Properties and Causal Powers

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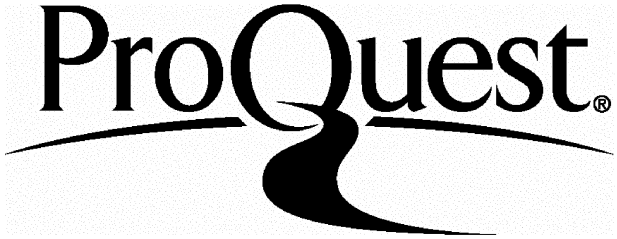

Abstract

In this thesis, I defend and develop Shoemaker's account of properties (causalism). This states that monadic properties should be characterised relationally, i.e. by their causal powers or interactions with other entities. I begin by clarifying the proposal. Shoemaker presents causalism as a metaphysical thesis. Closer examination, however, suggests that it would be better understood as analogous to Lewis' account of theoretical terms, since it leaves metaphysical questions concerning the nature of properties open. Most other expositions of causalism misrepresent it by describing it as a thesis within the dispositions debate. This damages causalism by unnecessarily tying the thesis to irrelevant and unwanted claims.

Having outlined causalism's central commitments, I look at the argumentative considerations that can be offered in support of it. I argue that Shoemaker's defence of causalism is inadequate, hence, the thesis requires alternative support. The basis of this will be causalism's commitment to the claim that the laws are metaphysically necessary. I argue that anyone who wants to offer a non-Humean account of laws, should endorse this thesis.

Next, I make a suggestion concerning how we might try to develop Shoemaker's account. I argue that the thesis can offer a plausible account of properties, since it needn't be seen to contravene the grounding intuition (namely, the thought that any relational properties an object has, should flow from the combination of its intrinsic properties and those of other objects). We can identify properties with causal powers while still grounding them in objects, because causal powers warrant the same treatment. I suggest that tropes provide a good candidate for realising the metaphysical grounding role of properties and causal powers. Finally, I show how a modified version of causalism allows us to present an attractive account of the causal relation, encompassing the insights of both singularism and generalism.

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Chapter One: Setting Out Causalism

I.i. Introduction

We describe and categorise our world using predicates. But we tend to share the realist's assumption that (at least some of) these predicates point to some non-linguistic reality. In this thesis, I shall be examining Shoemaker's account of properties – the aspects of our world which (some) predicates refer to. The backdrop of this thesis (which I shall refer to as causalism) is unashamedly realist and non-reductive. The notion of property is said to belong to an interrelated network of concepts, which includes categories like law, causation, modality and objects. We can only understand a component in the group by referring to the others, which, in turn, can only be understood by referring back to the component initially examined. Hence, the proposal cannot be a reductive one. Nevertheless, the thought is that an investigation into the nature of properties can still prove worthwhile, because by charting the relations between these ideas, we may illuminate them.

Whether or not we should endorse this approach is not an issue that concerns this thesis. It is taken as given. I shall, however, begin by pointing out some of the connections between the notions mentioned above. The relation between properties and the nature of objects is pretty clear. We attribute properties to objects, hence, this practice raises the question of what relation they bear to each other. Are there bare particulars that exemplify properties? Are objects just collections of properties at a particular space and time? Or is the relation between properties and particulars one of mutual dependence? So, for instance, one intuitive way of understanding the relationship between the two is offered by Armstrong. He characterises properties as "ways things are" (1997, p.30). This implies that the two are mutually dependent. Properties are not free standing, substantive entities, only ways a particular can be. But, similarly, particulars are incapable of existence without any properties, since everything must be some way.

Causal explanations indicate that a close relationship exists between properties and causation. Consider, for instance, Honderich's example of a pear being placed on some scales. We think that it is the pear's property of weighing two pounds that causes the pointer to move on the scale, rather than, say, the pear's French origin (1982, p.60). This seems correct, because we could have used an English pear, or indeed any other object - it doesn't matter - as long as all the alternatives weigh two

pounds, the result would have been the same. This feature is not specific to pears, it can be generalised across the board. Therefore, we would expect an account to explain this close connection between properties and causation.

Another way of linking the notion of cause with that of properties and the nature of objects, is by thinking about the idea of a "causal power". As well as attributing properties to objects, we also credit them with powers to do certain things. Hence, our notion of an object seems to involve the idea that it is "a powerful particular" (Harré and Madden, 1971 p.5). Take, for example, the common substance water. We attribute to this substance the power to dissolve sugar/salt, make us wet, boil at 100°C etc. The powers that we take substances to exemplify, thus seem responsible for much of the causal activity within our world.

The history of philosophy forges a very intimate connection between causation and the laws of nature. Hume's analysis of causation ties the two together, because he argues that to say that a caused b, is to say that it is a consequence of the laws of nature that when a occurs b occurs. Hence, whenever there is causality there is a causal law. Many philosophers have wanted to get away from the idea that a causal event must be subsumable under some law,[1] but nevertheless, it seems undeniable that there is a close relationship between these two notions, because one of the main epistemological reasons for accepting the claim that a caused b, is that a always causes b when the same circumstances hold. As this fact also provides evidence for the claim that a law holds between a and b, the two notions seem closely conjoined.

Our laws also appear to be intimately related to properties, since many are said to hold between a thing's properties. So, for example, Boyle's law expresses a regularity relating the pressure, volume and temperature of "ideal" gasses. This has given rise to what is sometimes known as "property theories of laws". These state that regularities of the form "all Gs are Fs", express a law if there is some relation that holds between the properties of G and F. Or, in other words, if there is something about a particular being G that is responsible for its being F.

Finally, there is connection between these notions and modality. Laws are generally said to reflect causal *necessities*, what must happen rather than what just did/will happen. This feature is also mirrored in causal powers and dispositional properties. When we attribute a causal power to an object, we are not just saying that

[1] See, for example. Ducasse (1926) and Anscombe (1971).

it will act in a certain way (for this may be the result of coincidence), we are saying something about what the object can do in a variety of situations, including non-actual ones. Similarly with dispositional properties. Arguably, we pick these out by predicates whose meaning incorporates a conditional, e.g. an object is fragile just in case if it had been dropped (given suitable conditions) it would have broken. Hence, all these notions make an appeal to what might have happened and what couldn't have happened.

I.ii. Shoemaker's Thesis

Strong Causalism

Shoemaker offers the first formulation of his account of properties in 1980 (I shall refer to this as "strong causalism"). The crux of this proposal is captured by his slogan, "properties are causal powers" (1980a, p.210). His idea is that instead of thinking of monadic properties as characterised by something intrinsic to the object, we should identify them by their relations to other entities. In other words, he thinks that a property should be identified with the powers that an object possesses in virtue of instantiating that property.[2]

Shoemaker qualifies this idea slightly, by bringing in a distinction between powers and properties. A power is defined by Shoemaker as "a function from circumstances to effects" (1980a, p.211). If, for example, a substance exemplifies the power of being poisonous, we would say that in certain circumstances, the substance would result in death or illness. Shoemaker thinks that powers like "being poisonous" are usefully distinguished from properties, because many different substances can realise this power differently. Substance A, for example, could be poisonous in virtue of damaging the heart; while substance B could deserve that title because of the havoc it causes in the nervous system. Because substances A and B manifest these different powers, we are lead naturally, and Shoemaker would say correctly, to the conclusion that these substances have different properties.

[2] Mellor offers a different, though related view (see 1991). It is similar because both claim that properties should be characterised by what they do. They differ because Mellor characterises properties by their place in the laws of nature, whereas causalism characterises them by their causal contribution.

Therefore, Shoemaker does not simply equate properties with powers, rather he suggests that we should conceive properties as "second-order powers" (1980a, p.212). He writes,

> properties, on which powers depend, can be thought of... as functions from sets of properties to sets of powers. One might even say that properties are second-order powers; they are powers to produce first-order powers... if combined with certain other properties. (1980a, p.212)

Powers have conceptual unity (i.e. they pick out certain effects which are usefully and easily identified, like solubility, dormitivity etc), but they are not unified by some underlying property, because they can be realised by different base properties.

He illustrates his proposal with an analogy (1980a, p.212): consider the property of being knife-shaped. If this is all I know about an object, then I won't be able to tell you anything about what it might be able to do, because the property of being knife-shaped may be combined with the property of being made of candy-floss, steel etc, and no power necessarily belongs to all these things just in virtue of being knife-shaped. However, if we combine this property with other properties, e.g. the property of being made out of steel, we can say that an object exemplifying these properties will have certain powers necessarily. For example, it will be able to cut through cheese, it will leave a certain impression in soft wax, etc.

Shoemaker's 1980 paper, therefore, offers us the following picture: objects are attributed conditional powers, e.g. being poisonous, soluble etc. These powers are conditional upon that object having certain sets of properties. So, for example, the property of being knife-shaped has the power to cut wood conditionally upon it being made out of steel and being sharp. We can then define properties as clusters of these conditional powers. In other words, we can take any property, P, and then list what causal powers P can contribute to (usually, P will create a power only in conjunction with other properties). So then our imaginary P can be defined as the set of these conditional powers – if x and P, then an object has causal potentiality S; if y, e, P and not u, then an object has causal potentiality T, and so on, until we have stated the whole cluster of conditional powers with which P is identified (see p.26 for more details).

Weak Causalism

A modified version of this thesis appears in Shoemaker's 1998 paper (I shall refer to this as "weak causalism"). Here he rejects his previous characterisation of causalism

as the view that properties are causal powers, arguing that "there is no question here of reducing properties to some more fundamental sort of entity" (1998, p.64). Instead, he puts forward the weaker claim that the individuation conditions for properties are given by their causal features. He writes, "properties that have causal features non-derivatively, have them essentially and are individuated in terms of them" (1998, p.65).

It is difficult to know quite how we should understand this individuation claim because, ordinarily, the term is used with reference to particulars. Within this context, a group of related projects have become known as "problems of individuation". What, for instance, makes this entity the particular entity it is? Or, what determines how much of the world counts as one entity of that kind? Or, how can we know that this entity is a so-and-so? One such undertaking, however, does appear more relevant to a discussion of properties. This is the question (which could be usefully posed of any entity of a metaphysically interesting kind) as to what it is for e and e* to be the same entity? So, for instance, if e and e* are sets, they are identical iff they have all the same members. Whereas ordered n-tuples are identical iff they have all the same members in the same order.[3] This seems to be what Shoemaker means by his usage of "individuation". He writes,

> Any property has two sorts of causal features: "forward looking" ones, having to do with how its instantiation can contribute to causing, and "backward looking" ones, having to do with how its instantiation can be caused. Such features are essential to it, and properties sharing all their causal features are identical. (1998, p.59)

This strongly suggests that Shoemaker is offering a criterion of identity for properties, because he is telling us how we know when two objects instantiate the same property. This, anyhow, is what I shall understand him as trying to do.

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[3] These are also known as "criteria of identity" (see Lowe 1989 ch. 2). There are problems surrounding the search for a criterion of identity. Williamson, for example, argues that if a criterion of identity for a particular type F is to be of interest, then it must be more than a necessary and sufficient condition for a pair of Fs to be identical, because this will be trivially satisfied by itself. He writes, we must instead offer "a necessary and sufficient condition meeting a certain constraint, where such-and-such does not itself meet that constraint" (1990, p.144). It is unclear what Williamson means by "constraint". The idea he seems to be trying to get at, is that there must be a reason why the criteria is interesting - we cannot simply say that the condition must be intriguingly different from that which we are identifying because this would be "capricious" (p.144). Perhaps Shoemaker could avoid the problems raised by Williamson by expressing his view as a supervenience thesis instead: properties supervene on backward and forward looking causal powers – there can be no difference in these features without a corresponding difference in the property. However, I shall continue to refer to the view as a thesis about the individuation conditions of properties.

Comparing Strong and Weak Causalism

The similarities between the two positions are most striking, because they both offer the same criterion of individuation of properties. This criterion can be summarised as follows: first, because causalism states that properties are identified by the sets of causal powers to which they contribute, we must grant that properties make some contribution to the causal potentialities/powers of substances. Second, if two properties share all the same causal potentialities in every possible situation, they are the same property. And, conversely, if two properties do not share all their causal potentialities in every possible situation, then they are not the same property.

The combination of these two claims provides us with identity conditions for property persistence through time, because they rule out the possibility that the causal potentialities of a property can change over time. Therefore, if an object's causal potentialities change, this is not because the properties now have differing causal potentialities, rather it is because its properties have changed. Similarly, the criterion commits us to an account of transworld individuation, because all the causal potentialities of a property are essential to it (as it is the causal potentialities of a property which make the property that property). Hence, not only do they have to belong to the property at all times, they also must belong to the property in all possible worlds. This has the upshot that all our causal laws (viewed as propositions describing the causal potentialities of properties) are metaphysically necessary (in the sense of true in all possible worlds). For if the causal potentialities of our properties cannot change, then the laws which describe them cannot change either. Therefore, on both these views, it is impossible that different laws, in different possible worlds, could govern the same properties.[4]

I think the differences between strong and weak causalism are less clear. Shoemaker sometimes appears to present strong causalism as an ontological thesis (see 1998, p.64) which states that property entities are reducible to causal power entities. In his 1998 paper, he rejects this metaphysical formulation of causalism. Its replacement, weak causalism, confines itself to the individuation claim. Hence, it is not committed to the view that properties are exhausted by their causal features.

[4] The modal claims which causalism seems to result in, can be questioned (see chapter three). For now, however, I will assume that a causalist is committed to the claim that the relationship which properties bear to their cluster of conditional powers is necessary, but known only a posteriori.

Properties could have characteristics which are appropriately related to their essential causal elements.

Weak causalism, therefore, appears to absolve the causalist from making any of the hefty metaphysical claims which strong causalism seems committed to. In the next section, however, I shall argue that Shoemaker gives us no clear idea of what strong causalism amounts to. Hence, I shall suggest that we should conceive of the two theses in a slightly different way. This will still leave the individuation claims common to both accounts at the heart of causalism, but it will, hopefully, clear up the obscurity surrounding Shoemaker's metaphysical claim and avoid the dichotomy between the two proposals. This interpretation of causalism will form part of a wider project which tries to clarify what causalism is all about.

I.iii. Causalism – a more detailed proposal

The Scope of Causalism

All plausible causalist positions have to make some restrictions regarding which properties their analysis applies to. Shoemaker, for instance, restricts the account to what he calls "genuine properties". He defines these as properties whose "acquisition or loss by a thing constitutes a genuine change in that thing" (1980a, p.207).[5] So, for example, although it is true that the property "is 300 miles from Bob" holds true of me, if Bob moves location, I could lose this property without any alteration at all in my person. Therefore, this is not a genuine property.

This seems an unavoidable restriction, because it is implausible to say that my being 300 miles from Bob, is true of me because I possess a certain set of causal powers. It is true just in virtue of my location and Bob's. Similarly (although not mentioned by Shoemaker) properties that are traditionally conceived of as being necessary, the properties of mathematical entities, for example, like the evenness of four, must be excluded from the analysis, because these are widely recognised to be causally inert. Therefore, the question as to exactly what causalism is supposed to be an account of becomes paramount.

[5] Shoemaker draws upon Geach's discussion of change, arguing that a mere-Cambridge change does not constitute a genuine change in the object (see 1969 p.71).

The entities which the analysis needs to pinpoint are the empirical features (i.e. those discovered by science and sense perception) of objects/substances. We can do this by stating that causalism is an account of everything that can contribute to the causal powers of a substance/object. [6] All entities which do so are empirical properties and, thus, subject to the causalist's analysis.[7] In the rest of this section, I shall consider two objections connected to issues surrounding the scope of causalism. The first argues that not all of the entities we regard as properties get into the causalist's account. The second claims that causalism cannot plausibly be thought to hold true of all the entities within the suggested domain. In response, I shall try to argue that, given the proposed scope of causalism, we can meet these objections,.

Rosenberg objects to the thought that properties are just those entities which contribute to the causal powers of objects/substances, on the grounds that such an account leaves us with far too few properties. He writes "one cannot know that there is a cluster of causal powers associated with any predicate actually in use, because of the inadequacy and incompleteness of contemporary science" (1984, p.84). Therefore, because we cannot know whether there are any predicates corresponding to any genuine clusters of causal powers (as we can never know what the ultimate properties are, for "true total science does not wear this label on its sleeve" - 1984, p.82), we can never attribute any properties to particulars.

I don't want to accept this conclusion, and I don't see why a causalist has to. I think we can allow, with Lewis, that there are degrees of naturalness, or that some explanations of phenomena will be more fundamental than others, without thereby denying that properties like red, for instance, aren't genuine. For the predicate "red" does stand for a causal power, namely, the power to produce certain visual sensations in beings with a particular physiology (call this description R). We have to grant, of course, that this is an anthropocentric property. By this I mean that the property reflects our concerns – it picks out a range of sensations created, in certain situations,

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[6] This suggestion commits a causalist to the claim that not every predicate can be sensibly thought of as naming a property. For some predicates (grue, for instance) do not seem to contribute anything distinctive to the causal powers of objects.

