a causal theory, is to privilege certain properties or functional roles via reference to scientific laws.²⁷ The rationale for this is aptly captured by Lewis:

Scientific theorizing and the discovery of fundamental properties have gone hand in hand. For instance, the discovery of the phenomena of electromagnetism and the laws governing them was inseparable from the discovery of previously unknown, and very likely fundamental properties of positive and negative charge. So if we had a true and complete ‘final theory’, it ought to deliver a

²⁵ Lewis 1983: 12.

²⁶ This famous saying is inspired by Plato, who in *Phaedrus* writes, ‘The second principle is that of division into species according to natural formation, where the joint is, not breaking any part as a bad carver might’ (1970: 265d-266a).

²⁷ Fodor (1974) and Mellor (1991) both adopt this strategy.

true and complete inventory of those fundamental properties that play an active role in the actual workings of nature (manuscript: 3).

So if, in Mellor's words 'we stated all the laws there are in a single Ramsey sentence Σ ' (i.e. all those laws which appear in the 'final theory') then 'the properties Σ would quantify over all the properties there are' (1991: 175). Or, alternatively, we can say that Σ would quantify over all the natural properties.

On this proposal, then, the natural properties are those whose predicates appear in the ideal 'final' theory. Particular a instantiates the natural property F if and only if it satisfies the functional role set out in that complete and final theory. This way of demarcating natural from non-natural properties is very much in keeping with causal theories of properties. Certain functional roles are privileged because they play an essential role in accounting for the behaviour of particulars in the complete description of the universe. Moreover, natural properties are rendered independent of our present theories and us, for this final theory is something that awaits our discovery and exists whether or not we are lucky enough to happen upon it.²⁸

The second of the problems that causal nominalism faces is, unfortunately, far more serious. The formulation of causal nominalism, like set and resemblance nominalism, appeals to sets. This makes the view vulnerable to the notorious co-extension problem. The problem is this: if a property is a set of particulars, then two properties that are co-extensional, i.e. instantiated by exactly the same particulars, are the same property. For instance, if the functional role of F is only satisfied by particulars a, b, c and d , and the functional role of G is only satisfied by particulars a, b, c and d , then the F -set = the G -set, because they have exactly the same members. Consequently, on the assumption that properties are to be identified with sets, property F = property G .

Following Lewis, the standard solution to this problem is to appeal to possible, as well as actual, particulars. Even if all actual creatures with hearts also have kidneys, the response goes, this does not matter because there are some possible creatures which

²⁸ There may be a problem on the horizon if an account of laws has to invoke natural properties, in the manner of Lewis (1983: 41-43). But it is far from clear that this need be the case and, even if it were, I suspect that this would not damage the causal nominalist's ontological aspirations, it would only dash reductive hopes for a conceptual analysis of laws and natural properties. This is not the place, however, for a discussion of the deep and far-ranging issues that a comprehensive analysis of natural properties raises.

have hearts but lack kidneys and vice versa. So the property of having a kidney is identified with the set of all actual and possible creatures with kidneys. But whilst this solves the problem of accidentally co-extensive properties for set nominalists like Lewis and resemblance nominalists like Rodriguez-Pereyra, causal nominalists cannot appeal to this standard response. The reason for this is simple. According to causal nominalists, the functional role of a property is essential to it. So if it is a law that all *F*s are *G*s and it is a law that all *G*s are *F*s, properties *F* and *G* will be necessarily co-extensive. For instance, given the Wiedemann-Franz Law, electrical and thermal conductivity are co-extensive in metals. So, if the laws are metaphysically necessary, the property of thermal conductivity-in-metals is necessarily co-extensive with the property of electrical conductivity-in-metals, and hence (ignoring non-metals or the purpose of illustration) they are one and the same property.

This makes the prospects of combining nominalism with a causal theory of properties look very bleak indeed. If we endorse a causal theory of properties, and so with it the metaphysical necessity of laws, we must reject the principle of recombination. This states that ‘anything can coexist with anything else, at least provided they occupy distinct spatiotemporal positions. Likewise, anything can fail to coexist with anything else’.²⁹ The result of denying this principle, for all causal theorists, is a proliferation of necessarily co-extensive properties. This poses no problem for those forms of the causal theory which distinguish the property from the set of particulars that instantiate it. But once we try to combine nominalism with a rejection of this recombination principle, we get stuck with a virulent strain of the co-extension problem.

Is there any way of defending causal nominalism which preserves its causal and nominalist credentials? One possibility would be to modify the position slightly. Rodriguez-Pereyra, in his defence of resemblance nominalism, suggests that there is no need for resemblance nominalists to identify properties with sets of resembling particulars.³⁰ Unlike set nominalism, *a*’s membership of the *F*-set is no part of the truthmaker for ‘*a* is *F*’, as *a* is *F* just in case *a* resembles all the other *F* particulars. Consequently, granted ‘property’ is used in a way that does not commit one to anything over and above the particulars that have them, resemblance nominalists do not require

²⁹ Lewis 1986: 88.

³⁰ Rodriguez-Pereyra 2002: §4.2.

an ontology of sets. Causal nominalists seem to be in a similar position. According to them, an object is *F* in virtue of a particular functional role being true of it. In the formulation of causal nominalism offered earlier, property *F* was then identified with the set of particulars which satisfy this functional role. But, as with resemblance nominalism, this looks like an optional extra. For causal nominalists do not make *a*'s membership of the *F*-set part of the truthmaker for '*a* is *F*'. Its truthmaker is just the fact that *a* satisfies a certain functional formula. So perhaps causal nominalists can avoid the co-extension problem by dispensing with this optional, very troublesome, extra?

This seems a promising line of response. However, Rodriguez-Pereyra argues that resemblance nominalists cannot solve the co-extension problem in this way. He writes,

the co-extension difficulty goes deeper, since it does not depend on identifying properties with classes. The root of the problem is this: Resemblance Nominalism says that a particular that is *F* and *G*, is *F* in virtue of its resembling all the *F*-particulars and *G* in virtue of resembling all the *G*-particulars. But if all *F*-particulars are *G* and all *G*-particulars are *F*, then how can a particular have two different properties in virtue of resembling the very same particulars? (2002: 96).