[7] Some philosophers have wanted to endorse a much more restricted form of causalism. I shall refer to these views under the heading of "restricted causalism". So, for example, both Ellis and Lierse (1994) and Mumford (1998) want to claim that the most fundamental of particles are individuated solely by their causal powers. They thus endorse a causalist's analysis of the most basic of properties. I shall not discuss these views here, because their analyses are the same - just applied to fewer properties. But such a position is worth bearing in mind if you think that causalism does offer a good analysis of a subset of properties.

in an average human's visual system. It is, in a manner of speaking, tailor-made for us. Nevertheless, it still designates a very important property/causal power, because it is one which we can perceive.

It might be objected that because red is grounded in other properties of objects, it does not pick out anything fundamental like a property/causal power. However, this assumes that a property/causal power must be something fundamental. While some of them will be (namely those invoked as the "ultimate, inexplicable units of explanation" - Mumford, 1998 p.217), most of them will be of a more mundane variety (i.e. not features in the final description of reality). This is consistent with the causalist's account, because it does not matter if the causal power which a property is associated with, is based on other causal powers of other properties. It is sufficient to quantify over first level properties by describing another property/causal power, which the other properties/causal powers combine to make. So, for example, we can identify the property red, even though it is grounded in other properties of objects, because there is a unique causal power (namely the one given by description R) which is associated with it.

It may be thought that this doesn't get to the heart of the matter. Redness is still not really a causal power since it doesn't cause anything - all its power is conferred upon it by the causal powers of the more fundamental properties. I think that there is something right about this objection, but also something wrong. What is wrong is the claim that looking at something red doesn't cause my perception of redness. While we can complain that this isn't a very informative explanation of my sensation of red - we could offer a more detailed account by including information about light waves, our physiology and so on - it still doesn't follow that redness doesn't cause my sensation, because we can say that redness inherits the causal powers of the properties that form it.[8] What is right about the objection is that "red" will not appear in the ultimate list of the movers and shakers of the universe. It is not a fundamental causal power - it is grounded in other properties/causal powers, which are grounded in other properties/causal powers and so on. We have here, the popular picture of the "multilayered" universe emerging (see, for example, Kim 1998 p.15). At each level (from fundamental particles to higher living organisms) new properties

[8] See Kim's causal inheritance principle. This states that "the causal powers of an instance of a second-order property are identical with (or a subset of) the causal powers of the first-order realiser that is instantiated on that occasion" (1998, p.116).

appear, each having their own unique cluster of causal powers associated with them. Often it is believed (by the physicalist at least) that the properties at the higher level are reducible to the fundamental properties postulated by physics. If this is true, then all causal powers do ultimately depend upon these.[9] But to say this is not to claim that redness isn't a causal power, it is just to say that it isn't a fundamental causal power.[10]

The second difficulty arising from the proposed scope of causalism, concerns the existence of apparent counterexamples. Under the present suggestion, shape properties fall within the scope of the causalist's analysis, because it is clear that they can and do contribute to the causal powers of objects. So, for example, if an object is square-shaped, it will, in virtue of instantiating that property, appear square-shaped to anyone perceiving properly; be able to fit in certain square-shaped holes, and so on. Shape properties cause problems for causalists, because it seems plausible to claim that they have individuation conditions independent of their causal powers. So, for instance, we can say that a property is the property of being square-shaped iff it is a figure which has four equal sides and four right angles. It seems wrong to say that the property of being square-shaped is the property it is because it contributes conditional $powers_{1\text{-}n}$ to the objects which possess it. Causal powers are not what make a square the property of being a square, these are secondary. What does this is a certain description which makes no reference to a square's causal powers.

This is an important objection against causalism. If it cannot be met, then either we have to limit the scope of causalism even further (but then the account starts to look vacuous because it does not hold of the type of entities it ought to be applicable to), or we have to simply assert that shapes do fall under the causalist's analysis (but this doesn't look too promising either, since our intuitions do seem to side with the opponent on this point). Unfortunately, I cannot adequately discuss this objection here, but I shall try to give some indication of how a causalist might try to respond.

Shapes are difficult customers. They are properties which are exemplified by physical objects, and they are entities which figure in pure geometry. Therefore, they

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[9] If you reject the physicalist world view (causalism is in no way committed either way), and accept that some properties at the higher levels are genuine emergent properties (by which I mean properties which are irreducible to the lower levels), then the ultimate causal powers would not only be at the level of fundamental particles, they would occur higher up too. Where, would depend on what emergent properties you thought existed. I shall not make any judgements regarding these issues here.

[10] By a fundamental causal power, I just mean one which cannot be said to be based on other causal powers of particulars.

are partly within the scope of Shoemaker's account (insofar as they are empirical properties of objects) and partly outside it (insofar as they are abstract mathematical entities). This gives the causalist more room to manoeuvre, because they can say that while shapes understood as mathematical entities are not subject to the causalist analysis, shapes as exemplified by physical objects are. The causal powers which physically exemplified shapes result in, are what give the mathematical entities of pure geometry their physical significance.

The line of approach I am suggesting is akin to the claim Campbell makes for spatial properties (1994). He argues that pure geometry (i.e. a purely formal exercise in mathematical computation) is turned into applied geometry (i.e. a body of doctrine about the world in which we live) by connecting spatial properties with physical ones. He writes, "what turns one into the other is the assignment of some physical meaning to the spatial concepts, for example, the identification of a straight line as the path of a light *in vacuo*" (1994, p.25). I think a causalist could nullify the force of this apparent counterexample, by making a similar move. They can argue that what makes the property of being a square physical rather than purely mathematical, is the fact that it makes certain causal contributions to the objects that instantiate it. Therefore, the shapes that are instantiated in the physical world are subject to the causalist's analysis.[11] In the next section, I shall try to clarify causalism's commitments by discussing its relationship to other issues. I will begin by arguing that it is misleading to tie causalism too closely to the dispositions debate.

Causalism and The Dispositions Debate

Causalism is often presented as a thesis about dispositions. Armstrong, for example, calls it "the Dispositional Thesis" (1997, p.71), while Mumford writes of "Dispositional Eliminativism" (1998, p.175), and even Shoemaker summarises his position by stating that "all properties are dispositional properties" (1980a, p.210), although he does greatly qualify the statement later on. I, on the other hand, think that the causalist's account should be distinguished from the dispositions debate. In this section, I shall try to show that the characterisation of causalism as the attempt to make all properties dispositional is inadequate. In order to explain why this is, I shall

[11] For more on this debate see Campbell (1995) and Ludwig (1995).

have to delve some way into the dispositions debate. But, hopefully, this will serve to illustrate that, on the whole, the point of contact between these two debates is slim.

One major issue within the dispositions debate is whether it is possible to find a satisfactory conceptual distinction between so called dispositional predicates and categorical predicates. Frequently, it is asserted that dispositional predicates differ from their categorical associates because they are entailed by conditionals, in the sense that they are necessary (but not sufficient) for the ascription.[12] So, for example, it is often said that "fragility" is a dispositional predicate because its meaning is given by this conditional: "if x were (suitably) dropped then x would break". Whereas "copper" is a categorical predicate because its meaning is not supplied by a conditional which (could be) associated with it. In other words, although it is true that copper will conduct electricity, and thus certain conditionals will hold true of it, these conditionals are not part of the meaning of "copper".

Some philosophers have argued that this conditional analysis is inadequate.[13] Fortunately for causalists, however, there is no need for them to get involved in this dispute, because they are not committed to any particular viewpoint on this issue. They can endorse this conceptual distinction, as Shoemaker does (see p.210, 1980a), arguing that that the cluster of conditional powers associated with a property is not conceptually linked with it (i.e. they do not have to assert that it is analytically true that copper, for instance, conducts electricity). Or they can reject such a distinction, on the grounds that causalism (strong or weak) is a thesis about all properties, not any specific group.

If a causalist decides to reject the claim that there is a conceptual distinction between categorical and disposition predicates, then it is obviously unfair to categorise their position as trying to render all properties dispositional, because they do not recognise any such special subset of predicates, never mind entities which these properties are supposed to pick out. Nevertheless, we might think that such a position is untenable; that any reasonable theory has to accept this claim. Thus, if we grant, for the sake of argument, that a causalist (for reasons of plausibility) must take the Shoemaker route, we are still faced with the question as to whether causalism should be stated as the thesis that all properties are dispositions.

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[12] See, for example, Ryle (1949), Jackson, Pargetter and Prior (1982), Prior (1985), Place (1996) and Shoemaker (1998 and 1980a.)

[13] See, for example, Martin (1994) and Mellor (1974).

I think the answer should still be negative. One issue in this area where a causalist is rather tied, concerns the question of whether an ontological distinction corresponds to this conceptual distinction. If you do not accept restricted causalism,[14] the account looks committed to denying that there could be an ontological distinction, because it claims that all properties (within the scope mentioned) should be characterised by their relational aspects.

The waters are perhaps a little muddier than this suggests, however, because Shoemaker does want to concede that there is a "rough correspondence" (1980a, p.210) between the distinction between categorical and dispositional predicates and the one between powers and properties (outlined on p.1-2).[15] He writes, "By and large, dispositional predicates ascribe powers while non-dispositional monadic predicates ascribe properties that are not powers in the same sense" (1980a, p.210). Thus, as "being poisonous" is a dispositional predicate, it is labelled as a power not a property. Nevertheless, this does not mean that a causalist can endorse a fundamental ontological distinction between two different types of properties. It is important to be clear about what Shoemaker is suggesting. There are not two radically different sorts of entities - powers and properties - which divide reality. This cannot be the right interpretation since both terms are inter-definable: a property is characterised as a second-order power – a power to produce first-order powers; while powers are defined in terms of sets of properties. What the causalist is faced with then, is a rather more mundane choice concerning terminology. They could decide to employ "properties" and "powers" interchangeably. Since a causalist can say that the property of being red, for instance, is also a power realised by further properties. While the power of "being poisonous" is also a property, because it realises the power "being able to cause harm to humans". Or, they may choose to reserve the term "powers" for those properties picked out by dispositional predicates, and "properties" for those

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[14] I think Ellis and Lierse (1994) accept restricted causalism. They claim that there is an ultimate division between dispositional and categorical properties, because they claim that both types of properties are required in order to give a complete catalogue of the world. (I am interpreting them as restricted causalists because they argue that "with few exceptions, the most fundamental properties that we know are all dispositional. They are of the nature of powers, capacities and potentialities" 1994, p.32. And although they do not say exactly what a categorical property is, I am presuming they think that these are identified independently of their causal powers.)

[15] He probably asserts this, because he agrees with the traditional orthodoxy which states that dispositions/powers have causal bases, i.e. a "property-complex of the object that, together with the first member of the pair... is the causally operative sufficient condition for the manifestation" (Jackson, Pargetter and Prior 1982, p.251).

picked out by categorical predicates, as Shoemaker does. Or, they could reserve the term "properties" for those fundamental entities which are not realised by anything else. Not much, however, seems to ride on this decision. The distinction between properties and powers is not great whichever way the causalist decides to use the terminology, because all properties (even the ultimate ones) still only admit of relational characterisation. They are not of a different kind to the powers which are realised by them (see p.26 for more details).

Granted that a causalist has to accept that there is no fundamental ontological distinction corresponding to a possible conceptual distinction between dispositions and categorical properties, I think the best thing for them to say is what Shoemaker does, namely that the contrast between the dispositional and the categorical should be seen as holding solely at the level of predicates. Therefore, we should not describe causalism as the claim that all *properties* are dispositions, because the contrast between the dispositional and categorical is best made at the level of terms rather than entities.

We may, however, try to push the matter further. Someone could argue that this doesn't prove that causalism isn't a thesis about dispositions, because we can say that a property is dispositional iff a dispositional predicate picks it out. At this point, anyone (like the causalist) who doesn't accept that there is a fundamental ontological distinction between categorical and dispositional properties, is faced with four choices (Mumford, 1998, ch.8). They could adopt "categorical reductionism" (the view that dispositional properties, i.e. the entities that are picked out by dispositional predicates, are reducible to categorical properties); "categorical eliminativism" (the view that dispositional properties are eliminated by categorical properties); "dispositional reductionism" (the view that categorical properties are reduced to dispositional properties); or "dispositional eliminativism" (the view that categorical properties are eliminated by dispositional properties). Here the debates may be thought to collide – Shoemaker asserts that all properties are dispositional, so surely he is advocating some form of dispositional reductionalism or eliminativism?

No. Given the definition of the various positions, Shoemaker's account isn't an example of dispositional reductionism or eliminativism at all. He argues that if dispositions have counterparts in the world, these correspond to powers rather than properties. In other words, they are realised by sets of properties, rather than being properties themselves. Therefore, on this definition of a dispositional property,

Shoemaker should be categorised as a categorical reductionist, because he allows that there are categorical properties and, moreover, that dispositional properties can be reduced to them.

I hope this has shown that it is misleading to characterise causalism as the attempt to construe all properties as dispositional. Such a description unnecessarily ties causalism to some thesis concerning the distinction between categorical and dispositional predicates, and, furthermore, commits it to the claim that the latter's definition must hold of all properties. Shoemaker exposition usefully demonstrates that this needn't be the case. A causalist can argue that given this account of the dispositional/categorical distinction, it is false to say that all properties fall within the dispositional category.

This conclusion is important, because it immediately disperses a number of potential objections to causalism. Mumford,[16] for example, objects to dispositional eliminativism on the grounds that it is based on the mistaken assumption that an adequate conceptual distinction cannot be drawn between the dispositional and the categorical. In opposition, he argues that we can offer an adequate distinction, despite the fact that both types of property ascriptions imply counterfactuals of some sort. Therefore, there is no need to eliminate a categorical specification of properties from our description of the world. We have seen, however, that while this may be an objection to dispositional eliminativism, it clearly will not do as an objection to causalism. For Shoemaker, at any rate, does allow that there is a distinction, and that properties do admit of categorical specification. Therefore, not only should causalism not be identified with dispositional eliminativism, the criticism which the latter looks vulnerable to, does not apply to causalism.

Jackson offers another objection which may be thought pertinent to causalism. He claims that dispositions cannot be causes (see Jackson, 1998 p.96-7). Hence, if properties were just dispositions, they could not be causal powers. His argument draws upon the prevalent assumption that dispositions have causal bases (i.e. a property or property-complex of the object which is causally sufficient for the manifestation of the disposition – see p.16). So, for example, when a fragile glass is dropped and it breaks, a property-complex of the object, probably a certain kind of bonding between the molecules, is responsible for the breaking. This leads him to

[16] It is unclear whether Mumford intends this to be a point against Shoemaker as well as Mellor.

conclude that it is the causal base of the disposition, and not the disposition itself, which is causally responsible for a manifestation of a disposition. For if (as was assumed) the causal base is sufficient for a manifestation of a disposition, then unless we want to countenance widespread overdetermination, there is nothing left for a dispositional property to do. Therefore, dispositions are "impotent".

This argument has a hole in it. Given that we grant Jackson's causal base assumption, which I find plausible,[17] we are not forced to accept that dispositions are impotent, for we could block it by claiming that the relation between the disposition and the causal base is one of identity (see Armstrong, 1996a). This, however, is rather academic to causalism. Jackson's claim that dispositions are not causally responsible for the manifestation of the disposition, can be accepted by causalists without any consternation. For if by a disposition it is meant something which is conceptually connected to its cause, then a causalist can simply allow that, in these cases, the so-called property is always realised by the powers of other properties in the object. This, as we've seen (sect. I.ii), is the approach taken by Shoemaker. He "roughly" equates dispositional predicates with powers and then argues that the latter are realised by sets of properties. Therefore, as causalists have a free hand on the question of whether dispositions are causally efficacious, Jackson's argument is no threat.

The type of reply utilised against Jackson's argument is also applicable to another kind of objection, based on Hume's thought that cause and effect are distinct existences. It is difficult to give precise content to what Hume is asserting. The claim refers to his thought that "all distinct ideas are separable" (1978, p.87), which seems to suggest that if we can, without contradiction, conceive of one without the other, the two ideas are distinct. So, for example, the idea of "being a wife" and the idea of "having a husband" are not separate ideas, because we cannot say that a woman is a wife, without also saying that a woman has a husband. Unfortunately, as Stroud comments, this interpretation does not do Hume's dialectic any favours. Since if this is what he means by "all distinct ideas are separable", then no further support is provided for the conclusion he wants to establish, namely that "no cause necessarily entails the effect", for he is simply asserting that the negation of a causal claim is never contradictory (see Stroud, 1977 p.47). However, it is difficult to find another way of understanding the idea. Moreover, it seems to be this conception which

[17] Place argues against this assumption (1996 ch.2), but I didn't find his alternative very convincing.

Mackie utilises in an argument against the causal efficacy of dispositions. Therefore, at least for present purposes, I shall adopt this interpretation of Hume's claim.