Do similar considerations preclude causal nominalists making headway on the co-extension problem by identifying properties with sets? I doubt it, because causal and resemblance nominalists appeal to different truthmakers. Resemblance nominalism runs into problems because '*a* is *F*' must have a different truthmaker from '*a* is *G*' – a desideratum which is not met if *a* qua *F* resembles exactly the same particulars as *a* qua *G*. But on the causal nominalist's analysis, '*a* is *F*' and '*a* is *G*' do have different truthmakers, even if *F*-ness and *G*-ness are co-extensional. For *a* is *F* if and only if it satisfies such and such a functional role, whilst *a* is *G* if and only if it satisfies a different functional role.

But, it may be objected, if all the particulars that satisfy the functional role of *F* also satisfy the functional role of *G*, surely there is no telling these properties apart, since the functional roles of *F* and *G* can simply be combined? In other words, in the case of co-extensional properties, why suppose that there are two distinctive functional roles, *F* and *G*, which characterise two different properties, rather than just one functional role and property (*F*&*G*)? In response, causal nominalists can say that if we are talking about non-natural properties, then it is permissible to say that there is a conjunctive property of (*F*&*G*). But if we are dealing with natural properties the matter

is different. Given that their characterisations are drawn from the ideal scientific theory, it may be the case that the function that predicate F plays in the theory differs significantly from the function that predicate G performs. So it would be a mistake to simply combine the functional roles of F and G , even if the very same particulars do instantiate them.

Another difficulty for this modified causal nominalism is this: if we refuse to identify properties with sets of particulars, what are our Ramsey sentences, which characterise the functional roles of properties, quantifying over? Ramsey sentences state that there is a property F such that any object which is F stands in such and such causal relations. But if properties are not sets of particulars, sets of tropes or universals, then there is nothing that these sentences can quantify over. One possible response to this problem is simply to reinterpret the Ramsey-Lewis sentences. Instead of adopting the standard objectual reading of the quantifier, causal nominalists could opt for a substitutional reading.³¹ In other words, rather than saying that there is some entity F such that anything which is F will..., we say that at least one substitution instance of ' F ' is true.³² So a makes it true that ' $\exists F(Fx)$ ' iff a satisfies such and such a functional role. Here, granted the substitutional reading, the second-order quantification over F does not commit us to the existence of F -ness. So as long as causal nominalists are prepared to adopt these substitutional quantifiers, they can still employ Ramsey sentences in the formulation of their theory.³³

The final difficulty is one that infects all causal theories of properties. The scope of causal theories of properties is usually taken to be very broad. Shoemaker, for instance, claims that his theory holds of all 'genuine properties' (1980: 297). But most causal theorists have recognised the need to place some restrictions on the properties within its domain. Proponents, for instance, do not want to say that properties of

³¹ Or, alternatively, see Prior's non-nominal quantifiers (1971: chapter 3).

³² For more on these substitutional quantifiers, see Haack 1978: chapter 4.

³³ Another possibility is to identify properties, not with sets, but with groups or collections of individuals whose identity conditions goes with the conditions of entry. These, of course, would not be extensional entities, but we have an intuitive grasp on them nevertheless. McTaggart, for instance, argues that the intuitive notion of a class is 'determined by a class-concept'. He writes, 'the content of two different classes may be co-extensive. Cambridge colleges in which, in the year 1919, the Headship is not in the gift of the fellows are a class. Cambridge colleges founded between the years 1515 and 1550 are another class. Each class contains only the same two members – Magdalene College and Trinity College. But the classes are different' (1921: 131-32). Whilst McTaggart's talk of class is now misleading, Simons makes a similar claim for groups (see 1987: 146 & 168). Perhaps, then, causal nominalists could explore the idea of identifying properties with something like McTaggart's classes or Simons' groups.

mathematical entities, such as *being even* or *being prime*, are subject to their analysis, as these properties receive their characterisations from mathematical theories. Similarly, it is unwise to include properties and relations which characterise ‘the form of the world’,³⁴ such as identity and causation, into the domain of the causal theory. For the prospect of defining these relations in terms of their causal features seems, at best, unpromising. The difficulty, then, is this: if causal nominalism does not offer a theory of all properties, then we have to endorse another kind of theory, such as realism or set nominalism, for these properties. But if we employ one of these analyses to deal with properties outside the scope of causal nominalism, we are stuck with all of its problems and so we might as well embrace one of these analyses for all properties.

Causal nominalists can respond by arguing that this difficulty is not unique to them. It seems unlikely, as Lewis (1993) and Oliver (1996) have argued, that any one analysis can satisfy the different roles assigned to properties. Lewis, for instance, points out that unadorned set nominalism cannot deal with natural properties, whilst Armstrong and Rodriguez-Pereyra state that their realist and nominalist theories respectively are not concerned with abundant properties. Similarly, both set and resemblance nominalism leave untreated necessary co-extensive properties.

Causal nominalists can push their defence further by arguing that it is plausible to treat mathematical properties (and other structural properties, such as identity and mereological properties) differently. Although the property of being even and having charge, for instance, are grouped together under the heading ‘property’, it is far from clear that they bear anything more than a superficial resemblance to each other. In any case, since the properties of the former category, unlike the latter, do not make a causal contribution to the world, it would be pointless to attempt to utilise the causal theory for these sorts of properties. The properties of space-time pose a more serious challenge to all causal theorists. It may be that these relations can be brought under the causal nominalist’s umbrella. Bird, for instance, writes,

The lesson of general relativity is just that we may see the components of this set-up as dispositional. Each space-time point is characterised by its dynamic properties, i.e. its disposition to affect the kinetic properties of an object of that point, captured in the gravitational field tensor at that point (2003: 165).

³⁴

Hawthorne 2001: 373.

Forthcoming in Toby Handfield (ed.), *Dispositions and Causes* (OUP)

But, of course, the jury is still out on this. Even if they cannot be dealt with in this way, however, there are still grounds for claiming that it is not arbitrary or ad hoc to say that these relations are part of the ‘structure’ or ‘form’ of the world, and thus warrant separate treatment from, what Hawthorne calls ‘the nodes in the structure (the ‘matter’ of the world)’ (2001: 373).

Unfortunately, this fails to adequately dispense with the objection, for while we might be justified in dealing with these properties differently, we still need some account of how they should be treated and why that analysis would not serve equally well for all properties. But there is increasing recognition that, due to the different roles theories of properties play, this will be a challenge that most, if not all, analyses of properties will have to meet. So this objection certainly is not decisive against causal nominalism. In light of the discussion here, then, I think that it is worth pursuing this position further, by considering causal nominalism’s ramifications for an analysis of causal powers.

Part Two: Ryling away Causal Powers

1. Reduction, Ryle and Causal Nominalism

Shoemaker’s claim that ‘properties are causal powers,’ I argued earlier, cannot be understood reductively if a realist causal theory of properties is embraced. Properties cannot be reduced to causal powers, for if we are realists about properties (or their instances), then these are *sui generis* entities in their own right. Similarly, causal powers cannot be reduced to non-powerful properties for the simple reason that properties are conceived of as powerful entities. According to causal theorists, properties are the entities which bestow power onto the world. They do not do this when amalgamated with laws (be those Humean or non-Humean), they are themselves dynamic. So causal powers are not reduced to a different kind of entity – there is no getting rid of them for something else.

This account of properties and causal powers has important consequences for causality. Whilst it does not bear on the issue of whether we can offer a reductive analysis of our *concept* of cause, what is excluded is reductionism about causation: the

view that causal facts can be reduced to non-causal facts about the world.³⁵ Any suggested reductive base for the causal facts will have to include facts about properties. According to causal theorists, these properties are fundamentally powerful entities, and so facts about them count as causal facts. Consequently, if we turn to Tooley's definition of causal reductionism, which states that 'any two worlds that agree with respect to all of the non-causal properties of, and relations between, particulars events or states of affairs, must also agree with respect to all of the causal relations between states of affairs' (1990: 173), we find that realist causal theories fall on the other side. For if properties are themselves powerful entities, holding fixed all the 'non-causal properties' (which for causal theorists will only include a very small number, perhaps only the mathematical and structural properties mentioned earlier) will certainly not fix the causal relations across possible worlds.

Causal nominalism looks in a similar position. On this view, *a*'s being *F* has certain causal implications – *a* is only *F* if it does *X* in circumstances *C*₁, *Y* in circumstances *C*₂, etc. Once again, then, it looks like holding fixed all the non-causal facts will not fix all the causal facts, since the non-causal properties are very few in number. There is, however, a substantial difference between the two positions here. Those who embrace a realist causal theory of properties claim that there are *sui generis* powerful properties that are absolutely fundamental – they cannot be accounted for in terms of anything else. Causal nominalists, in contrast, do not assert this. Whilst *a*'s being *F* entails certain causal counterfactuals, the question of whether these causal counterfactuals are irreducible or not is left open. Perhaps facts about what *a* can and does cause can be reduced to non-causal facts about the world, such as patterns of regularity in this world, our best scientific theories, psychological facts, etc. If this is the case, then whilst the reductive base for causal facts will, of course, appeal to the properties of objects, the causal counterfactuals that these entail may then themselves be reducible to further non-causal facts.³⁶ So although causal nominalists are committed to rejecting Humean supervenience, the denial of causal reductionism does not automatically follow.

In addition to this, causal nominalism reverses the ontological priority found in realist accounts. A realist causal theory of properties gives ontological priority to the

³⁵ By 'causal fact' here, I mean a true proposition about what causes what, or what could cause what – what causal powers a thing has.

³⁶ I shall say a little more about this in §3, part 2.

persisting powers of objects over the causal relations that happen. On this view, whilst it might be correct to analyse our concept of poison in terms of what would happen, that this causal relation occurs depends upon the persisting, powerful properties of the particulars involved. If sugar did not have certain properties which were the source of its solubility, if, for instance, it did not have the ability to form hydrogen bonds, then this lump of sugar would not have dissolved in water. In contrast, causal nominalism makes facts about the causal powers of objects dependent upon facts about what causal relations objects would enter into. There are no *sui generis* properties of the objects bestowing irreducible powers. Rather what we have are particulars and facts about what they would do. So every causal power, on this view, is identical to some complex of would-be causal relations. In other words, causal powers are reducible to facts about what an object would do.

It is because of this, that causal nominalism can offer a reductive rendering of Shoemaker's claim that 'properties are causal powers'. In broad outline, the story goes as follows: first, following Shoemaker, we should distinguish between macro-powers of particulars and the property (or complex of properties) that supports that power.³⁷ For instance, two substances may both display the macro power of being poisonous, but the substances are different, so their diverse properties are responsible for their damaging effects. While the properties of methyl mercury achieve their deadly effect by killing neurons in the nervous system, for example, hydrogen cyanide works by inhibiting our metal-containing enzymes. These properties of the substances should not just be identified with the causal powers of particulars, since they have different identity conditions. If, for instance, properties F_1 , F_2 and F_3 , which are responsible for the object's property or power of being poisonous, change, then these properties will form a different set of properties or, what I will call, "a property complex". However, whilst the property complex may change, if the complex functional role that is definitive of the property of being poisonous remains true of the object, the object's property or power of being poisonous will nevertheless persist.