Mackie defines a dispositional property as one which would be "conditional entailing" (1973, p.137), i.e. it would be something in addition to the (non-entailing) molecular structure, which would ensure that the manifestation, under suitable conditions, would occur. Mackie then objects that properties so conceived cannot exist, by utilising the Humean claim outlined above. He writes,

> dispositional properties... would violate the principle that there can be no logical connections between distinct existences, which... is the least disputable step in Hume's critical discussion of causal necessity. For a piece of glass's being fragile would on this view be an intrinsic feature of the glass, and the conjunction of this with the glass's being (suitably) struck would be a distinct existence from the glass's breaking; yet on this rationalist view the former conjunction would logically require that the glass should break. (1977, p.266/7)

In other words, the idea of a disposition and the idea of its manifestation are not distinct, because we cannot say, for example, that the vase is fragile, without also claiming that in suitable circumstance, the glass will break. Therefore, we cannot say that fragility is a cause of the glass breaking if Hume is right to insist that cause and effect must be distinct existences (and the interpretation given above is correct), because the idea of fragility, and what it causes, are not distinct.

A causalist may reasonably try to dispute this argument,[18] but they are not required to, because it does not discredit their thesis. Mackie's basic claim is this: the disposition logically necessitates the effect, because there is a conceptual link between the two. Or, in other words, it is analytic that the cause follows from the effect given the appropriate circumstances. Fortunately, a causalist need not claim that causal powers are conceptually linked to the properties with which they are identified. Shoemaker makes this very clear on numerous occasions (see, for example, 1980b p.324). We have to discover the causal potentialities of properties, they are not knowable *a priori*. Therefore, a causalist can assert that the idea of a particular property, and the powers it produces, are separable ideas.

Due to the fact that there are objections which seem prima facie pertinent, but are actually irrelevant to causalism, I think it is important to distance the two debates,

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[18] See, for example, Mumford (1998, ch. 6). He argues that the assertion is not only unproven, it is false. Consider the proposition [P] "the cause of the effects of G is G". While [P] is clearly a useless casual explanation, we do not want to say that G is not the cause of the effects of G, because this would be an outright contradiction. Similarly, he writes, "if by a dispositional term D, we mean the cause of G-ing upon being F-ed... it will be a nonsense to claim that the cause of G-ing upon being F-ed was not the cause of G-ing upon being F-ed, because it is logically connected to G-ing upon being F-ed" (1998, p.140).

because this way we can avoid potential misunderstandings. I do not want to suggest, however, that there is no relation whatsoever between causalism and the dispositions debate, since there are positions within this debate which a causalist has to reject. First, there is the aforementioned commitment to the thesis that there is no distinction of ontological importance corresponding to the possible conceptual contrast between dispositional and categorical predicates.

Second, a causalist must reject Ryle's approach to dispositions. He argues that two objects could be completely identical in their genuine properties, yet one could have a disposition to X and the other a disposition to not-X (Ch.5 1949). This is incompatible with causalism's second individuation claim (see p.9), which states that two objects with identical properties will have all the same causal potentialities. In view of this conclusion, the causalist must accept one of two options: either they could accept that a disposition must have a "causal base" as Shoemaker does (see p.16), i.e. a property complex within the object, which realises the manifestation of a disposition. Or they could claim that the disposition is itself a property of an object and, as such, has causal powers in its own right. A causalist doesn't have to decide between the two positions. If what she says rules out Ryle's analysis, this will be sufficient.

Finally, I have presumed that a disposition is characterised by the fact that it is conceptually linked to its cause, because this seems to present a reasonable summary of the majority of views in this debate. However, it isn't always correct. Armstrong's discussion of "dispositionalism" and "categoricalism" (1997, ch.5 and 1996b) claims not that dispositions, construed as functional properties, are causally impotent, but rather that powers themselves are causally inefficacious. He defines dispositionalism as the view that, "all properties... have a nature which is exhausted by their possible (empirically possible) manifestations" (1997, p.75-6), and argues that we should reject this view in favour of "categoricalism", the view that categorical properties are "self-contained things, keeping themselves to themselves, not pointing beyond themselves to further effects brought in virtue of such properties" (1997, p.86). I am not convinced that this points to a well thought out, coherent distinction between the categorical and the dispositional. Nevertheless, it seems clear that what he is suggesting is at odds with causalism, because he wants to deny that the "real" categorical properties are identified by their powers.

There are then some links between the two areas. But a causalist is justified in keeping them separated, due to the lack of a definite connection.[19] Moreover, I think the debates should be kept apart, because I suspect that it will prove beneficial to causalism. First, for the lazy causalist, it means that there is no need for them to offer a fully worked out account of dispositions. They could remain neutral on some points (such as the question of whether there is an adequate conceptual distinction, whether a disposition has to have a causal base...), thus enabling them to avoid divisive debates in this area. Second, it frees causalism of dangerously laden, theoretical terms. Martin argues that the terms of the dispositional debate are biased (1996, ch.5). The word "categorical", as compared to "dispositional", carries with it the connotation of "actual" "real" etc. More important than this, however, is that within the confines of the dispositions debate, the only way we can express causalism, is through claims such as "all properties are dispositional". But this, as I've tried to show, ties causalism to unnecessary, and often unwanted, commitments.

All in all, I have a feeling that the framework of the dispositions debate, with its different emphases and terminology, provides a skewed picture of what causalism is trying to put across. One reason for thinking this is the incredulous reactions, rather than philosophical attention, causalism seems to have provoked. For example, Martin quotes a passage from Shoemaker and then writes, the only "response to such an account is to state it fairly... and let its absurdity show though" (1996, p.86). I am hoping that put in the right context, and with fair exposition, I shall be able, at the very least, to question this attribution of absurdity. With luck, distancing causalism from its usual setting, will be the first step towards this goal. In the next section, I shall briefly clarify causalism's relation to what is sometimes known as "the causal criteria of property existence" (Mumford, 1998 p.122), because this principle also looks, prima facie, quite similar to the causalist's account.

Causalism and The Causal Criteria of Property Existence.

Mumford's version of the principle, of the causal criterion of property existence, states that "for any intrinsic, non-abstract property P, P exists iff there are circumstances C in which the instantiations of P have causal consequences" (1998,

[19] By this I just mean that causalism cannot be defined as a thesis about dispositions. The most likely candidate – i.e. the view that all properties are dispositional – has hopefully been shown to be wholly inadequate.

p.122). This is basically the same claim as the first individuation claim I attributed to causalism (see p.9), namely that a genuine property must make some causal contribution to the powers of an object. But here the similarities end. The principle contains no other individuation conditions, therefore, someone who accepted it is not committed to the claim that two properties sharing all their causal potentialities are identical. Or that two properties which don't share all their causal potentialities differ. Similarly, they could reject the causalist's identity conditions for property existence through time, and their criteria for transworld identity. Thus, the principle makes none of causalism's controversial modal claims.

I think the reason for these differences are uncovered if we look at what type of principles causalism and the causal criteria for property existence are endorsing. The motivation for the latter is epistemological. It is reminiscent of Armstrong's more general principle: causally inert entities do no explanatory work. The thought behind this principle is that we could never have any reason to posit a property which has no causal effects because, as Armstrong puts it, "a property that bestows no powers will not be easy to detect" (1997, p.69). Causalism too could be interpreted as making this epistemological claim:

> **Epistemological claim:** all that we can ever possibly know about a property is via its causal powers. Thus, we should individuate properties by their causal effects.

Much of what Shoemaker says (for example, his epistemological arguments in favour of the view and his preoccupation with how we are able to identify and re-identify properties) seems to imply that he holds this type of view. However, this exposition of at least his account in the 1980s papers is mistaken. Shoemaker's earlier thesis is much more radical than this, because it makes this claim:

> **Metaphysical claim:** properties just are causal powers.

Unfortunately, it is not at all clear how we should interpret this thesis, or what it actually amounts to. Shoemaker appears to be saying that there is nothing more to a property than what it does. For example, he writes, "properties are clusters of conditional powers" (1980a, p.213). But in the next section (and in ch.4), I want to challenge this way of understanding the causalist's claim. I shall argue that

causalism's account of how we should characterise properties leaves open, to a large extent, questions concerning the metaphysical nature of properties.

Causalism and Lewis

So far I have discussed what causalism is not. Now I want to say what sort of account it is similar to. Shoemaker's thesis parallels that of Lewis' functionalist approach to theoretical terms. He can be thought of as doing for properties what Lewis did for theoretical terms. In this section, I shall try to justify this claim. In so doing, I hope to draw attention to an important feature of Shoemaker's thesis.

Lewis (1972) argues that theoretical terms (T-terms) are those which occupy a certain causal role in a hypothesis/story. T-terms are defined by reference to that causal role, specified by the theory T. So, suppose that we have a new theory which introduces a T-term. The other terms in the theory are already understood (these are the O-terms). Hence, the T-term can be defined by reference to the causal relations it stands in to the O-terms. The sentence which describes the relations between the T-term and the O-terms, is the postulate of our term-introducing theory. The postulate says of the entity, named by the T-term, that it stands in certain causal relations to the other entities, named by the O-terms. If a group of entities satisfy the postulate, then we can prefix an existential quantifier to the theory. Thus giving us the Ramsey sentence of T, i.e. $\exists x\ T(x)$, which claims that T has at least one realisation. We can then modify this to $\exists x^*\ T(x)$, in order to express the claim that T has a unique realisation. If T has a unique satisfier, we thus have the resources with which to write a "Carnap sentence" for T. This states that if T is realised, then the T-term names a component of some realisation of T, i.e. $\exists x\ T((x) \rightarrow T(t))$. We can therefore eliminate the T-term, because it has been defined as an occupant of certain causal roles specified by the postulate.

Lewis offers an example of how this theory can work for our psychological predicates. We begin by formulating a postulate (P) for our psychological P-term, by listing all the platitudes we can involving causal relations between the P-term and other O-terms (i.e. terms which name other mental states, sensory stimuli, motor responses etc). This postulate then defines our P-term by reference to the O-terms. Once we have discovered the unique realiser of P (if there is one), we can then Ramsify P. Hence, we get the result that the P-term names a component in the unique

realisation of P. The P-term is thus eliminated – it is the property which plays such-and-such a role.[20]

There are two slightly different ways of characterising what a property is, given the basic network model outlined above.[21] Lewis thinks that the property should be identified with what the occupant of the T-term is. Others (sometimes referred to as "functional state identity theorists"[22]) have argued that the property should be "identified with an abstract causal property tied to the real world only via its relations, direct and indirect, to inputs and outputs" (Block, 1980 p.175). So, for example, suppose that T is the psychological theory which tells us the relation between our P-term "pain" and other mental states, sensory inputs and behavioural outputs. For ease, we'll make T very simple. It tells us that pain is caused by pinching (sensory input), causes fear (relation to other mental states), causes the emission of sound (behavioural output) and the fear causes frowning. Lewis thinks that the property picked out by "pain" is *the thing* that is caused by pinching, which results in the emission of loud noises, causes the mental state fear which, in turn, causes frowning. In other words, pain is the realiser of a certain causal role in a system. Functional state identity theorists, on the other hand, claim that the property picked out by "pain" is *the property that one has* when one has a state caused by pinching, which results in the emission of loud noises, causes the mental state fear which, in turn, causes frowning. These two varieties of metaphysical functionalism, therefore, both agree that pain should be defined by a network of causal relations. Where they differ is in whether they think that pain is what realises this network (Lewis), or whether they think that pain just is this network (functional state identity theorists).[23]

The parallel between causalism and metaphysical functionalism isn't difficult to see. The formal apparatus used to define theoretical terms in these functionalist accounts, is implicitly employed by Shoemaker in his account. He argues that a property should be defined relationally – by its interactions with other entities. Take Shoemaker's example of a knife which has the property of being knife shaped and

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[20] P is therefore rendered a second-order property, because it is the property of having a certain property. Thus, it can only be defined by reference to other properties.

[21] By "the basic network model" I mean the method by which functionalists specify entities via the causal relations they bear to other entities.

[22] See Block, "What is Functionalism?" (1980).

[23] It should be noted that whilst accepting the network model does not commit you to any *particular* metaphysical thesis, if a functionalist invokes the model to characterise properties, they will have to decide between the Lewisian and functional state identity theorist approaches. Thus, it would be impossible to avoid making at least some metaphysical claims.

being made of steel (see p.7). The thought is that what it is to be "knife-shaped" and "made of steel" can be identified by its nexus of interactions. So, for example, "if X is made out of steel and knife-shaped and *passing through* Y and Y *is butter* then X *cuts* Y". In this case, we fix what is italicised (these are the O-terms), in order to define what is underlined. (This renders "made of steel" and "knife-shaped" second-order properties, because they are defined by other properties.) But, according to this theory, all properties are inter-definable. Although, in the case above, our T-term "knife shaped" was defined by the O-terms that were held fixed, these O-terms are in turn defined by that which they define. So, for example, what it is to be cut, is characterised relationally also. Hence, it is (partly) defined by what happens when knife-shaped steel passes through butter. Properties and powers then, are inter-definable – we define properties by what they can do, and causal powers by what properties they result from (see p.16-7).

By pointing out the origins of Shoemaker's account of properties, I hope to draw attention to a feature of it, not mentioned by Shoemaker. The network model used to define properties by causal powers, does not commit us to a metaphysical account of properties. What it provides us with is a theory which informs us what properties there are, and how they are too be individuated. In order to get a metaphysical account of what properties are, further assumptions need to be added to the model.

In order to see this point, we just need to reflect on its close relatives in the philosophy of mind. Consider Lewis' account first. If he is correct, then the mental state pain (P) is defined by its relations with O-terms. But this does not tell us what (in the ontological sense) P is. Nor does the fact that we can Ramsify P, if the P-theory is realised, tell us anything. All this informs us is that P exists, it does not tell us about P's nature. What actually realises the component P within the P-theory, is still a matter open for debate. This is not to say, however, that Lewis' way of characterising what a property is does not commit you to any metaphysical claims regarding pain. It does. We have to say, for example, that if the state which realises the causal role associated with pain in humans, is different from the state that realises it in tortoises, then there is no state, pain, which is common to both humans and tortoises. This is the metaphysical claim which is rejected by functional state identity theorists. They argue that there is a unique property of pain which occupies this functional role (this is what justifies the uniqueness assumption utilised by the formal apparatus, expressed by $\exists x^*$

- see p.24. Because pain is just the property of having a certain causal role, any state which plays this role, thereby exemplifies the unique property of pain). Therefore, their characterisation of properties makes the metaphysical assumption that humans and tortoises have something in common, namely pain, if they exemplify a state which stands in certain relations to other states/inputs/outputs. However, the theory does not commit you to a thesis concerning what realises the property of pain. Although the property is identified with a certain functional state, what ontologically grounds this state is yet to be decided.

I think Shoemaker's different versions of causalism can be better understood once we have recognised their relation to other functionalists accounts. The essence of causalism should be identified with the network model which states that properties are defined by their relational aspects. This provides us with individuation conditions for properties, and tells us what properties there are. This is very close to Shoemaker's exposition of weak causalism. Here he avoids making any metaphysical assumptions,[24] instead identifying causalism with the individuation conditions outlined on p.9. He slightly blurs matters by implying that weak properties could also have non-causal aspects, but I shall ignore this because it seems to stem from his desire to move away from strong causalism, and his failure to see the origins of the account.

Strong causalism, on the other hand, can be seen as adding metaphysical assumptions to the core causalist thesis (i.e. the network model). Shoemaker's 1980s papers seems to suggest that the claim that properties are defined by their causal roles, commits us to an ontological thesis to the effect that properties just are their causal roles.[25] I have argued that this is mistaken. Without importing further claims we do not get this conclusion. What we could interpret Shoemaker as trying to do in his statement of strong causalism, however, is something analogous to what the functional identity theorist does.[26] They claim that a property just is a certain state which plays an abstract causal role. This does not tell us what (in the ontological sense) a property is, but it does claim that all there is to being the property of red, for

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[24] Although a fully worked out theory would have to make some metaphysical assumptions (see footnote 23 for further details).

[25] I might be mistaken in attributing this to Shoemaker. His formulation seems to suggests it, however. Furthermore, in his 1998 paper he refers to his earlier view as trying to reduce properties to more basic entities (causal powers), which implies that properties ontologically are causal powers. But because his presentation of strong causalism is rather vague, I am not sure about this.

[26] This is a rather creative reconstruction of Shoemaker's account.

instance, is the fact that it occupies a certain causal role. Hence, it seems to make good sense out of Shoemaker's presentation of strong causalism (see, for example, 1980a p.210 and 212).

As we have seen, there is more than one way in which causalism might be spelt out. What a causalist need to try to do, therefore, is make explicit what metaphysical assumptions they are adding to the core theory. In chapter four, I shall suggest a version of causalism which, I think, offers us a plausible account of properties.

I.iv. Summary

In this chapter, I have argued for the negative claim that causalism is not primarily about taking a stance in the debate about dispositions. This setting, or one which views causalism as some sort of principle of property existence, does not provide the right background for the debate. Next, I made the positive claim that causalism could be seen as analogous to Lewis' account of theoretical terms. But this should not blind us to its close connections with other issues within philosophy. In the course of this thesis, I hope to show that the account has ramifications for theories of causation, the laws of nature and modality.