This distinction between macro causal powers and property complexes of objects can and should be maintained by causal nominalists, because we want to allow that there are interesting things to be said about the differing powers of particulars. The properties that are responsible for mercury's being poisonous no doubt differ from those

³⁷ See Shoemaker 1980: 212.

that make cyanide poisonous, but they both satisfy the functional role definitive of being poisonous – a functional role which will differ from the functional roles of its property complexes that make it the case that this substance is poisonous. So causal theorists, be they nominalists or realists, can say something more about the power/property, even though the identity conditions for that property are given by facts about what that object would do.

But whilst macro-powers of objects can be thought of as being made true by property complexes of objects (or their parts), this does not exclude the possibility of a reduction of properties to causal powers. In the second stage of the analysis comes the main claim, namely that for some properties, the natural properties which ‘ground...the causal powers of things,’³⁸ all it is for the object to instantiate that property is for a certain functional formula to be true of it. There is nothing else about the particular, no sui generis tropes or universals, which make this functional formula true of the object. So macro-powers or properties are constituted by (though not identical to) property complexes of objects, each of which might in turn be constituted by (though again not identical to) further property complexes. But as the natural properties, which are not constituted by any other properties, are themselves just complexes of facts about how the particular would behave, all the properties ultimately get reduced to Rylean causal powers. They are, in Armstrong’s colourful language, just ‘congealed hypothetical facts or states of affairs’ (1997: 79).

Causal nominalism, then, in Chakravartty’s words, can be thought of as ‘a Rylean inference-ticket-type view’, since it offers us a ‘deflationary account’ of powers (2003: 394). It is similar, at least in spirit, to Ryle’s account of dispositions, because the powers of objects ultimately get reduced to facts about what would and could happen to objects.³⁹ To instantiate a property – which macro-powers are complexes of – is not for the object to instantiate a universal or trope, rather it is for that object, in Ryle’s words, ‘to be bound or liable to be in a particular state, or to undergo a particular change, when a particular condition is realised’ (1949: 117). So although we can talk about property complexes of objects making different macro-powers or dispositional properties true of

³⁸ Lewis 1983: 12.

³⁹ Although Ryle tends to talk of dispositions rather than powers, I shall continue talking of powers because, following Shoemaker (1980) and Mellor (2000), I think that the distinction between the dispositional and the categorical is best understood as a distinction between predicates rather than properties.

them, because what it is to have a property is just for the object to behave in certain ways, macro-powers and properties are reduced to facts about the causal relations objects do and can stand in.

Despite preserving the spirit of a Rylean view, however, the differences allow causal nominalists to escape some of the criticisms this position has given rise to. For instance, one frequently cited objection is this: if we allow for the possibility, as Ryle's account does, that one object can have a power to X, while its duplicate has a power to not-X, then it looks as if dispositions are randomly imposed upon the object, as they have no grounding in the object's nature. But this, as Geach remarks, seems to go against both 'scientific investigation' and 'a very deep rooted way of thinking' (1957: 5). He writes,

A physicist would be merely impatient if somebody said to him: 'Why look for, or postulate, any actual difference between a magnetized and an unmagnetized bit of iron? Why not just say that if certain things are done to a bit of iron certain hypotheticals become true of it?' (1957: 6).

These worries, I think, are dodged by causal nominalism. It rejects the claim that 'two items could be alike in all their causally relevant properties and one item possess a particular disposition – D – but the other item not possess that disposition'.⁴⁰ Causal nominalism, just like other forms of the causal theory, claims that the identity conditions of properties are determined by what objects can do. If two particulars act in just the same ways, they have all the same properties. So this view does not hinder the search for more advanced explanations. We can appeal to the properties of objects to explain the differences between magnetized and unmagnetized objects, and we can say more about the properties of objects by investigating their basis in the object (and its surroundings). Consequently, causal nominalism is not vulnerable to Geach's worries.

But whilst causal nominalists can happily talk with the realists, and claim that there are persisting properties of objects which make these causal conditionals true, in essence they side with Ryle. For all it is for the (natural) properties to be had by particulars is for certain functional roles to be satisfied by them. So philosophers who discuss analyses of dispositions or powers often present us with a false dichotomy. Mumford, for instance, writes,

⁴⁰ Prior (1985: 31) thinks that this is one of the essential theses of Ryle's phenomenalism. If this is correct, then causal nominalism certainly should not be regarded as a form of phenomenalism. Nevertheless, the parallels between the two positions are clear.

Are we intending to ascribe properties, as the realist claims, or are we saying that some events are possible, as Ryle and Dummett would have it? (1998: 63)

Causal nominalism illustrates that we need not make this choice: we could be both ascribing properties to an object and just saying something about what that object can do, since properties can be reduced to facts about the actual and possible behaviour of objects. This middle way between Ryle's phenomenalism and the realism of Armstrong and others deserves consideration, for as we have just seen, the extent to which it is vulnerable to the objections targeted at Ryle's position is unclear. In the next two sections, I shall begin this task. In order to make it manageable, I shall focus on two objections that are commonly regarded as the most serious. Indeed, I think it is fair to say that they account (rightly or not) for the demise of Ryle's position from the philosophical scene. The aim of this discussion will be to see whether well-known difficulties raised against Ryle's account, render a nominalist form of the causal theory of properties untenable.

2. Finks and Antidotes

The so-called simple conditional analysis, which is standardly attributed to Ryle, has come in for some tough criticism. The analysis states that dispositional predicates or concepts can be reductively analysed in terms of conditional statements. So, roughly speaking, statements concerning dispositional expressions can be translated into statements lacking them by employing the following formula:

Something x is disposed at time t to give response r to stimulus s iff, if x were to undergo stimulus s at time t, x would give response r.

But now take this analysis of the dispositional predicate 'is fragile': x is fragile iff if x is dropped or struck, x breaks. This glass could be fragile, but nevertheless fail to break when dropped, because a sorcerer protects it. This protection might come in one of two forms: first, at the time the glass is dropped, the sorcerer may cast a spell so that the glass ceases to be fragile (a finkish disposition).⁴¹ Alternatively, as the glass is dropped, the sorcerer may find some way of protecting the glass – an antidote to its breaking.⁴²

⁴¹ See Martin 1994 and Lewis 1997.