The reason I have discussed causalism's relations to other accounts so extensively, is that I hope it has served to uncover its central commitments, and provided us with some idea of how we should go about defending it. One of the main tasks facing a causalist is to defend its individuation conditions for properties (see p.9). In the next chapter, therefore, I shall examine Shoemaker's attempt to do so. Part and parcel of the criterion of individuation, is a commitment to the claim that the laws of nature are metaphysically necessary. Hence, one of the biggest challenges facing a causalist it to defend this contentious claim. Such an attempt will involve a causalist in issues which encompass both a theory of laws and modality. This shall be the concern of chapter three of this thesis.

As well as supporting their individuation conditions, I think a causalist should also try to show how their theory about how we define properties, fits into a wider (and, hopefully, plausible) metaphysical account of properties and causal powers. For many issues demanding consideration are left open by the causalist's analysis. Should we, for instance, hold on to the thesis that there is nothing more to properties than

their relational characterisation? How should we understand the claim that properties are causal powers? How does it relate to a theory of properties/causation? Chapter four will be concerned with these issues.

Chapter Two: Shoemaker's Defence of Causalism

Shoemaker's argument for causalism (in his 1980s papers) consists entirely in the epistemological benefits causalism is intended to bestow. It has the following form:

1) We know (or can know) facts of sort F;
2) If metaphysical thesis M were not true, then it would be impossible to know facts of sort F;
3) Therefore, metaphysical thesis M is true (Shoemaker, 1980b p.323).

He begins by claiming that we can know facts about properties, by the effects they have. Thus, if we make the identity of a property consist in something logically independent of their causal potentialities (i.e. if we claim that causalism is false), we would be forced to conclude that there could be properties which make absolutely no difference to the causal potentialities of objects. This would result in us not being able to know the facts about properties which we take ourselves to know. For if it were true that properties could make no difference to the causal potentialities of objects, these possibilities are created:

a) Two different properties could make exactly the same contributions in all possible circumstances. Therefore, our practice of supposing that a single property is responsible for a particular cluster of causal powers is not justified. An infinite number of properties could equally well be said to be responsible for that particular cluster of causal powers. Similarly, we could not say that two objects resembled each other due to some shared property, because if it is possible to have two different properties with exactly the same causal potentialities, resemblances do not provide an adequate criteria for sameness of property.

b) Properties could exist which have no potential whatsoever for contributing to the causal potentialities of objects. So, the fact that the properties A and B have similar effects on our instruments and A and C do not, does not provide us with adequate justification for the claim that A and B resemble each other more closely than A and C, because it may be that A and C share lots more properties – of the causally impotent kind – than A and B.

c) An object may undergo a radical change with respect to its properties, without undergoing any change in its causal powers. Or, a radical change in its causal powers, without undergoing any change in its properties. Therefore, if the properties and causal potentialities could vary independently of one another, it would be impossible to know that an object had retained a property over time.

Given then, that these possibilities do make it "impossible for us to know various things which we take ourselves to know" (Shoemaker, 1980a p.215), we need to reject the thesis that created these possibilities, and thus embrace causalism.

We could try responding to this argument by claiming that although the rejection of causalism would allow these possibilities, nevertheless, they are nothing to worry about. Swinburne, for example, argues that we are justified in dismissing them because we can appeal to the principle of simplicity. (This is a methodological principle which states that we should "postulate the simplest explanation of the phenomenon" - Swinburne, 1980 p.315.) Once we have added this to our schema, then we can reject these logical possibilities, because they are more complicated explanations of the available data. So, for example, "It is simpler to suppose that two objects producing a certain set of effects in certain circumstances do so in virtue of possessing a common property, than that they do so in virtue of possessing two different properties" (Swinburne, 1980 p.315-6).

Shoemaker objects to this response on the grounds that appeals to theoretical simplicity are questionable in this context. He illustrates his assertion with this example (1980a p.216): imagine that a water supply remained poisonous all day. It is simpler to explain this fact by postulating one substance which made the water poisonous, rather than two substances - say cyanide till noon and strychnine afterwards. However, this only holds because we assume that constant causal potentialities are grounded by constant underlying properties. Once we have removed this assumption, we can no longer presuppose that postulating constant properties provides the simplest explanation of the sameness of causal powers, because it is this very assumption which makes the explanation the simplest one. Therefore, if we abandon this presupposition, appeals to theoretical simplicity are futile.

Swinburne retorts by claiming that it is "a contingent feature of the example which Shoemaker constructs that this presupposition is made" (i.e. the presupposition that, when using the criteria of simplicity to decide between two hypotheses, we are

already supposing that properties remain constant in their causal potentialities). Thus, he denies that this "has any tendency to show that we do not use the criteria of simplicity to provide our normal grounds for supposing that in general properties do remain constant in their causal potentialities" (1980, p.316). I'm not convinced by this reply. It seems conceivable that there could be cases in which a hypothesis is the simpler explanation, only because we make the assumption that underlying constant causal powers, are constant properties. (So, for instance, it seems likely that a doctor of a patient with distinctive symptoms, will suppose that the person has the same disease as others with the same distinctive symptoms, because this presupposition is in place.) The problem with appealing to "the simplest explanation" is that unless we have some assumptions concerning what constitutes the simplest explanation, the principle appears vacuous. Therefore, it seems plausible to suspect that the causalist's assumption informs the presuppositions involved in applying the principle.

Nevertheless, there does seem reason for believing that Swinburne is right to think that the possibilities Shoemaker outlines are nothing to worry about. The plausibility of this reply, however, does not turn on the principle of simplicity, as Swinburne suggests, but rather upon what background epistemological assumptions are in play. Shoemaker's argument is a special version of a more general sceptical argument, another instance of which can be stated as follows: imagine that there is a city which is identical to London in every way except for the fact that it is located on another planet. If I, without my knowing, were transported to this city, then I would think that I was still in London. Does this mean that, given that I am in London, I cannot know that I am in London? Not necessarily. Although there is something intuitive in the thought that if we can't rule out certain possibilities, I cannot claim to know the facts I do, most have thought this to be too stringent a condition for knowledge, and have thus developed their epistemological theory accordingly. So, for example, most externalist theories would allow that I know I am in London, despite the fact that I could have been transported to its duplicate, because they argue that not all the factors that justify a knowledge claim, need be cognitively accessible to the subject (see, for instance, Goldman, 1979). Therefore, if we have adopted an epistemological theory which can account for our knowledge of being in London despite the epistemic possibility that I am in a duplicate city elsewhere, then the force of Shoemaker's argument is removed. For the fact that there could be different properties that look identical, and identical properties that look different, does not

imply (assuming that I am not actually confronted with such properties) that I am incapable of knowing whether two properties are different or not.

Another way of objecting to Shoemaker's argument is by questioning its form. Swinburne argues that it has a "strongly verificationist flavour" (1980, p.315), because it takes the form: it is impossible to know that__ so it can't be the case that__. He argues that although Shoemaker is correct to say that we could never have good reason for supposing that there exist properties which make no causal contribution whatsoever, this in no way justifies the conclusion that it is impossible that there exists such properties. The only reason for moving from the first premise to the second is provided by the "dogma of verificationism", i.e. the claim that "a sentence is meaningful if and only if it can to some degree in some way be verified or falsified" (Swinburne, 1980 p.316). As this view is widely thought to have been discredited, the argument's reliance upon this dogma is worrying.

This objection appears to be in order. Shoemaker's argument is analogous to this one: if I were a brain in a vat being fed sensations, I could not possibly know this to be the case. Therefore, this scenario is impossible. The principle behind this reasoning is that if we could never know that P, if P were true, then P is impossible. But, as Swinburne states, there is little reason to accept this principle, independent of the verificationist theory of meaning. Hence, Shoemaker's argument should be rejected.

What if, however, we have some independent reason for thinking that the nature of physical kinds is such that we can always know about them. Does this assumption entitle Shoemaker to the conclusion that a property's causal powers are essential to it? Owens argues not (1992, p.39), because in order to rule out the possibilities listed above (see p.30-1), we only need endorse the following claims:

a) Necessarily, properties have causal powers. (This rules out causally inert properties.)
b) Necessarily, different properties have different causal powers. (This rules out the possibility of two different properties having the same causal powers.)
c) Necessarily, identical properties have the same causal powers. (This rules out the possibility of the same property changing its causal powers over time.)

Shoemaker's conclusion does not follow from this. From a)-c) we can only conclude that, necessarily, each property has some distinctive set of causal powers associated with it. This is not equivalent to the claim that all the cluster of causal powers which are associated with a property in the actual world, are essential to it. Hence, Shoemaker's argument does not show that causal powers are necessarily identified with properties.

Unfortunately, then, Shoemaker's epistemological argument is not up to the job of establishing causalism.[27] Hence, we need to present some other reasons for adopting causalism. In what follows, therefore, I shall try to develop a non-epistemological strategy which, I hope, will provide causalism with a bit more support.

[27] In his 1998 paper, Shoemaker abandons the epistemological argument. He relies instead on the fact that we can identify properties by their causal powers due to the consistency of laws through time (see p.47).

Chapter Three: Laws and Modality

In this chapter, I shall argue that causalism's commitment to the claim that the laws of nature are metaphysical necessary, is both defendable and a significant advantage of the account.

III.i. Humean and Non-Humean Accounts of Laws

It is widely held that one of the primary tasks of science is to discover what laws govern our universe.[28] Hence, the scientific enterprise raises an inquiry into the nature of laws. Philosophical approaches to this investigation have varied in line with what aspect of the question, "what is a law of nature?", have been focused on. Humeans have tended to concentrate on question a) what makes a given statement a statement of law? While non-Humeans have been more interested in question b) what aspect of the world does a law statement report? Or, in Armstrongian language, what is the truthmaker of law statements?

This difference in emphasis between the Humeans and non-Humeans can be seen if we look at their responses to the question, "what distinguishes a statement of law from a true universal generalisation?". Everybody accepts that there is a need to make a distinction between lawful regularities (like the fact that water boils at 100°C) and coincidental regularities (like the fact that every time I go to Wigan it rains), despite the fact that both have held without exception in the past.[29] But Humeans (see, for example, Ayer 1953, Braithwaite 1972, Lewis 1973 and Mackie 1974) claim that the difference between the two holds only at the level of statements. They argue that the law "all Fs are Gs", is nothing more than the claim that all actual Fs turn out to be Gs, i.e. $\forall x\ (Fx \rightarrow Gx)$. Therefore, because the metaphysical reality which underpins

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[28] The laws which the sciences are primarily concerned with uncovering are the basic or fundamental principles of our universe. While these, and conjunctions of these, will result in further truths (whether or not we decide to call these truths laws seems little more than a terminological dispute - I shall refer to them as "derived laws"), the thought is that they derive their lawlikeness from the basic principles. What concerns us here are these basic principles.

[29] Philosophers usually assume that the real laws are exceptionless, i.e. they hold true in all situations in which they are supposed to apply. This claim, however, has increasingly been put under scrutiny. Cartwright, for instance, has argued that this is only true because a "ceteris paribus" clause is inserted into our law statements. This renders laws exceptionless by trivialising them – all Fs are (ceteris paribus) Gs can, in practice, be spelt out as "all Fs are ("other things being right" – 1983, p.45) Gs". She argues that we can only formulate laws by idealising and simplifying the conditions in which they are said to obtain. Laws are, therefore, not exceptionless generalisations but rather unrealistic generalisations which do not hold true of reality. However, I shall put aside Cartwright's sceptical doubts here.

laws is just the fact that certain regularities hold (hence, the label "regularity theory"),[30] there is no metaphysical fact which is capable of differentiating laws from accidents. According to Humeans then, what serves to distinguish the two types of regularities lies at the level of linguistic reality. Law statements are distinct from true universal generalisations because they are employed differently – the statements play different roles in our theorising about the world.

The non-Humean takes a different approach (see, for example, Dretske 1977, Armstrong 1983 and Tooley 1987). Question a) is not their primary concern. They believe that there is more to laws than regularities. Hence, the division between law statements and true universal generalisations corresponds to a metaphysical, not just linguistic, difference. According to non-Humeans, the distinction between the two types of regularity is grounded in the fact that a true generalisation records a state of affairs in which all actual F events happened to be G events, while a law expresses a relation of "nomic necessity" between the properties F and G.

I made it clear in the introduction that I assume a realist framework. Since a realist assumes that there is some metaphysical reality which underpins law statements (i.e. that an answer to question a) will be given via an answer to question b)), this chapter shall be primarily concerned with non-Humean accounts of laws. However, before proceeding to the main business, I shall take this opportunity to briefly state some intuitions which drive the non-Humean approach. The central thought is that Humean theories fail to do justice to the real differences between laws and accidents. Dretske lists six features which we take laws, but not true universal generalisations, to share (1977, p.262-3). They can be stated as follows:

a) A statement of law has its descriptive terms occurring in opaque positions.
b) The existence of laws does not await our identification of them as laws. In this sense they are objective and independent of epistemic considerations.
c) Laws can be confirmed by their instances and the confirmation of a law raises the probability that the unexamined instances will resemble (in the respect described by the law) the examined instances. In this respect they are useful tools for prediction.

[30] One consequence of this approach is that it commits you to the contingency thesis (i.e. the claim that the laws of nature are contingent – CT for short), because all the facts that make the laws true are contingent.

d) Laws are not merely summaries of their instances; typically, they figure in the explanation of the phenomena falling within their scope.
e) Laws support counterfactuals; to know a law is to know what would happen if certain counterfactual conditions were realised.
f) Laws tell us what must happen, not merely what has.

Dretske calls these characteristics manifestations of "ontological ascent" (p.263); they mark the shift from talking about individual events, to talking about laws.

Humean theories seem counter-intuitive because they fail to respect (at least some of) these features of laws. So, for example, Braithwaite argues that a hypothesis is lawlike if "it occurs in an established scientific deductive system as a deduction from higher-level hypotheses" (1927, p.302). One difficulty with this approach, which Braithwaite recognises, is that it has the paradoxical consequence of suggesting that the most basic principles of our scientific system are not laws. Another is that it fails to respect feature b) on Dretske's list - we suppose that laws exist before they become part of a scientific hypothesis.

These considerations lead Braithwaite to change tack. He argues that the most basic principles of a system are lawlike because they have explanatory force. This renders explanatory power, not deducibility, the most fundamental feature of laws. Hence, the proposal accords well with c). But despite this, the suggestion being offered is still counter-intuitive. For although a regularity theorist can avail themselves of the fact that laws perform an important role in explanation, they cannot offer any rationale of *how* they can play this role. Since if a law is just a true universal generalisation of the form $\forall x\ (Fx \rightarrow Gx)$, this fact goes no way towards explaining why any F happened to be G. Thus, although we do invoke laws to account for phenomenon, this practice has no justified basis if we think a law is just a universal truth.

This is not intended as an argument against the regularity theorist, because it presupposes that we are trying to answer question b) rather than question a), and I already pointed out that the Humean, anti-realist approach is only concerned with a). But it is, I think, a good example of why the Humean project strikes many as limiting. We don't just want to know that our law statements explain, we want to know why they do. The question which seems of utmost importance to me, doesn't concern what function law statements and true generalisations play in our theorising. Rather, it

concerns what metaphysical facts justify our treating the statements so differently. In the next section, I shall return to the main line of argument. I shall raise a problem for the traditional non-Humean account (I shall use Armstrong as a typical example of this approach) which, I think, will serve to motivate the causalist's approach.

III.ii. A Problem for the Non-Humean

Armstrong offers a more intuitive account of laws. He argues that what makes certain regularities lawful are second-order states of affairs (e.g. N(F,G)), in which two first-order universals (F and G) are related by a certain dyadic second-order universal (N). According to Armstrong, it is a contingent matter which universals are related by the lawmaker N, but if N(F,G) obtains, then it necessarily implies the first-order regularity $\forall x(Fx \rightarrow Gx)$. Furthermore, if N(F,G) and Fa, then Ga will necessarily follow (so long as there is no further state of affairs that could act as a defeater). Therefore, according to this account, necessary connections between universals form the basis of the distinction between law-like and coincidental regularities. The former express necessary connections between universals, whereas the latter only report facts like "all (actual) Fs happen to be Gs". [31]

Armstrong is thus committed to these two claims:

a) Laws are contingent.

b) In a law, a relation of necessitation connects the universals.

These two claims are not inconsistent because that a relation of necessitation holds between F and G does not imply that the relation holds necessarily. However, he owes us an account of how this relation of necessitation should be understood, given his commitment to a).

Armstrong appeals to a notion of "physical necessity" or some sort of "contingent necessity" (1983, p.97) to connect the universals. He argues that the law "all Fs are Gs" can be expressed by the locution "it is physically necessary that Fs are Gs", where "physical necessity" stands for something stronger than "all (actual) Fs are Gs", but weaker than "it is logically (or metaphysically) necessary that Fs are Gs".

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[31] Dretske (1977) and Tooley (1987) offer very similar accounts to Armstrong's. (I am primarily referring to these three theories when I mention "non-Humean accounts".) Dretske, for example, writes that "laws are expressed by singular statements of fact describing the relationships between properties and magnitudes" (p.261). Whereas Tooley argues that the truth-makers for law-statements report relations of nomic necessitation among universals (see, for example, p.79).

There is some ambiguity surrounding what Armstrong takes the truthmaker for this "physical/contingent necessity" to be. It is definitely a relation between universals, but this leaves it open whether the necessity is something which derives from the connected universals, or is a characteristic of the nomic relation itself. The second reading appears more likely, however, in light of what has been said. For if Armstrong is claiming that the necessity is derived from the universals, then he would have to say either that it is an essential feature of F that it is nomically related to G (hence rendering us metaphysical necessity). Or, that it is a contingent feature of F that it is nomically related to G (hence rendering us no necessity). We should probably grant then, that the model being suggested is that the necessity is a feature of the nomic relation N which exists between F and G. Then Armstrong can claim, as he seems to want to (see, for example, 1983, p.85), that if the nomic relation N and the universal F exist, G must obtain. But it is not the case that $\Box(\forall x)(Fx \rightarrow Gx)$, because F and G may both exist without the nomic relation N existing to connect them.

Unfortunately, however, just talking about a necessitating nomic relation between universals achieves very little – it labels the difference between laws and true universal generalisations, but it doesn't tell us what that difference amounts to. What Armstrong needs to do, therefore, is offer an analysis of the nomic relation, which shows how it accounts for the differences between laws and true universal generalisations.

I find Armstrong's reasoning for the conclusion that his account provides us with some "hard-to-capture necessity" (1993, p.145) rather obscure. He writes that there is "something identical in each F which makes it an F" (namely, a universal), and "something identical in each G which makes it a G". Hence, we can say that, "being an F necessitated being a G and, because of this, each individual F must be a G" (1983, p.78). What I think is doing the work for Armstrong here, is the move from talking about particulars to talking about types (analysed as universals). If we say that a relation holds between a type of state of affairs (universal F) and another (universal G), then automatically, every particular which instantiates F will also instantiate G, because F and G are identical in all their instantiations.

How is this supposed to render us physical necessity? Well, as physical necessity is as yet an undefined theoretical term, it is not at all clear what the theory is trying to support. Nevertheless, as it is supposed to be something that reflects what we

take our laws of nature to be like, I shall test Armstrong's account by seeing whether it can substantiate our practice of projecting laws into counterfactual situations.

Armstrong certainly seems to think it can,[32] because he invokes this fact as a reason for preferring his account to the regularity theory (see 1983, p.103). He argues that the latter cannot explain this practice, because its analysis of the law "all Fs are Gs" states that "all actual Fs are Gs". Therefore, if we extend the class of Fs to include not only Fs but also possible Fs, the extension of F is changed. Hence, we have no reason to think that the laws will hold in this new case. Armstrong thinks his theory is an improvement on this. He writes,

> The law, a single entity, a higher-order state of affairs, remains exactly the same, strictly identical, regardless of the number of its instantiations. So when it is supposed a is F, the truth-maker for the law-statement has not changed. The extension of the law to the new case requires no justification (1983, p.259).

The suggestion seems to be that laws cannot change because the universals are somehow related into "a higher-order state of affairs". Hence, when we imagine changes in the extension of a universal, no reason is provided for thinking that the nomological relations between the universals are themselves altered.

This proposal appears to be based on the thought that imagining that the higher-order state of affairs N(F,G) is different, involves a bigger departure from reality than imagining that the extension of this state of affairs is different. Or, put in the language of possible worlds, Armstrong is claiming that in nearby possible worlds (i.e. ones quite similar to ours), we tend to hold the law N(F,G) fixed rather than the extensions of F and G. I think this is an inadequate *realist* account. Nothing has been said to show that this practice is something more than a mere convention, because Armstrong has not presented us with a truthmaker for the claim that G and F are nomically related in counterfactual situations. Moreover, I think it's plausible to say that no truthmaker is available to Armstrong, if he insists on claiming that the relation between the universals is contingent. Hence, Armstrong's account does not prove to be an advance on what a Humean can offer after all - for they too can avail themselves of the convention that in counterfactual situations, we hold law-like

[32] Dretske also appeals to this fact as a way of motivating his account. He claims that the relationship between universals, despite not being a modal relationship, "imposes a modal quality on the particular events" (p.264). It is not clear how this is so, however. He argues that "This F must be G. Why? Because F-ness is linked to G-ness" (p.264). But if there is no modal quality to the relationship, then there is no justification for smuggling in the "must".

regularities, but not the other types, fixed.[33] Indeed, Armstrong's appeal to convention or linguistic practice plays into their hands, because this is just the sort of difference Humeans want to claim exists between laws and true universal generalisations.

Without an ontological truthmaker, or some objective basis, for our practice of projecting laws rather than true universal generalisations into counterfactual situations, Armstrong's assertion that the laws involve "physical *necessity*" seems hollow. What does this amount to? How exactly does this relation between F and G render the laws necessary? Without clarifying the type of necessity involved in laws, fuel is given to the Humeans case, because they can legitimately complain that the so-called necessity involved in alternative accounts of laws is unfathomable. This is exactly what Lewis does. He argues that the necessary connections invoked by the non-Humean are unintelligible, commenting,

> The mystery is somewhat hidden by Armstrong's terminology. He uses "necessitates" as the name for the law-making universal N and who would be surprised to hear that if F "necessitates" G and a is F, then a must have G? But I say that N deserves the name of "necessitation" only if, somehow, it really can enter into the requisite necessary connections. It can't enter into them just by bearing a name, anymore than one can have mighty biceps just by being called "Armstrong". (1999, p.40)

I think Lewis hits the crux of the problem here. If non-Humeans are serious about endorsing the existence of necessary connections, then they need a truthmaker which explains why it is impossible in our world to have the law N(F,G) and Fa without Ga. It is not clear how invoking the idea of "physical necessity" can achieve this aim. Even if we grant the non-Humean a primitive notion of "physical necessity", which designates a number of possible worlds where the relation N(F,G) obtains between properties, this does nothing to show that we have thus defined an appropriate sense of the word "necessitates". In fact, I don't see how it could. For we do not want to claim that just because I could have existed in a number of possible worlds, there is some sort of necessity involved in my existence. Adding in a number of possible worlds to the list of where something is the case, does nothing to make

[33] Lewis offers us an excellent example of how a Humean can offer us a similar account to Armstrong's. He argues that laws can support counterfactuals, because laws are those generalisations which are part of an optimal scientific system. A world in which a law fails, is one where many other generalisations fail too, and so, it will be relatively distant from the actual world. Therefore, in the nearest possible worlds where some counterfactual antecedent holds good, we would expect our laws to hold good too, hence constraining the counterfactual consequent. An accident counterfactual, on the other hand, can fail to be true without requiring any further changes to other generalisations. Thus, it is quite possible for it to be false in the nearest possible worlds, i.e. for the counterfactual antecedent to hold, and the consequent to be false. (See Lewis, 1973 and 1986a. In 1986a p.47-8, Lewis provides us with a system of priorities for the relation of similarity/closeness between worlds.)

that state of affairs anymore necessary. Therefore, it is difficult to see what is the use of appealing to "physical necessity", because the notion does not seem to connect with our ordinary concept of necessity (namely, the idiom "it couldn't have been otherwise").

III.iii. The Appeal Of CT

Given the difficulties a non-Humean faces trying to make sense out of the combination of CT, and the claim that there is a relation of nomic necessitation between properties, we may wonder why most non-Humeans have wanted to hold onto CT. The reason for this is that its denial is usually thought to face the opposite problem. Rather than not being able to provide us with a meaningful notion of necessity which is strong enough to capture the thought that "F must follow G", it is generally believed that its rejection gives us too much necessity. To see why, consider the example of a brick being thrown at a window, causing the glass to break. A causalist argues that in every possible world, given that the properties of the moving brick and the glass are identical to the properties of the moving brick and glass in the actual world, the cause has to produce the very same effect in that world, because the properties of the brick and the properties of the glass are just specifications of what powers (active or passive) the brick and glass have. Therefore, the cause (given the same circumstances) will necessarily (in the sense of in all possible worlds where those circumstances exist) bring about the effect.

It is not difficult to appreciate why people might feel that this provides us with too much necessity. For we certainly seem able to imagine a situation in which the brick hit the glass but did not break it, even if all the properties of the brick and glass are the same. It seems likely that one of the primary reasons why causalism is so often dismissed, is because it ties us to the claim that laws are metaphysically necessary (see p.9). I shall, therefore, briefly consider whether causalism is committed to such a contentious thesis.

Shoemaker discusses two ways we might try to hold onto our intuition that the brick might have broken the glass. First, he considers the possibility of divorcing laws from a description of the causal potentialities of properties. He had argued that "causal laws can be viewed as propositions describing the causal potentialities of properties" (1980a, p.222). Thus making it "impossible that the same properties

should be governed by different laws in different possible worlds" (1980a, p.222). However, he now considers an alternative possibility - that of asserting the existence of laws other than ones describing the causal potentialities of properties - laws which state the connections that exist between the conditional powers. We can say that these laws are contingent, without contradicting causalism. Thus enabling us to say that in worlds where these different lawlike connections hold, conditional powers can be differently clustered into properties.

I'm not sure how this suggestion is supposed to work. Take, for example, the conditional power of knife-shapedness to cut wood and wood's passive power of being able to be cut by steel knives. We could say that a contingent law connects these two conditional powers. Thus, in some possible world where a different law exists between the two conditional powers, steel knives will be unable to cut through wood. This, however, does not seem to get us any nearer our goal, because contingency is only bought by changing the causal potentialities of properties. A causalist could still not say, as Humean intuitions seem to demand, that the very same property can have different causal powers. For even if there existed a possible world in which two conditional powers were connected in a different way, this would not be a world in which the same properties were instantiated. We saw earlier how a property was specified with reference to its conditional powers, for example, the property of being knife-shaped was said to have the conditional power of being able to cut through wood, conditionally upon being steel. If the property of being knife-shaped did not exercise the conditional power of being able to cut wood conditionally upon being made out of steel then, *ex hypothesi*, this would not be the same property. Thus, if the causal laws between conditional properties are different, then we have to say that the properties are different also, because the properties have been specified with reference to the conditional powers and the relations between them. We could try and remedy this by abandoning the idea of properties as transworld entities. Then we could say that properties are identical to the causal potentialities of objects in this world, but they do not travel beyond our world. But this would still not solve our problem, because it will remain the case that all the causal potentialities of a property

will be essential to it. Just because it does not exist in any other possible world, does not change this fact.[34]

The second suggestion considered by Shoemaker is named the "core cluster theory" (1980a, p.225). This states that a property should be identified with the cluster of conditional powers which are essential to it. Therefore, every property of type P will have a requisite set of conditional powers, but not all the conditional powers associated with P in the actual world will be in this set, and so P may have different causal potentialities in other possible worlds. I am going to put this suggestion to one side not, primarily, due to the epistemological difficulties which Shoemaker discusses (see 1980a, p.227-9),[35] but because we have to allow that some of the causal powers of properties are necessary. If we accept this claim, the Humean intuition is contravened. Thus, we might as well claim that all of a property's powers are essential to it, and avoid the difficulties introduced by the cluster theory.

I think that Shoemaker is right to claim that the hopes of plausibly combining causalism with less contentious modal commitments look slim. Therefore, I think a causalist should accept this conclusion and proceed by trying to nullify the force of CT. The rest of this chapter will thus try to argue for two claims. First, I shall put forward the negative thesis that CT is based on insubstantial argument. Then, I shall put forward the positive claim that, in light of the discussion in III.ii., this should not be seen as an objection against causalism, but rather as a reason for accepting it.

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[34] One way we might be able to modify causalism's modal commitments, would be to utilise the suggestion made by Lewis in his discussion of accidental properties (1986, p.174). We could argue that while it's correct to say that our property of red, for example, is the set of conditional powers$_{1\text{-}n}$, there could be a counterpart of red, which has a different set of conditional powers. Then we could claim that the causal potentialities of property P are essential to it iff there is no possible world where a counterpart of P exists that has a different set of conditional powers from P in the actual world. Therefore, because we can say of the property red that there exists a counterpart with different causal potentialities, we can say that the causal powers that red actually has, are not essential to it. This account, like the first, cannot allow that there exists a possible world which exemplifies a property that exists in the actual world, but without some of its causal potentialities. But, it does manage to overcome this problem by providing another analysis of what it means to say that a property has its causal potentialities essentially. This alternative, however, depends upon accepting Lewis' contentious theory of counterparts, a theory which I find unattractive. I also think that causalism's denial of CT is an advantage of the theory. Hence, I think its counterproductive to pursue this attempt to combine CT with causalism.

[35] This discussion is based on how we know which of the causal potentialities are essential.

III.iv. CT - The Unfounded Claim

Hume's celebrated discussion of causality has constituted the basis of the case for CT. His argument for the thesis can, for the most part, be found in this passage:

> When I see, for instance, a billiard ball moving in a straight line towards another... may I not conceive that a hundred different events might as well follow from that cause? May not both these balls remain at absolute rest? May not the first ball return in a straight line, or leap off from the second in any line or direction? All these suppositions are consistent and conceivable. Why then should we give preference to one, which is no more consistent or conceivable than the rest? All our reasonings *a priori* will never be able to show us any foundation for this preference.
>
> In a word then, every effect is a distinct effect from its cause. It could not, therefore, be discovered in the cause, and the first invention or conception of it, *a priori*, must be entirely arbitrary. (1975 p.29-30).

The extract contains three claims all of which purport to support CT:

a) We can conceive of contradictory events following from the same cause.
b) We discover causal connections *a posteriori* not *a priori*.
c) Causes are distinct from their effects.

The last of these claims I have already discussed in another context (see p.19-20). I interpreted Hume's thought as being that because our cause idea does not entail the idea of the effect (unlike say "bachelor" and "unmarried"), causes do not necessitate their effects. Hence, (if this reading is correct) it states no more than claim b) – causes can't be necessary because they are discovered *a posteriori*, not knowable *a priori*. In the next two sections, therefore, I shall discuss what grounds we have for believing a) and b). I shall begin by looking at b).

Kripke's A Posteriori Necessities

Hume seems right to think that one of the most crucial differences between our idea of nomic necessity and that of logical or conceptual necessity is captured by the fact that the former is based on experience, while the latter is divorced from experience, finding its origin (somehow) in "the relations of ideas". The question I shall therefore consider is: what conclusions should we draw from this difference?

The general consensus since Kripke has been that we should sharply distinguish the notions of necessity and possibility from that of a priority and a posteriori (1972). The reason for this is simple: an *a priori* truth is one which gains its justification independent of any experience. The status of a necessary truth, by contrast, is not determined by how we grasp the truth of the proposition. The basic

intuition behind this notion, is captured by the idiom "it couldn't have been otherwise". A proposition is said to be necessary if it describes something true in every possible world/situation. This difference in emphasis between these two sets of concepts, indicates that they should be sharply distinguished. For the first belongs to epistemology; it concerns how we can know things. Whereas the second is a metaphysical notion; it says something about how the world must be, rather than just how it actually is.

Kripke supports his claim by trying to show that the two notions can come apart, i.e. that there can be contingent *a priori* truths (see p.75) and necessary a posteriori truths (see p.128-9). Traditionally, because the class of necessary truths had been restricted to those of logic, mathematics and analytic statements, all necessary statements had the status of being *a priori* and vice versa. But Kripke argues that semantic facts and logical truths create a much broader class of necessary truths than had previously been recognised. To see why, first consider an uncontroversial necessary truth, like all bachelors are unmarried men. From the fact that "bachelor" means "an unmarried man", and the logical truth (which has the status of being necessary) that "all unmarried men are unmarried", we get the result that □(all bachelors are unmarried men). Kripke argues that the same reasoning demonstrates that there are necessary a posteriori truths. For if we grant that water, for example, cannot be water, without being H_2O (just like a man cannot be unmarried without also being a bachelor), then we would have shown that the identity statement "water = H_2O" is necessary, because □ (water = water).

Why should we think that a substance isn't water if it isn't H_2O? Kripke argues that because science has demonstrated that water *is* H_2O, any substance in the actual world which is similar to water, but which has a different molecular structure, is not water. Similarly then, if we consider a counterfactual situation in which there is a substance very similar to water but which has molecular structure XYZ rather than H_2O, this substance isn't water because what water is, is H_2O. The fact that people in the counterfactual world might refer to the substance as "water" is beside the point, it is not the substance which our term "water" refers to.[36]

[36] Lots more needs to be said at this point, in order to provide an adequate defence of Kripke. Chalmers' primary intensions, for example, pose an important challenge to Kripke's semantics (1996). I have not the space to go into this debate here.

If we grant this conclusion, then we can perhaps formulate an analogous case for causalism (see Shoemaker 1998). For it seems arguably the case that water is essentially H_2O, because it must have this property across time. So, for example, if tomorrow I discovered a "fool's water" with a radically different chemical analysis, we would not expect philosophers to stop writing "water = H_2O". This seems to gives us reason to think that if, in a possible world, a Martian made the same discovery, we would not claim that this substance was water. Therefore, there appears to be some justification for Shoemaker's conclusion that, "constraints on intra-world variation are also constraints on inter-world variation" (1998, p.70).

If this principle constitutes (at least part of) the reasoning which renders the conclusion that water is necessarily H_2O, then we can make an analogous claim for properties. For although different properties can be instantiated with greater or lesser frequency, and they can (so far as the laws of nature allow) be coinstantiated differently, they cannot be governed by different laws at different times and places. Thus, if Kripke's argument does rest, to some extent, on the intra/inter-world principle, then this gives us some reason to think that the causal powers of properties (which the laws describe) are essential to them also.