⁴² See Bird 1998.

Perhaps, for instance, she magically makes it the case that a soft duvet always appears for it to land upon. Consequently, the objection goes, dispositional predicates cannot be eliminated in favour of conditional statements.

We should, I think, be careful about attributing this simple conditional analysis to Ryle, since he writes,

There are many dispositions the actualisations of which can take a wide and perhaps unlimited variety of shapes...If we wish to unpack all that is conveyed in describing an animal as gregarious, we should similarly have to produce an infinite series of different hypothetical propositions (1949: 43-4).

This suggests that Ryle is not offering a conceptual analysis of what dispositional terms mean. For it is unclear in what sense an infinite series of different hypothetical propositions could provide a conceptual analysis of ‘gregarious,’ as such an analysis would be far too unwieldy for us to employ. Given the stated aims of causal nominalism, however, it is doubtful whether this, or the failure of the simple conditional analysis, should concern its proponents. For causal nominalists are not purporting to offer a conceptual analysis of dispositional (or any other) predicates – they are not in that business. It might well be the case that the meaning of fragility cannot be given a non-circular analysis in terms of conditionals. Perhaps the best we can do is something like ‘if x were stressed without ceasing to be fragile, it would break’.⁴³ But, as Molnar points out, a conceptual reduction is not necessary or sufficient for an ontological reduction.⁴⁴ So whilst the functional formula an object must satisfy in order to be fragile may be far too complex to be graspable by us, and so not give the meaning of the concept of fragility, it might still be the case that ‘what in reality’ fragility is,⁴⁵ can be reduced to facts about what objects would and could cause.

We may object, however, that this fails to get to the heart of the matter. If Ryle is right and there are cases (or, worse, all cases) that require an infinite series of hypothetical propositions, then the functional role of the property would not be specifiable even in principle. This is certainly the view of some, Mumford, for instance, writes,

⁴³ Mellor 2000: 763.

⁴⁴ See Molnar 1999: 8.

⁴⁵ Mellor 2000: 758.

Forthcoming in Toby Handfield (ed.), *Dispositions and Causes* (OUP)

The possible interfering background conditions cannot be excluded in a finite list that is appended to the conditional. This is because there is no finite list that could name all such possible conditions in which the manifestation is prevented (1998: 88).

If this were the case, then the functional roles, central to the ontological reductions, would be open-ended. It would be impossible to specify the entire of the functional role definitive of some, if not all, properties. But surely this is unacceptable? Just as we should not identify a mental property with an infinite disjunction of physical properties, because the latter is shapeless with respect to the former and thus cannot offer any explanation of the pattern of dependences found at the mental level, similarly, an infinitely complex functional role excludes any reduction of properties to facts about the causal behaviour of objects. So we need to postulate some property, a *sui generis* universal or trope, which is the source of this open-ended behaviour.

In response to this, two lines of defence are open to the causal nominalist. One possibility would be to challenge the claim that infinitely complex functional roles are required. I think that the best way of pursuing this line is by utilising the distinction between the functional roles of natural and less than perfectly natural properties. Although non-natural properties or powers, such as fragility, are given by a particular functional role, they are nevertheless made true by further properties of the objects. This licenses the use of *ceteris paribus* clauses because, at this level, causal nominalists do not require an ontological reduction of fragility to a precise set of facts about how fragile objects do and could behave. So we can avoid infinitely complex functional roles by saying something like this:

Other things being equal (there are, for instance, no fragility antidotes, finks etc.) this glass is fragile iff it breaks when dropped or knocked.

Causal nominalists can make sense of this because they can talk like a realist and appeal to the underlying property complexes which support the power. For example, they can say that, in this instance, the fragility of the glass can be identified with such and such a property complex (although not generally because they have different extensions). So we can understand the *ceteris paribus* clause in terms of whether there is a suitable

property base that continues to support the attribution of the property in tricky finkish or antidote cases.⁴⁶

But this tactic, of course, cannot be employed when dealing with the natural properties, for ex hypothesi there are no property bases making them true of objects. So surely we have only delayed, not solved, the problem, because infinitely complex functional roles will reappear at the level of natural properties? No argument, however, has been offered which shows that complex functional roles are required at this level. Not surprisingly, then, philosophers have been far less confident of this claim. Mumford, for instance, writes,

Is there some condition...available to defeat every disposition manifestation? Possibly not. Some dispositions of basic particles may manifest indefeasibly whenever their stimulus conditions are realised (2001: 376).

Bird strengthens the causal nominalist's hand here by arguing that the existence of 'fundamentally finkish dispositions can be excluded fairly straightforwardly' and 'fundamental antidotes may be eliminable'.⁴⁷ The argument for the latter claim draws upon the difference between natural and non-natural properties. Non-natural properties, such as being poisonous, are multiply-realizable, so a number of different property complexes can make its functional role true of the object. This makes it difficult to envisage how we could rid ourselves of antidotes, since we have to list all the antidotes to every different property base. Even if this is possible in principle, Bird argues, the resulting property will lack the explanatory power of the original, so the 'antidote-free' dispositions should not be replaced with 'antidote-sensitive' ones (2004: 7). In the case of natural properties, however, there are no property complexes making the functional role true of the object. So whilst there may well be some antidotes that stop the natural properties manifesting their powers, there is no reason to think that these would be, in principle, unspecifiable. We could thus replace the antidote-free functional roles with antidote-sensitive ones. Given the aims of causal nominalists, this would suffice to

⁴⁶ But if, for instance, the sorcerer always changed the properties of the glass when dropped, so that it broke due to another complex of properties, we would still want to say that the glass was fragile. This again supports the claim that the individuation of the property of fragility goes with what the object does, not directly with the property complexes that support it.