But perhaps this is pushing things too far. It is enough for the present purposes to have nullified the force of Hume's claim b). I think that Kripke manages to do this, because regardless of what we make of his thought experiments, his separation of the epistemological notions of *a priori* and a posteriori, from the metaphysical notions of necessity and possibility, still seems justified. Once this distinction has been admitted, Hume's observation has no force. For the mere fact that nomic necessity is discovered a posteriori, while logical necessity is knowable *a priori*, does not tell us anything about the type of necessity involved in each case. Or, in other words, we do not generate the conclusion that the necessity involved in laws is different from that involved in logic, from the premise that there are different epistemological methods of discovering laws and logical truths. Therefore, if you're willing to accept the conclusion that these two notions should be distinguished, then we get the result that Hume's claim b) does not support CT.

Conceivability as a Guide to Possibility

Hume's first claim is probably the most persuasive reason for adopting CT.[37] We can defend causalism, however, by showing that in each case where it is claimed that it is conceivable that our laws could have been otherwise, either the sense in which this is conceivable is an inadequate guide to possibility.[38] Or, if the sense of conceivability utilised is an adequate guide to possibility, then we are not actually conceiving of the laws being otherwise.

The contention that not all conceivings provide evidence for possibility has, I think, a firm basis. It is clear, for instance, that we can imagine (in some sense) Goldbach's conjecture being proven or disproved, despite the fact that if it's true, in conceiving it being disproved, I have conceived of something necessarily false and vice versa. The literature is littered with examples of cases where philosophers have claimed that although we *seem* able to conceive a certain situation, we are not really conceiving it properly. So, for example, since Kripke, many have wanted endorse the existence of necessary a posteriori identities such as "water = H_20" (see the previous section), despite the fact that we seem able to imagine water having a different molecular structure. Similarly, the rise of physicalism has resulted in numerous philosophers wanting to deny the possibility of the oft depicted, and hence imagined, zombies. If, therefore, someone wants to make a convincing argument against causalism from this point, it must be shown how we can exclude cases like Goldbach's conjecture, and probably more contentious cases like imagining water as XYZ and zombies, without thereby ruling out the causalist's claim.

Kripke defends his claim that "water = H_20" by arguing that whilst it seems conceivable that water = XYZ, it is actually impossible. The appearance of conceivability is created in one of two ways. Either what we are imagining is a situation in which the substance that we refer to as water (and which we now know to be H_20) could have been discovered to be something other than H_20. This is a case of epistemic possibility – our ignorance or imagined ignorance means that we find it possible to believe that the hypothesis could turn out either way (as in the case of

[37] Unless, that is, you have established the claim that we can adequately ground the laws of nature on non-nomological facts that are obviously contingent. Causal realists like Armstrong and Tooley, however, do not claim that the laws of nature can be grounded on non-nomological facts. Hence, they cannot use this as an argument for CT.

[38] I shall refer to the principle, "conceivability is an adequate guide to possibility" as CP.

Goldbach's conjecture). Or, we can seem to conceive of a situation where water isn't H_20, by imagining that the mode of presentation with which we have come to recognise water, is correlated with a substance which has a different molecular structure (see Kripke 1972, p.131-2). In both cases, however, Kripke wants to claim that we are not conceiving the scenario in a way relevant to proving its metaphysical possibility.

If we grant Kripke his claim that there are cases of seeming conceivability which can be explained by invoking the notion of "epistemic possibility", then a causalist can account for the seeming conceivability of laws being otherwise. For they too can argue that although we seem able to imagine the laws being different from what they actually are, this only reflects the epistemic possibility that they could have been otherwise (in light of the available evidence) for all we know. It does not establish that, granted they are true, they are only contingently so.

Yablo (1993) argues that conceivability, once it is understood properly, does support the CP principle. He characterises the relevant sense of conceivability as: "I find p conceivable if I can imagine, not a situation in which I truly believe that p, but one of which I truly believe that p" (p.26). Then, he takes us through different apparent counter-examples to illustrate why they do not constitute a rebuttal of this principle. So, for instance, he argues that this sense of conceivability does not really enable us to think that Hesperus (H) ≠ Phosphorus (P). The example is not even a case of epistemic possibility (as Kripke allows), because what I imagine I believe is not a situation in which my actual p-thought is true, since this would be equivalent to imagining myself believing that Venus was distinct from Venus. What accounts for its seeming possibility is rather the thought which my p-thought would have expressed, had the imagined situation obtained. So had it turned out that H≠P, then I could have expressed something true with my thought that Hesperus might not have been Phosphorus. But as it happens, I can't.

Yablo's sense of conceivability, however, not only allows Kripke's a posteriori identities into the net, it can also accommodate the causalist's thesis. The causalist can claim that what we are imagining with our p-thought, is not a situation in which the laws of nature are really different, but rather a situation in which if it had been the case that a certain property had different causal powers, then the laws describing its relationships with other properties could have been different. Hence,

Yablo does nothing to show that we can actually conceive (in the relevant sense) of the laws of nature not holding.

Nevertheless, we may try to respond by arguing that the two cases are disanalogous. Yablo's analysis of conceivability appeals to imagination. He writes, "to imagine an X is thereby to enjoy the appearance that an X could exist" (p.30). What exactly this amounts to is, I think, difficult to tell. Moreover, Yablo doesn't provide us with a clear indication of why imagination should be thought to give us access to what is possible. But there is one way we could try to utilise an appeal to imagination in favour of Hume's principle. Peacocke (1985) offers an experiential analysis of imagination. In experiential imagination we do not imagine in the sense of "suppose" or "entertain a thought", rather we "imagine from the inside being in some conscious state" (p.21). It is this experiential form of imagination - the capacity to imagine a certain experience, say of seeing a tiger - which, arguably, provides us with defeasible evidence for a situation's possibility.

The principle that if we can experientially imagine having an experience then such an experience is possible (EIP), seems to have some plausibility. For experience is our primary indicator of what is actually the case. Hence, it seems reasonable to claim that if we can imagine experiencing a certain situation, this is prima facie evidence for the possibility of the situation. Or, in other words, experiential imagination derives its authority about what might obtain, from the authority experience has about what actually obtains.

If we accept that EIP carries some weight, then we may think that there is a way of arguing for the contingency of laws, which does not render the case of H=P contingent also. For we can say that in the case of H=P, we cannot imagine an experience of seeing an H without also seeing P, because (given that H=P) we would have to imagine an experience of both seeing Venus and not seeing Venus. But when we consider the laws of nature, it seems quite easy to imagine having an experience of, for instance, a ball hitting another and yet of one not moving. Therefore, in this case, experiential imagination does provide us with defeasible evidence for CT.

Does this succeed in demonstrating that the burden of proof is on those who wish to deny CT? I don't think so, because it is far from clear that we are able to experientially imagine a case where the laws do not hold. Take the example of a ball hitting another and the second failing to move, does this constitute an experience of non-Newtonian behaviour? No, not unless we add in a commentary claiming, for

instance, that there are no other Newtonian forces at work on the second ball which stops it from moving; that the mass of the second ball is not so much greater than that of the first that it doesn't move with the impact of the second etc. The experience alone does not suffice to show us that what we perceive is a case in which Newton's laws do not hold. We need to add in the extra commentary in order for this conclusion to follow.

We may object that this imposes a false distinction between the content of an experience and the interpretation we put upon it. But this doesn't matter, because the plausibility of EIP rested on the fact that we can separate what we experience from what we merely suppose. Potential experience, on this suggestion, is the source of modal knowledge. Mere suppositions do not protect us from impossibility. Hence, if the objector is right to say that our interpretation completely permeates experience, then experiential imagination is a useless guide for revealing possibilities.

We may attempt to defend Hume's billiard ball experiment by arguing that although the necessary commentary is not part of the experience of two balls hitting one another, nevertheless, if we expand our imagination experiment to include lots of experiential tests which demonstrate, among other things, that there are no interfering forces, then this is enough to show that Newton's laws do not have to hold. But this is not so, because while we can imagine an experience, verified by a number of tests, which provides evidence for the claim that Newton's laws do not hold, the possibility of this experience only serves to establish that laws are known a posteriori, hence we can imagine evidence which counts against them. This is not equivalent to the claim that if the laws are true, they are contingently so. This latter claim would require not just an imagined experience of the laws not holding, but rather an experience of the laws obtaining or not obtaining. As it is very difficult to see how we could imagine such a possibility, experiential imagination does not provide us with a reason for thinking that CT holds.

I hope this section has provided some justification for the claim that there is no compelling reason why we should support CT. The most promising defence of the principle was based on this line of reasoning:

a) Conceivability is a reasonable guide to possibility.
b) We can conceive of a situation in which the laws do not hold.
c) Therefore, there is a possible world in which the laws do not obtain.

But in the accounts I examined, it could not be shown that, given the qualified senses of "conceivability" or "imagination" which were thought to provide reasonable guides to possibility, we could really conceive/imagine a world in which the laws do not obtain. Therefore, on the basis of this discussion, I conclude that there is no overwhelming reason why we shouldn't reject CT. In the final part of this chapter, I shall argue for the positive claim that not only do we have no reason to accept it, a non-Humean should reject it.

III.v. A Different Type of Non-Humean Approach

Causalism is like the other traditional non-Humean accounts in that it offers a property theory of law. It claims that laws state real relations between the properties of particulars. Where the view differs, is in its claim that the necessity involved in laws is a species of metaphysical necessity. It argues that laws are not contingent facts about our world, rather they hold true in every possible world where the relevant properties exist. In this section, I want to suggest that this alternative, non-Humean property theory of law is an improvement on the traditional non-Humean variants.

The mainstay of this case was presented in section III.ii. There it was argued that one of the major difficulties facing the non-Humean accounts, concerned how they could analyse the necessity involved in law statements. Appeals to the notion of "physical necessity" appear hopelessly vague. The only characterisation of this type of necessity seems to be that physically possible worlds are those with the same causal laws. But then, obviously, we can't invoke this notion in our analysis of laws. Moreover, even if we decide to accept that the notion of "physical necessity" is a primitive one which serves to quantify over possible worlds, it is still difficult to see how it connects with our ordinary understanding of necessity, and hence, with our everyday talk of laws (see p.41-2).

By contrast, the causalist's account gives content to the intuition that causal laws *must* hold, because the claim that laws hold true in every possible world falls out of their theory. They can, therefore, justifiably claim that laws make genuine modal claims concerning what can and cannot happen. This has two further happy consequences: first, it enables us to formulate a very clear distinction between law statements and true universal generalisations. Laws are those statements which hold

true in every possible world. True universal generalisations need only be true of our world. Second, it justifies our custom of supposing that laws hold in counterfactual situations because, very simply, they do hold in these situations. We thus have an objective basis for our practice.

Causalism's commitment to CT, therefore, far from being a disadvantage of the theory, is one of its most beneficial features. Without this in place, the difference between the Humean and non-Humean accounts is much smaller than is usually realised. Traditional non-Humean accounts offer "a second-order Humean picture" (Swoyer, 1982 p.211). Laws, rather than being cosmic coincidences at the level of particular events (as the Humeans claim), are cosmic coincidences at the level of properties. It takes more than a property theory of laws to avoid the radical contingency of the Humean picture. We require an explanation of how and why talk of properties renders us necessity. This is what causalism gives us. What it suggests is that if the nature of A dictates that it produces B in certain circumstances, and B does not occur, then the nature of the particular is not of type A after all. We thus have an account which can support genuine modal claims concerning what, given the laws of nature, can and cannot happen.

I take this to be the main advantage of the causalist's version of the property theory. However, I think causalism can also present us with a natural explanation of some of the other signs of "ontological ascent", which Dretske claims marks out laws from true universal generalisations (see p.36-7). Causalism can, for instance, explain why we think that laws are confirmed by their instances, since the account goes some way towards vindicating the inductive inferences we make (i.e. inferences from the particular to the general). We can be sure, if causalism is correct, that properties always have the same cluster of causal powers. Thus, if we know that an object instantiates a certain property, then we can know that it has certain causal powers (so long as we have discerned what behaviour is associated with it), and that certain (presumably derived) laws will hold true of it. Therefore, by observing the behaviour of objects, we raise the probability that unexamined cases resemble (in relevant respects) the examined cases, because it provides us with evidence for a certain cluster of causal powers which necessarily hold in all relevant situations.

In a similar way, causalism can offer an explanation of the generality of law statements (granted that laws are understood as describing the causal relations that exist between properties). Since, as properties are general (however we decide to

characterise properties, our account must respect this fact), a law which describes a relation between property A and property B, for instance, will hold true of all of the interactions between properties of type A and B. This can be guaranteed because, if two properties are identical, then they must contribute the same causal potentialities to a particular. Therefore, for a property to be of type A, it must interact with property B in the way specified by the law; and for a property to be of type B, it must interact with property A in the way specified by the law.

To summarise, I think that causalism's account of properties has very positive ramifications for a non-Humean property theory of law, because it vindicates the intuitive differences between laws and true universal generalisations. This, of course, can only provide causalism with a very limited defence. For it would only move those who were inclined to adopt some variant of a non-Humean account. However, I hope I have shown that the intuitions which motivate this type of approach in the first place (namely, Dretske's usefully summarised signs of ascent), are not always satisfied by the resulting accounts. This greatly undermines them, because it is not clear what else, other than the desire to respect our causal intuitions, legitimises the non-Humeans heavy ontology (as compared to the Humeans). Therefore, if you do want to take this sort of stance in this area, it seems that causalism presents us with a plausible version of this theory.

Chapter Four: The Grounding Intuition

In this chapter, I shall consider an objection to causalism. I shall argue that it is a powerful criticism. Hence, I hope to try to accommodate it by developing Shoemaker's thesis. The resulting account is not intended to be faithful to Shoemaker's aims and objectives (whatever they might be), rather it is put forward as one way of spelling out what a detailed causalist account could look like. I shall begin by setting out the objection, then I will consider why it needn't be seen as posing too much of a problem for the causalist, by looking at what metaphysical commitments could be added to this account.

IV.i. Armstrong's Intuition

Armstrong (1996b and 1997) offers two objections to causalism (or dispositionalism, as he refers to it). First, he claims that if we endorse the existence of properties conceived of in the dispositionalist way, then we allow entities with "objectionable features" (1996b p.16) into our ontology.[39] Their principal objectionable feature, according to Armstrong, arises from the fact that properties are understood in terms of "congealed hypothetical facts or states of affairs" (1997, p.79). If we follow Shoemaker in identifying a property with the causal potentialities it bestows upon an object, then the property is reduced to a mere promise of what would happen in the right circumstances. Armstrong argues that this idea is unacceptable, because "irreducible intentionality has turned up in everything there is" (1997, p.79). He writes,

> Is this not objectionable? Does it not assimilate the physical to the mental, rather than the other way round? But more to the point, how can a state of affairs of a particular's having a property enfold within itself a relation (of any sort) to a first-order state of affairs, which very often does not exist. We have here a Meinongian metaphysics, in which actual things are in some way related to non-existent things. (1997, p.79)

This is quite a strange, rhetorical passage. I think Armstrong puts his objection against causalism in an unnecessarily obtuse manner by bringing in the idea of "irreducible intentionality". The thought behind this seems to be that because

[39] Armstrong seems to speak sometimes of dispositionalism as a view about properties (1997, p.60), and sometimes as a view about dispositions (for example, when he puts forward this objection 1997, p.79). In order to make this objection relevant to Shoemaker's thesis, however, (a view which he clearly labels as dispositionalism) I am going to presume that he means to apply his objection to properties *per se*.

properties can point to situations which never exist (as that particular's power may lie dormant), we have anthropomorphically attributed our mind's ability to place itself in a seeming relation with non-existent things to the physical realm. But what exactly Armstrong is trying to achieve by this comment I do not really know. The complaint does not employ the standard sense of intentionality, because what it being picked out is not a relation to a non-existent particular. Nevertheless, the general tincture of his objection does appear to point to a strong intuition against causalism. There does seem something unacceptable in the idea of a property which is just possibility. To say that we know about the properties of objects through the effects that objects have is one thing, but to say that a property is just a bundle of effects either hypothetical or actual, seems quite another. Can a property really be just the stringing together of what an entity will do in certain (possible or actual) circumstances?

Armstrong's second objection reinforces the intuition being invoked in the first. Suppose that an object acts, causing another object to gain a new property. According to the dispositionalists, this new property will itself be purely dispositional. If this new property goes on to cause any effects, these will be nothing more than either a losing, or gaining, or sustaining of purely dispositional properties. Armstrong finds this result unacceptable. He writes,

> Can it be that everything is potency, and act is the mere shifting around of potencies? I would hesitate to say that this involves an actual contradiction. But it does seem to be a very counter-intuitive view... particulars would seem to be always re-packing their bags as they change their particulars, yet never taking a journey from potency to act. For "act", on this view, is no more than a different potency. (1997, p.80)

The thought here is that if properties are just potentialities to do things, and causing just amounts to changing the causal powers of an object, then there seems nothing within the object which is actually responsible for its causal powers. The picture we get seems, at best, bizarre. The causal powers, or properties, that an object instantiates appear to be randomly imposed upon the object. If, for example, one property of an object causes the existence of a new property in another object, we cannot say that this is a real change in the object, because what we are conceiving of is just a change in the description of what objects can do given certain circumstances, nothing more.