⁴⁷ Bird 2004: 1. Although I refer the reader to the details of Bird's argument, in the case of finkish dispositions, the basic idea is that we need some time delay between the stimulus that the object with disposition D receives and the manifestation of D. But in the case of fundamental properties, i.e. ones with no supporting property complexes or causal bases, that there should be any such time gap is mysterious.

solve the current problem, since it does not matter if the antidotes are many in number, so long as they are not infinite in number.

This defence, however, makes the success of the reduction depend upon an empirical matter – if it turns out that there are an infinite number of antidotes at the fundamental level, then no reduction is possible. The next response does not require such a commitment, since it simply denies that infinitely complex functional roles would preclude a reduction of properties to facts about what objects can do. Causal nominalists can argue that the analogy with the philosophy of mind which motivates this objection is not a good one. Whilst it seems extremely plausible to say that a mental property is not identical to an infinite disjunction of physical properties, for such a disjunction lacks theoretical unity, and so does not appear to form a natural kind, such considerations do not apply here. For the functional formula in question, even if it were infinitely long, may not be shapeless or lack theoretical unity. There may be a good scientific rationale behind the various kinds of causal interactions *F*-particulars can stand in, even if they cannot in principle be specified. The model we should be thinking of here is not Nagel's, or the functionalist's, model of reduction,⁴⁸ but rather ontological reductions of metaphysical categories, such as that offered by set or resemblance nominalists.

What, then, is required for a reduction of these metaphysical categories? This is admittedly a difficult (and under-discussed) issue. But since opponents claim that an infinite number of facts about the possible behaviour of objects would preclude a reduction, the onus is on them to provide desiderata for such reductions that warrant this conclusion. This, I suspect, will prove difficult. The success of a metaphysical reduction depends largely upon whether the explanatory work done by the metaphysical category targeted for reduction can be executed as well by the category doing the reducing. So, in this context, the key question is: can the explanatory role performed by *sui generis* universals or tropes (for instance, the part they play in an analysis of resemblance, of laws, causation, etc.) be carried out by facts about objects and how they behave? If it turns out that causal nominalism can only perform this explanatory role if its functional definitions are, in principle, specifiable, then these open-ended definitions will pose a

⁴⁸ Nagel's (1974) model of reduction requires a derivation of the laws of the reduced theory from those of the reducing theory, when this is taken in conjunction with bridge laws that connect the predicates of the two theories. The functionalist model, in contrast, depends upon the functionalizability of the target property to be reduced (see Kim 1998).

problem for the proposed metaphysical reduction. But I see no reason why this must be the case. So, in the absence of further argument, it is open to causal nominalists to deny that specifiability in principle is a necessary requirement for reduction.

But, it may be objected, surely there is such an argument in the offing here, namely the one gestured at earlier? If the functional definition of *F*-objects is open-ended, so it cannot be encapsulated by a finite number of causal facts, there must be some entity, a sui generis universal or trope, which is the ‘source’ of this behaviour. For this entity is what explains or accounts for the fact that these particular truths form a cohesive, although open-ended, cluster of causal facts. So, by postulating this sui generis entity, we provide an explanation of this open-ended, causal behaviour – an explanation which is fatally lacking from the causal nominalist’s account.

This line of reasoning, however, whilst admittedly seductive, is resistible. Talk of ‘*F*-ness’ leads us to think that there is some thing or entity in the object which is making all these causal counterfactuals true. But whilst we can posit these sui generis entities as truthmakers, it is not clear that the explanatory advantage claimed by the realist over the causal nominalist at this juncture is significant.⁴⁹ Causal nominalists can respond by saying that the causal counterfactuals are unified into cohesive clusters by scientific laws. It is these laws, possibly in combination with other scientific facts, that explain why, when an object is *F*, it can engage in such and such (perhaps open-ended) behaviour. Realists, one suspects, will also appeal to the laws and detailed scientific explanations to explain why such and such behaviour is definitive of the universal of *F*-ness rather than the universal of *G*-ness, for instance. So one might question whether postulating a sui generis universal or trope, which is the ‘source’ of this open-ended behaviour, really does amount to an explanatory advance. Does their metaphysical explanation add anything to our understanding of *F*-ness or the causal facts in question? Or, is it just an unnecessary metaphysical postulation, which brings with it added ontological costs and epistemological worries?⁵⁰

The fink-antidote objection, therefore, does not render causal nominalism defunct. This position does not claim to offer a conceptual analysis of our predicates, so there is no requirement that our concept of fragility be substitutable for some simple, conditional formula. Moreover, even if the functional roles definitive of natural

⁴⁹ I shall say more about this, and the issues raised in this paragraph, in the next section.
⁵⁰ See earlier, p.??.

properties were infinitely complex, an eventuality which seems unlikely, it remains to be seen whether this would damage the kind of reduction on offer here. Ramsey sentences could still be employed – ‘if the postulate of T was an infinite set, we must introduce devices for infinite conjunction – to do so would be bothersome, but not problematic’.⁵¹ And causal nominalism would still be presenting a clear conception of which of the metaphysical categories are basic. If causal nominalists are right, macro causal powers can be reduced to complexes of properties which themselves can be reduced to (a finite or infinite number of) facts about what objects can do. Of course, all this is still very problematic, but infinitely complex functional roles do not obviously undermine this account of which ontological items are *sui generis*.

3. Truthmakers

The most influential of the objections to Ryle’s analysis, however, has been saved until last. Armstrong (1968), Lewis (1992), Mumford (1998) and Heil (2003), amongst many others, have all argued that Ryle’s view is unacceptable because it violates the demand for truthmakers. Heil, for instance, writes,

Nowadays, few philosophers would be willing to endorse Ryle’s conception of dispositionalism. A large measure of the resistance issues from an implicit commitment to a truthmaker principle: if a statement concerning the world is true, there must be something about the world in virtue of which it is true (2003: 62).

Ryle’s account is accused of failing to meet this demand because, again in Heil’s words,

certain descriptions could hold true of objects without there being anything about those objects in virtue of which the descriptions held...Such statements do not answer to features of the world, but instead function as ‘inference tickets’ to license inferences (2003: 61).

The question I shall address here is whether, given that causal nominalism is similar in spirit to Ryle’s view, is it subject to the same complaint?

It is not clear that it is, although the issue is complicated by the fact that there are numerous formulations of the truthmaker principle. If we look at Heil’s statement of the objection, however, it is doubtful whether it has any weight against causal nominalism. For, according to this, the powers of objects do ‘answer to features of the world’. The fact that *a* is fragile is made true by property complexes or further features

⁵¹ Lewis 1970: 80. For more details, see Berent 1973 and Hendry 1975.

of the object. So there is something that makes the counterfactual ‘if this glass were dropped, then it would break’ true. Even when we get to the natural properties, a causal nominalist can still claim that this object would do *X* in circumstances *Y* because *a* is *F*, since that is part of what it is for *a* to be *F*. So causal nominalism does not seem to fall foul of this formulation of the truthmaker objection.

Even if we beef up the truthmaker principle and say, with Parsons, that,

To say that a certain class of sentences (in our case, sentences asserting dispositions) are made true is to say that those sentences supervene for their truth on the qualitative properties of something in the world. ‘Qualitative’ is here used to contrast with ‘dispositional’, but it is equally intended to cover something of what is meant by ‘intrinsic’ (1999: 2).

There is still an issue about whether causal nominalism would fail this test. For, first, causal nominalists can claim that natural properties are not dispositional, since they are not referred to by dispositional predicates whose meanings are given by something like the simple conditional analysis. Second, they can claim that their properties are intrinsic, because they pass the duplication test. If *a* would *X* in circumstances *C* since *a* is *F*, then all duplicates of *a* (i.e. those which have exactly the same perfectly natural properties), will also be *F* and so do *X* in circumstances *C*. Of course, there are other usages of the word ‘dispositional’ and ‘intrinsic’ according to which the properties of causal nominalism would not count as dispositional or intrinsic,⁵² but the case is certainly not cut and dry.

A feeling, however, will no doubt persist that causal nominalism does somehow fall foul of the truthmaker principle. We can home in on this worry by turning our attention to the unmanifested powers of particulars. According to causal nominalists, *a* could be *F* even if *a* never manifested any part of the functional role which made it the case that *a* is *F*, since the circumstances never arise which render *a*’s *F*-ness apparent. But even if some of *F*’s functional role is made manifest, in most instances, *a* will only exemplify a small fraction of the functional role definitive of *F*-ness. Given this, although causal nominalists can say that *a* is *F* iff *a* satisfies the functional role definitive of *F* and, conversely, that *a* does *Y* in circumstances *C* etc. because it is *F*,

⁵² For such usages of the word ‘dispositional’ see, for instance, Armstrong 1997: 69 and Ellis 2001: 119. On such usages of the word ‘intrinsic’ see, for instance, Dunn 1990: 178 and Humberstone 1996: 242. Kim’s (1982) well-known (though flawed) definition of intrinsic could be incompatible with some of the properties postulated by causal nominalism – those properties’ whose functional role demands the existence of something independent of the property, *whatever the circumstances* – but this kind of case will not be standard.

they cannot say that how the object *actually* behaves is what makes *a* *F*. So what, then, are the truthmakers of the sentence, '*a* satisfies the functional role of *F*'? What is it about the universe in virtue of which this sentence is true?

According to causal nominalists, the truth of '*a* is *F*,' as well as requiring the existence of *a*, also requires certain facts concerning what *a* would do in this and nearby possible worlds. For what makes it true that *a* satisfies the functional formula of *F* is that *a* would X in circumstances *C*₁, Y in circumstances *C*₂, etc. So even if those circumstances are never actualised in this world, there are still counterfactual truths concerning what would happen to that object in such and such circumstances. But this is just to restate the problem, since we do not know what it is about the world that makes it the case that these counterfactuals are true of the object. Why is it that if this object had been in circumstances *C*₁ it would have X-ed?

When talking about the macro causal powers of an object, such as its fragility or solubility, causal nominalists can respond by saying that the counterfactuals definitive of such powers are made true by property complexes of the object. Even when we get to the level of natural properties, causal nominalists can still talk with the realist and say that this particular would have done such and such because it is *F*. But this will not satisfy the realist's intuitions for, at this level, all there is to *a*'s being *F* is that a particular cluster of causal conditionals holds true of the object. The claim that '*a* is *F*' functions as an 'inference ticket'; it allows us to infer that if *a* were in such and such circumstances then it would X etc. But there are no non-spatiotemporal parts or constituents of the objects – its universals or tropes – which make this counterfactual true of *a*. Consequently, realists might argue, the demand for truthmakers is violated.

But just because causal nominalists refuse to postulate *sui generis* entities, such as universals or tropes, which are responsible for such and such a functional role being true of an object, does not automatically mean that the view violates a (sensible) demand for truthmakers. It is open to the causal nominalists to say more here about why it is that *a* satisfies the functional formula of *F*-ness, and hence why the counterfactual 'if *a* is in circumstances *C*₁ then *a* Xs' is true. Broadly speaking, at least three kinds of analyses are open to causal nominalists. First, causal nominalists could argue that *a* satisfies the functional role of *F* because of *a*'s possible, as well as actual, behaviour. Even if *a* is never in the right circumstances and so never Xs, still, *a* satisfies the functional role of *F* because a counterpart of *a*, in nearby possible worlds, is in those

circumstances and *Xs*. On this view, then, it is not just actual world entities that makes it case that *a* is *F* and thus satisfies such and such a functional role. The truth of this statement also supervenes upon events across possible worlds.