I shall dub the intuition which I think underlies both of Armstrong's objections "the grounding intuition". It is basically the idea that monadic properties of an object (and its causal powers) should be fixed by entities which are intrinsic to that object. This thought explains both why it seems so absurd to say that a property is nothing

more than a bundle of possible effects, and why we are so inclined to think that if a property changes another property of an object, then there will be some real change in that object which will account for its modified causal powers.

Unfortunately for causalism, Shoemaker's account does not support the grounding intuition. For his relational characterisation of properties suggests that properties should be identified with their interactions with other objects and not with anything within the object itself. So, for instance, the property of "being made out of copper", is nothing more than a collection of the ways in which the substance can behave. Hence, Armstrong's complaint that properties are rendered nothing more than "congealed hypothetical states of affairs" (1997, p.79) seems a justified summary of Shoemaker's position.

The problem, moreover, is heightened because there are rival accounts which do not contravene this important grounding intuition. Armstrong, for example, argues that immanent realism can do justice to the this intuition. Unlike the transcendent version of realism which states that an object's properties are determined by its relations to Forms beyond itself rather than by its own self,[40] immanent realists claim that universals do not exist independently of the particulars which instantiate them. They are "ways things are" (1997, p.30), and thus, "universals exist only in particulars" (1978, p.22). Therefore, immanent realism allows us to conceive of the properties of objects as entities which are "intrinsic to" or "in" the object.[41] Armstrong then makes the further claim that any dispositional properties (which Armstrong understands as causal powers) an object has flow from the combination of its intrinsic or categorical properties,[42] the laws of nature and those intrinsic/categorical properties of other objects. He writes, "given these truthmakers, the particular's having a certain property, plus the relevant laws, it is entailed that the particular has the power or disposition" (see Armstrong 1997, p.81). I believe that one of the primary reasons why the picture Armstrong offers us is so appealing, is because it respects the grounding intuition. Hence, I suspect that causalism's failure to do

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[40] See, for example, Fales (1990).

[41] There is, of course, some obscurity surrounding the ideas of "intrinsic to" and "in" which critics could exploit. I, however, think we do have an intuitive handle on what Armstrong is getting at – although it would be better if we could spell it out more clearly. I am afraid I shall not try to here.

[42] By "categorical properties" I think Armstrong means to refer to the particular instances of the universals which are instantiated by the object. He makes the controversial assumption that these can be specified without reference to causal powers (see Armstrong 1996a and 1996b). This seems unlikely in light of current scientific theories (see Blackburn's discussion on the nature of scientific discovery 1991 and 1993), but I shall let this point pass.

similar justice to this intuition, is one of the main reasons why the view has been so frequently dismissed as absurd. This objection (along with its denial of CT) thus strikes me as one of the principal challenges facing the account.

Causalists might respond to Armstrong's attack by biting the bullet and arguing that our intuitions are simply wrong. But this isn't a very promising strategy if we're trying to drum up support for the account. And, more importantly, I suspect that there are good reasons for believing that an adequate characterisation of properties will have to respect the grounding intuition. First, Armstrong seems right to point out that if an object's properties change, then we would expect some change in the intrinsic makeup of the object. This seems to be an important methodological principle not only at work in science, but also validated by it. So, for example, if an isotope of carbon is carbon 13 rather than 12, this extra neutron makes the mass of the isotope heavier, thus changing its properties. Tiny variations, not only in the constituents of a substance, but also in its arrangement (for example, left and right sugar), seem to change the properties of an object.

Second, we suppose that properties are constant within the object that instantiates them. We attribute properties to objects, even when their causal powers are not being displayed. So, for example, we naturally presume that red objects instantiate the property of redness, regardless of whether or not there is anyone around to see it. If we want to justify this intuition,[43] then we need a truthmaker which legitimises our practice of attributing properties to objects all the time. The claim that properties are no more than possible future effects does not do this.[44] Therefore, I

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[43] This intuition also supports the oft-cited distinction between a dispositional property and the manifestation of a disposition (see, for example, Mellor 1974). This distinction is an important one, because we need to be able to make sense out of the claim that a glass can be fragile, despite never having been dropped. Mellor makes it clear why this is necessary – think of all the safety precautions at a nuclear power station, "it is absurd to suppose that these precautions have no basis unless they are somewhere and sometime unsuccessful" (1974, p.111-2). We do not think that the disposition exists in the object only when it is manifested, rather we think of it as a power which the object has, if not displays, all the time.

[44] This observation also seems to motivate Swinburne's objection against causalism (1980). He argues that if causalism were correct, then we would have no justification for making the property attributions we do in fact make. He reasons as follows: in order to know that an object has a power there must be some demonstration of it. This demonstration will involve a change in something. Hence, in order to perceive a power, you must be able to perceive that it has brought about some change. Next, Swinburne claims that change must be understood by reference to the "changes in the properties or relations of objects" (1980, p.316). Thus, in order to detect a change in an object, we must be able to perceive some change in its properties.

Swinburne thinks that this conclusion causes problems for the causalist. If properties are causal powers, and powers are only recognisable if you can perceive a change in the object's properties, then we are faced with a regress. For to be able to perceive a change in an object, we have

don't think a causalist can afford to ignore our grounding intuition. Either they must come up with some very good reasons for thinking it to be wrong, or they need to try to accommodate Armstrong's intuition by developing Shoemaker's idea that properties are causal powers. I suspect that the latter project has more hope of success.

IV.ii. A Development

So far then, I have argued that we should concede that properties are grounded in objects. Armstrong understandably claims that this constitutes an objection to causalism since, as causalists want to characterise properties relationally, this seems to exclude the thought that properties are fixed by what is intrinsic to the object. This reasoning, however, implicitly supposes that there is nothing more to a property than specifications of what it enables the objects that instantiate it to do. That is an understandable assumption to make, given Shoemaker's statement of strong causalism as the view that properties are causal powers. But, hopefully, chapter one (see p.24-8) shows that this it isn't the only way of interpreting this vague statement. If we interpret causalism as the view that properties are defined by their causal powers (i.e. by the basic network model see p.25), this (to a large extent – see p.25) leaves metaphysical questions concerning what properties are open. Moreover, even if we take Shoemaker's statement at face value, it makes no claim concerning what exactly a causal power is. We could defend the strong causalist's statement (i.e. the claim that properties are causal powers) by opting for a different understanding of causal powers. For Armstrong's intuition only works as an objection against causalism if we

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to recognise that an object's properties/relations have ceased to exist or have come into existence. But, according to causalism, we cannot identify the object's properties without identifying its causal powers, and this requires us to perceive their effects, i.e. the changes they make to objects. Therefore, because being able to detect an object's properties entails perceiving changes in an object, and being able to perceive changes in an object entails detecting changes in the object's properties, we cannot say what properties are independent of an appeal to changes in objects, nor what changes in objects are independent of an appeal to properties.

Swinburne's objection seems to amount to the claim that we cannot identify properties with possible future effects, because without the capacity to identify properties, we wouldn't be able to perceive the effects in the first place. Shoemaker responds to this objection with the justified observation that we can identify some powers that objects have, independent of changes in objects. I think Shoemaker is right to say this, but I hope that the proposal I shall put forward later in this chapter will more persuasively meet the objection. I shall challenge Swinburne's assumption that causal powers (with which properties are identified) are just potentialities for contributing to the behaviours of objects. I shall urge that we should reject this claim and put in its place an alternative model. This will, I think, allow us to say that there is something continuous in the object which grounds the property/causal power. Therefore, because this will hopefully give us reason to attribute non-

are willing to endorse the assumption that causal powers should be understood solely in terms of what objects do.

I don't think this assumption is a very compelling one for the following reasons: first, causal powers, like properties, are attributed to objects even when the objects do not display them. We think that it is a current fact about some object that it has a certain causal power. This is why we claim that objects have causal powers when they are not manifesting them. Thus, we again need some truthmaker for the fact that an object can possess a causal power when it is not being displayed.

Second, scientific practice appears to attribute more to causal powers. When a scientist ascribes a causal power to a substance, the power of opium to produce sleep, for instance, they do not just collect statistics (although empirical tests will be run), they also do a chemical analysis of the substance to see what its chemical nature can tell us. If we just relied on the effects powers produced, we would have a problem distinguishing between seeming powers of substances and real powers. For example, a drug may be thought to have a power because it seems to have a positive effect. However, it may be discovered that the chemical composition of the drug is unable to produce any such positive effect (say because they were found to be sugar pills), thus we would have to put the improvement down to the placebo effect, and say that the drug only appeared to have a causal power.

Third, I think we have strong singularist intuitions which suggest that there needs to be something intrinsic to the cause and effect in virtue of which one brings about the other. A generalist analysis of causal powers (i.e. one which analyses the occurrence of A's power to cause B, in terms of all other As and Bs) seems unsatisfactory, because what it is for something to be a causal power doesn't depend upon the particular involved. Instead of analysing what it is for A to cause B in terms of other As and Bs, therefore, it seems far preferable to focus on what it is about this A that caused that B. If this intuition is correct, then to say that A has the power to cause B, suggests that there is something intrinsic to A in virtue of which it causes B.[45]

If I am right to think that there is motivation to offer an account of causal powers which appeals to the intrinsic features of an object, we can assert that an

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manifested properties/causal powers to objects, we will be able to undercut the claim that we identify properties solely by perceiving changes in objects.

[45] I shall say more about this later.

adequate characterisation of properties and causal powers requires us to think of them as grounded in the objects that instantiate them, despite the fact that they are both identified relationally i.e. by what they enable objects to do.[46] Thus, we can also hold onto the claim that properties can be identified by their relational aspects, without forfeiting our grounding intuition.

IV.iii. Tropes

If a causalist decides to opt for this method of response, they are then faced with the question as to what could ground the properties, or causal powers, of an object. Harré and Madden (1975) offer one suggestion. They argue that ascriptions of causal powers should be analysed as follows:

> "X has the power to A" means "X will/can do A, in the appropriate conditions, in virtue of its intrinsic nature". (1975, p.86)

This account seems to be on the right lines because by appealing to the state of an object's intrinsic nature, Harré and Madden provide a truthmaker for our practice of attributing inactive powers to objects. Since if causal powers are grounded in the make-up of the object, there is a continuous fact about the object which serves to justify our assumption that causal powers are constant features of it. But unfortunately, as it stands, the analysis is not very illuminating because it raises two pressing questions: "What is an object's intrinsic nature?" and "What is the relationship between the causal power/property and the intrinsic state?".

In order to get a better grip on the questions being asked, it would perhaps help to make them more concrete by using an example. Most philosophers seem to agree that the causal powers an object has flow from the particular aspects or states of that object. If we want to know why an object does something, we do not just look at what it does (although this is very important), we try to examine its internal structure. So, for example, we look at the specific configuration of the object's molecular structure, the type of substance that makes it up, etc. This procedure is very much in line with scientific investigation. Consider, for instance, the explanation they offer of copper's power to conduct heat or electricity. In this case, what grounds the power is

[46] That the individuation conditions for causal powers depend upon what the objects that manifest them do, seems uncontroversial. For the same feature of a substance can confer two different powers to that substance. Similarly, different features may realise the same power.

a particular feature of that object, namely, the freedom of its electrons. For this enables the substance to conduct heat and electrical charge with ease.

This suggests that one natural way of cashing out what the "intrinsic nature" of an object (which grounds the causal powers/properties of objects) amounts to, is in terms of the particular features or property instances of an object. It seems appropriate to call "the freedom of the substance's electrons" a property instance. The label "property" is suitable because it picks out a feature of the substance which many other substances could also exemplify, and it does not exclude other features of the object obtaining at the same place and time. While the addition of "instance" brings our attention to the fact that it is a particular manifestation of a property (not the general property/universal of redness say) which grounds the causal power.

The most popular way of characterising a property instance is by appealing to exemplifications of universals (see, for instance, Armstrong 1997, ch.2 and Tooley 1987, ch.1). Proponents of this view (which I shall refer to as universalism) claim that property instances are not basic, they are rather composite structures involving a universal, a particular and some sort of relation of exemplification. So, for example, a property instance of electric charge, is a union of distinct elements – one which furnishes a nature (the universal) and the other which particularises (the bare particular or individual).

Another way of analysing property instances is by way of tropes.[47] There is a lot of disagreement within the literature concerning how best to characterise these entities (also referred to as "abstract particulars", "concrete properties" and "unit properties"). The essence of the idea, however, is captured by the aforementioned notion of "property instance". A trope is a particular instance of a property, it is not "weakness" or "whiteness" in general. So, for example, it is "*that* cable's weakness", "*that* patch of whiteness". Trope theories contrast with the variety of realism offered by philosophers such as Armstrong, because they do not think that universals/properties can be wholly and completely in many places at the same time.[48] Each of them has its own particularised nature and so is not literally repeatable.

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[47] The term "tropes" is sometimes used interchangeably with "property instances". However, unless otherwise stated, I shall reserve the term "property instance" to pick out entities which are neutral between the universalist's and the trope theorist's accounts, and the term "trope" to designate the special, ontological entities which lie at the heart of trope theories.

[48] This is not to say that they are nominalists (i.e. that they deny the existence of universals). A trope theorist can endorse the existence of universals/properties, they just claim that they are reducible to

At first glance, the different characterisations of tropes may seem inconsistent, because they are referred to as both "abstract" and "concrete". But these are just different ways of focusing in on their features. So, for example, Campbell (1981) refers to them as "abstract" because he is drawing our attention to the fact that we discover them through a process of abstraction. Others have used the same term to indicate that different tropes (for example, a blue trope and square trope) can occupy the same spatiotemporal location. No trope theorist wants to use "abstract" in the sense it is sometimes used, namely, to categorise non-spatiotemporal entities. Therefore, we might prefer to call tropes "concrete particulars", in order to make clear that they display spatio-temporal location like the objects that instantiate them, or of which they are constituents (depending on your theory).

What is important for present purposes, however, is not how we should spell out the exact details of a trope account (although soon, following Ehring 1998, I shall suggest that trope theorists should accept that tropes are entities which are capable of persisting see p.67-9), but rather how the theory contrasts with the universalists. The crucial difference between the two is that trope theorists take property instances to be primitive. They then construct properties/universals and (sometimes) individuals out of them.[49] Whereas universalists construct property instances from constituents (namely, universals, particulars and relations of exemplifications).[50] In the rest of this section, I want to do two things: first, I shall argue that the a causalist can do justice to the grounding intuition, so long as they adopt an ontology of tropes rather than one

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tropes. This is not equivalent to the claim that universals do not exist, because you can argue that something is reducible to something else, without denying the reality of what is reduced.

[49] The classic trope theory (as espoused by Stout - 1921 and Williams - 1966) treats objects as constructs or bundles of tropes. But there is no need for those who believe in the existence of tropes to adopt this theory. Martin (1980), for example, recognises individuals and tropes. Both positions have their advantages - the former clearly has the advantage of ontological simplicity, but increasingly it has been doubted whether the relations posited between tropes, provide the necessary unity to make the bundle qualify as an individual. My concern here, however, is not with this issue. I am interested in how tropes could be employed in an account of properties and causation.

[50] Armstrong's notion of "state of affairs" picks out this idea of a "property instance", as they are defined as non-mereological associations of a substance and a universal. This notion can do a lot of work for universalists – work which trope theorists have sometimes claimed can only be done by adopting their ontology. Campbell, for example, argues that "the philosophy of cause calls for tropes" (1981, p.129), because we need them to explain causal statements such as "his poor physical condition led to his collapse". In this case, it was the particular poor condition he was in, and not a general instance of "poor condition", which lead to the man's collapse. Unfortunately, Campbell does not adequately establish his case, because it is not clear that Armstrong's notion of state of affairs won't suffice. For the combination of a particular with a universal results in a particular state of affairs which serves to pick out that man's poor condition and not just a general instance of it. The same goes for some of the other arguments offered by trope theorists, for example, Wolterstorff claims that

which endorses primitive universals. Second, I shall very tentatively argue (I am definitely not trying to offer a comprehensive discussion of this issue) that while both exemplified universals and tropes are respectable candidates for the position of property instance, tropes have a couple of features which perhaps make them better suited to this role.

A causalist cannot endorse the universalist position, because this ontology treats the universal as primitive. What it means to say, "X is red" is just to say, "it partakes in the universal redness". It thus straightforwardly denies the causalist's claim that "redness" is relationally characterised by the causal powers it has, i.e. its power to produce certain visual sensations in a creature with a particular physiology. Trope theory, on the other hand, provides the causalist with more room to manoeuvre, because they do not think that the property or universal "redness" is primitive. Instead, they argue that property instances or aspects of objects are ontologically prior. The universal/property redness is a construct out of these property instances. Redness, for example, is the class of exactly similar, or resembling, tropes. To say that an object exemplifies redness, on this view, is to say that one of its tropes is part of the class of red tropes.