In light of the co-extension problem, many nominalists have embraced modal realism.⁵³ Causal nominalism, as stated in part one, avoided commitment to such a view, but now qualms about truthmaking once again push us in that direction. This is unfortunate, since modal realism is a hard view to believe. Its heavy ontological cost makes an ontology of universals or tropes look far less extravagant. Moreover, resorting to other possible worlds rides rough-shod over intrinsicality intuitions. For what *a*'s counterpart does in some other possible world seems to have very little to do with *a*'s causal powers in this world. However, it is doubtful whether this sort of consideration should sway nominalists, since they have to violate at least some of our intrinsicality intuitions anyway. If, for instance, properties are construed as sets of particulars, or resembling particulars, properties cannot be thought of as 'in' or 'interior to' the spatiotemporal boundaries of their object.⁵⁴ Similarly with causal nominalism, whether or not a particular has a certain property depends upon that object's relations with other things, so intrinsicality intuitions have already been largely contravened.

A second kind of response attempts to eschew talk of real possible worlds in favour of quasi ones. Granted that causal nominalists are trying to propose a reductive analysis of what it is to say that *a* could cause it to be the case that *X*, this makes their job a lot harder. For if we do not construe possible worlds and the events that happen in them as real entities which simply make these counterfactuals true, we are still left with the question of what makes it the case that if *a* was in such and such circumstances, it would bring *X* about. Causal nominalists, however, may be able to develop a satisfactory, reductive account of this – one which does not postulate any *sui generis* causal facts, and so by holding fixed all the non-causal facts, the causal facts are thereby fixed. For instance, causal nominalists could analyse what it is for *a* to satisfy the functional role definitive of *F* via its causal behaviour in this and nearby possible worlds (perhaps construing these worlds as sets of propositions or sentences), and then

⁵³ See, for instance, Lewis (1986) and Rodriguez Pereyra (2002).

⁵⁴ See Dunn (1990) and Humberstone's (1996) notion of an intrinsic or interior property. The intuitive idea is that an intrinsic property is one whose existence and nature has been, in Humberstone's words, 'entirely determined by what is the case within the confines of the would-be possessor' (1996: 242).

analyse this talk of nearby possible worlds in terms of widespread facts about the actual world, such as similarity of particular matters of fact, nomic axioms of the best system, and so on. Whether or not such a project could be successfully carried out is, of course, a question that stretches far beyond the boundaries of this paper. But if it could be done, causal nominalists would have a response to the realists. For they could say that *a* is *F* iff *a* satisfies such and such a functional role, and then plug in their reductive analysis of what it is that makes these causal counterfactuals true.

It would, however, be better if the success of causal nominalism did not depend upon such a contentious issue as the viability of a reductive analysis. So it is fortunate that there is a third way that causal nominalists could take, which is less ambitious but which does not require modal realism. This simply accepts that there are irreducible functional facts about what particulars can do. In other words, at the level of natural properties, *a* is *F* iff it could do *X* in circumstances *C*₁, etc. – there is nothing further we can appeal to which accounts for the behaviour of the particulars in question. It is just a brute primitive fact which (whilst perhaps susceptible to conceptual analysis) cannot be accounted for in terms of other, non-causal facts.

Realists might interject that this violates the truthmaking principle, since there is nothing that makes this counterfactual true of its object. But at this level, it is not clear how seriously causal nominalists need take the complaint. After all, realists such as Armstrong or Shoemaker also posit irreducible facts. Realist causal theorists, for instance, claim that what makes it true that *a* *X*'s in circumstances *C*₁ is that *a* instantiates an irreducibly powerful universal or trope. Once we have reached the level of natural properties, upon whose powers all the others depend, there is nothing more that can be said about why the counterfactual holds true, it just does because the particular instantiates this property. Causal nominalists, then, can respond to these objectors by turning the tables and fairly questioning the explanatory value of such metaphysical posits. They can argue that appealing to *sui generis* powerful universals or tropes, as the realist causal theorist does, or powerful laws and causally inert universals, as Armstrong does, offers us no real advancement. For, either way, we still have to make do with irreducible causal facts. All in all then, it is very unclear whether an account of truthmaking could be offered which would disallow the causal nominalist's appeal to irreducible causal facts about the objects, without thereby also rendering illegitimate analyses offered by realists who endorse the principle of truthmaking.

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It might, however, be objected that this third response strips causal nominalism of all its potential interest to causal theorists, since one of its aims was to leave open the possibility of adopting a causal theory of properties and a reductive analysis of causation. I agree that this is a reason for pursuing the position but, as we have seen, the truthmaking objection does not foreclose this option. Here, all I wish to draw our attention to is the fact that it looks like causal nominalists can wriggle out of the truthmaker objection by endorsing a non-reductive account of causality. If this route is taken, then causal nominalism would remain an interesting, informative position, since we would still get a reduction of properties and causal powers to facts about particulars and what causal relations they stand in. None of this would be lost, all causal nominalists would be claiming is that we can go no further – there are irreducible causal facts about how objects behave.

Conclusion

I have argued that issues regarding the ontology of properties have a significant impact upon what kinds of analyses of powers causal theorists can offer. If you hold a realist causal theory of properties, then persisting causal powers are privileged over facts about the causal relation. For these causal theorists claim that universals (or tropes) are the ground of irreducible power in the world, and so because what causal relations occur depends upon the powers of the entities concerned, these irreducible powerful properties play an essential role in the analysis of causation. Even if standard conditional analyses of causal power concepts could be made to work, therefore, this would not reflect the underlying ontological priority of causal relations over causal powers. Nominalist causal theories of properties, on the other hand, reverse this order of ontological priority. Powerful *sui generis* properties are exchanged for basic concrete particulars and facts about what causal relations these particulars can enter into. Unlike realist causal theories, this leaves open the possibility of a reduction of these causal facts about the actual and possible behaviour of objects, but certainly no such account is in the offing here.

What has been offered, however, is a reductive reading of Shoemaker's claim that 'properties are causal powers'. We have seen that the resulting form of nominalism has a number of significant advantages over rival accounts. Moreover, although its

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analysis of causal powers has much in common with Ryle's 'inference-ticket-type view', it cannot be easily dismissed.⁵⁵

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