Causalists can intervene at this point and add their own take on things. For the relation of resemblance which groups our tropes together into properties/universals, is in need of some elucidation. This is what causalism can offer. We can claim that two tropes F and G resemble each other iff an object which exemplifies F and an object which exemplifies G is empowered to behave in the same way in virtue of F and G. Therefore, the relation of resemblance which, together with the tropes, constitutes redness, can be characterised by what objects, which exemplify this property, can do.[51]

The model being suggested is this: the fundamental type of entity which grounds both properties and causal powers are tropes. Nevertheless, our properties are characterised relationally, i.e. by their effects on other objects. In other words, we

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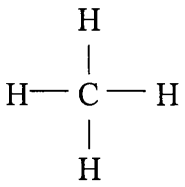
statements like "the green at the left hand corner" requires tropes (1960, p.105), but again it is not clear why exemplifications of universals could not play this role.

[51] It needs to be made clear what causalism is and isn't offering here. It is not a solution to the pervasive relational regress problem. If we do claim that relations are tropes, then this difficulty still remains. Neither does causalism offer us a theory of resemblance, i.e. it does not tell us what resemblances are. What it does do, however, is provide us with an account of what similarities between property instances are relevant to property construction. In other words, it offers us a way of understanding how we group our tropes into properties.

learn about tropes through the causal powers an object displays (the causal powers are thus epistemologically prior). These causal powers also serve to characterise our property notion by grouping together the property instances of various objects through this relation of causal resemblance. But tropes are still metaphysically prior in this picture - they are what provide the metaphysical basis of properties.

In order to answer Armstrong's objection, it is enough to show that causalism can be developed in such a way that it is consistent with the grounding intuition. I think this is possible so long as we adopt an ontology of tropes, because then entities intrinsic to the object (i.e. ones which the object is constituted of) form the basis of its monadic properties. However, independent of the needs of a causalist, it can be argued that property instances, understood as basic rather than composite, are better candidates for the grounding role. For two problems seem to beset the universalist's attempt to analyse property instances in terms of exemplifications of universals. The first is the much discussed problem of structural universals. Lewis (1986b) argues that there are severe difficulties facing any universalist attempt to analyse structural universals as structures of universals. We have to allow into our ontology many properties which are structural (i.e. properties which not only have parts - as conjunctive properties do - but whose arrangement of parts is crucial to them). So, for example, a methane molecule consists in one carbon molecule and four hydrogen molecules in a certain arrangement:

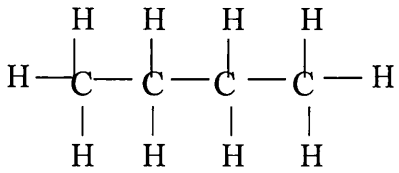
A) Methane Molecule

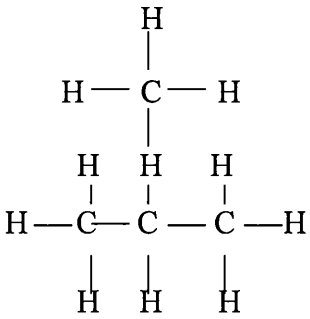


The problem arises for the universalist when they try to explain how we reflect the fact that there are four particular instances of hydrogen within the property of "being methane", despite there being only one universal of hydrogen. Universalists need to account for the four-foldness of hydrogen within the universal "methane", without thus contradicting the claim that there is one universal of hydrogen, which is completely present in all its instances.

The challenge is heightened still further for the universalist, by the existence of properties that have all the same constituents, but are nevertheless distinct due to the fact that they are arranged differently. So, for example, butane and iso-butane are both C_4H_{10}, but they are arranged like this:

B) Butane.





C) Iso-Butane

It is not enough, therefore, for a universalist to provide an account of universals which allows them enough particularity for butane to have ten instances of it, and yet enough universality to be multiply instantiated wherever butane occurs (whatever that suggestion would look like), because this would not serve to distinguish butane from iso-butane. What they also need to do is find a way of specifying the structure of C_4H_{10}, because only then will they be able to reflect the structural differences between butane and iso-butane.

Trope theorists have the resources to build structural properties. Take first the methane example. Their analysis can capture the four-foldness of the hydrogen which occurs in this property, because the hydrogen atoms which constitute the property "being methane", are as particular as the property instance is. Similarly, in the case of butane and iso-butane, if we accept that the bonds occurring between the atoms are tropes, then we can distinguish between these properties, because not only are all their constituents (being particular) distinct, they are differentiated by their divergent arrangements. The trope bonds connect the carbon and hydrogen tropes in different ways in both cases. Therefore, the trope theory offers a simple solution to this problem, because it can allow that structural properties really are built out of different parts, hence their structures can be reflected.

It is not at all clear that universalists have a solution – certainly not a simple one at any rate. Armstrong offers two responses to the problem (1986 and 1997), I shall outline the one he now prefers. This tries to utilise the notion of "states of

affairs" (i.e. a non-mereological association of a particular and a universal – see p.49) to resolve the quandary. The particularity of states of affairs,[52] allows a universalist to analyse, say, a methane molecule as the state of affairs which consists in that-carbon-atom-bonded-to-this-hydrogen-atom, and that-carbon-atom-bonded-to-this-other-hydrogen-atom etc. This molecule will thus have a unique description in terms of states of affairs which distinguishes it from any other state of affairs (since all its constituents will be particular and hence unique). Armstrong thinks that this notion can solve the universalist's difficulty. His idea is that we can view methane atoms as belonging to a distinct type of state of affairs, butane atoms to another and iso-butane to yet another, since each type will have a distinctive analysis which will serve to distinguish it from the others.

It is far from clear, however, that states of affairs can do the work Armstrong wants them to do. States of affairs are particular, hence, Armstrong is obliged to explain how we can move from talk of a particular token of methane, to talk of the type or property of being methane. (Appealing to a distinct "type" of methane state of affairs only serves to express the problem.) In order to do this, a universalist must analyse the state of affairs "being *this* hydrogen atom bonded to *this* carbon atom" as an exemplification of the type of state of affairs "being *a* hydrogen atom bonded to *a* carbon atom". Because a universalist has to cash out types of states of affairs in terms of universals, we have the same problem over again. For once we have analysed the properties involved in types of states of affairs as universals, two exemplifications of the universal "being a hydrogen atom bonded to a carbon atom" cannot be distinguished from a single exemplification of that universal. We still have no plurality in the picture with which to reflect the four-foldness of hydrogen. Thus, we are no closer to understanding how the property of being methane can be analysed as a structural universal.

The second difficulty for those who try to analyse property instances by exemplifications of universals, is posed by the possibility of nonsalient qualitative change. Ehring offers a thought experiment in order to illustrate the problem facing the universalist (1997, p.94). Imagine that there is one machine which eliminates all electrical charge from objects without a trace, and another machine which instantly

[52] "Particularity plus universality yields particularity again" (1978, p.115). This is the point Armstrong is making when he writes about "the victory of particularity" (1978, p.115).

generates electric charge in objects. These two machines have been programmed to activate at exactly the same moment, and the second machine is set to generate exactly the same magnitude that the particle previously exhibited. The result is that there is no apparent shift in the electrical charge of the particle. Yet, nevertheless, Ehring argues, we still want to say that there is a difference between this case and one in which a particle just retains its electrical charge over the same period.

I think Ehring is right to claim that there is a difference which needs to be recognised in the two cases.[53] For we could easily imagine a slightly different set up, in which the second machine had been set to generate double the electrical charge of the particle. The difference between the two cases does not seem sufficient to justify the claim that there is change in the object when the machine is programmed to double the charge, but not when it is set to replace it with the same one. Therefore, what could account for the difference between the first case of nonsalient qualitative change and the second case of property persistence?

A trope theorist has the resources for making the distinction between the two cases. For they can say that in the first case, the electrical charge trope was replaced with another exactly similar to the original. Whereas in the second case, the particle retained its electrical charge trope. This may seem slightly paradoxical, surely tropes cannot be identical through time because, as particulars not universals, they cannot be strictly identical at each moment of their existence. But this is not correct. Tropes are particulars, therefore, adherents of this position do commit themselves to the claim that they cannot occupy different spatial locations at the same time. But this is compatible with the persistence of tropes through time, because we can adopt a non-relational view of tropes (i.e. one analogous to a non-relational view of physical objects which claims that objects are not four-dimensional, because they lack temporal parts and are wholly present at each moment of their existence). Thus, we can assert that the same trope can occupy more than one temporal location.

Universalists, in contrast, seem unable to deal, in a satisfactory way, with the distinction between the two cases. There is no change in the universal in the case of nonsalient qualitative change, therefore, the only way they could try to account for the difference, is by appealing to a change in the exemplification of the universal. In other

[53] This is a controversial claim which I can't adequately defend here (see the parallel debate about whether three-dimensional objects persist over time - Shoemaker 1979, Armstrong 1980, Wiggins 1967), but I think it is a plausible.

words, they could say that the second case displayed a persisting exemplification of the universal, whereas the first case involved two different exemplifications of the same universal. The problem with this suggestion is that the notion of a "persisting exemplification" appears to be a dubious one. For exemplifications tend to be individuated by following criterion:

> E and E* are the same exemplification iff they involve the same particular, universal and temporal location.

Therefore, it is not clear that universalists can help themselves to the notion of a "persisting exemplification".

If we allow, however, for the sake of argument, that this notion is coherent, does the universalist then have an account of the difference between property persistence and nonsalient qualitative change? Not yet, because nothing has been done to demonstrate that a substantial difference has been located. For, in the case of nonsalient qualitative change, all the components involved in the time before the activity of the machine (t_1) and the time after (t_2) are the same. There is no new particular involved, no new universal or new exemplification relation. Therefore, unlike trope theorists who have a different property instance to appeal to, there is nothing which can serve as a truthmaker for the claim that there is a nonsalient, yet qualitative difference between t_1 and t_2. Hence, neither is there anything which can justify calling the first case an example of nonsalient qualitative change, and the second case an example of property persistence.

To summarise then, not only does an ontology of tropes cohere well with the causalist's theory, there seems to be some independent grounds for believing that they are good candidates for the role of property instance. Perhaps even preferable to their major (realist) competitor, since it is not clear that the universalist's ontology can deal with the structure or persistence of property instances. In the rest of this chapter, I shall argue that tropes can also be plausibly viewed as grounding the causal powers of objects. This is important if tropes are going to be adopted as the metaphysical supplement to the causalist thesis. For if we want to claim that properties and causal powers are interdefinable, then what grounds one must also ground the other (see section IV.ii.). In order to properly make this claim out, we need to develop a comprehensive theory of causation. But as this clearly cannot be done here, something

less ambitious will have to be outlined. What I shall try to show is that the modified form of causalism outlined above, can be shown to cohere with some important intuitions we have regarding causation. Hence, it is at least plausible to suggest that tropes are a good candidate for grounding causal powers.

IV.iv. Singularism and Generalism

In chapter three, I argued that causalism could do justice to the intuition that causal laws are necessary. Here, I want to claim that modified causalism offers us a promising conception of the relation between causes and effects. I shall begin by outlining two different approaches to the characterisation of the causal relation (generalism and singularism). Then, in the next section, I try to show that modified causalism can do justice to the intuitions which motivate both generalist and singularist accounts of causation.

The various accounts of the causal relation can be roughly demarcated into two different approaches. The first can be broadly labelled as "generalist". These theories claim that the main difference between a causal relation and some other relation is that the former instantiates types of events that are suitably related. Therefore, whether C causes E does not depend on something intrinsic to the process/relation between particulars C and E, rather it rests upon numerous extrinsic facts about the world's history. This view results in the claim that all singular causal facts supervene on general facts (e.g. laws, types of situations, properties). According to generalists then, given that the initial particular conditions are the same, there could be no difference in the singular causal facts without a difference in the general causal facts.

Singularists offer a different kind of approach. They believe that an account of the nature of the causal relation between causes and effects should focus on what happens there and then when C causes E. It is this intuition which forms the persuasive power of Armstrong's objections towards causalism (see IV.i.). The thought there was that it was unacceptable to think of a property as a mere bundle of effects, because we have a natural inclination to think that effects must be caused by something intrinsic to the object. Hence, this is really just offering us a version of the singularist's intuition that when C causes E, we should look for something intrinsic to C to explain the occurrence of E. This approach results in the claim that there is no

guarantee that the general causal facts fix all the singular causal facts. For if we argue that what makes a particular relation causal, are not general facts but something about the relation itself, then it is perfectly possible for there to be unique, unrepeatable causal sequences.

Generalism and singularism are usually presented as mutually exclusive alternatives (for they assert that the singular causal facts do/do not supervene on the general ones). However, I think that it is perhaps more illuminating to think of them as different ways of trying to describe the causal relation. For theories of causation can (and often do) combine both generalist and singularist components. So, for example, take the paradigm generalist account offered by Hume.[54] He claims that causation in a specific instance of C causing E, is derivative upon the constant conjunction of type C events causing type E events. It is thus a "top-down theory of causation" (Ehring, 1997 p.4), because general facts constitute the principal part of the analysis. However, Hume also acknowledges that there is a singularist component within the causal relation, because type-type relations often leave it undetermined which particular events are paired as cause and effect. Thus, Hume adds that a causal relation is one which holds between contiguous events ("nothing can operate in a time or place, which is ever so little remov'd from those in its existence" – 1975, p.75), where the cause precedes its effect.

Rather than thinking about the causal relation in either a generalist or singularist way, therefore, we could try to combine the approaches to get the best of both worlds. If we decide to do this, we need to specify what the generalist and singularist component of the relation is, and then work out the order of priority between them (i.e. see whether the resulting account commits us to the claim that singular causal facts supervene on general ones). In what follows, I shall give an example of how this could be done with respect to the developed causalist's account, suggesting that this theory offers a promising account of the nature of the causal relation.

IV.v. Tropes as the Relata of Causation

[54] This may be an inaccurate representation of what Hume actually does say. But this doesn't matter for the present purposes, because I am just trying to illustrate a certain approach.

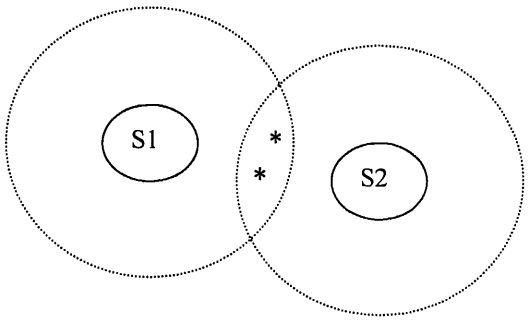
The suggestion I want to put forward is that when C causes E, certain powers that tropes have are being displayed. The causal relation between C and E will involve both persisting tropes and tropes undergoing changes due to the powers of other tropes. As tropes are particular aspects of objects, the nature of the causal relation essentially depends upon something intrinsic to the process itself. The suggestion thus presents us with an account which is largely singularist in nature. What makes it the case that C is causally related to E, is not some fact about types C and E, but rather because some interaction between tropes has occurred (or no interaction depending on whether you view non-change as a causal process).[55]

We may wonder, what's so good about the account's emphasis upon the singularist component in causation? Why stress this and not the generalist component? The reason for this, I am afraid, rests heavily on intuitions, but I think these are widely held, since even the opponents seem to share them. Hume, for example, recognises that his account might be thought problematic because it analyses the particular event of "A causing B", in terms of other type-A events and type-B events. He writes that his definition of cause may be "esteem'd defective, because drawn from circumstances foreign to the cause" and "from something extraneous to it" (1978, p.170). The intuition behind this worry (which I think also motivates singularist accounts of causation like, for example, Ducasse, 1926 and Anscombe, 1971, as well as Armstrong's grounding intuition) is that instead of analysing what it is for A to cause B in terms of other As and Bs, we should be thinking about what it is about this A that causes that B. There seems something odd about claiming that a process should be characterised as "causal", on the basis of generalisations that state that every other particular of type-A is connected to type-B. What seems more

[55] Ehring (1997) provides a much more detailed account of what the causal relation amounts to. He argues that trope persistence and the forming and unforming of property bundles constitute the singularist component in causation. I think that his account could be utilised to spell out many of the details which are not provided here. But I do not wish to endorse everything that Ehring advocates. In particular, he argues against causal realism, because he claims that causal facts supervene on non-causal facts like property persistence (see p.61-8). I, on the other hand, suspect that causal facts cannot always be reduced to anything further. While we might explain the powers of one particular by appealing to further properties, ultimately, it seems likely that we will have to postulate some powers which are brute. I want to claim that the ultimate property instances postulated by science (there may also be other "emergent" properties, not postulated by science, yet fundamental – see p.13) will have certain powers which do not supervene on non-causal facts, but rather form a crucial part of causal reality. Ehring does nothing to establish the case against causal realism in his book (although he does make some fair points against it). Moreover, I don't think his talk of property persistence conclusively furthers his aim to provide a reductive account of causality, because he does not establish that "property" isn't a causal notion.

important is that there is something about this A that made that B happen. This intuition is well accommodated for by the above account, for it explains causal processes by appealing to the causal powers of tropes – these are the crucial unit of explanation for our causal statements. Therefore, whether a relation is causal, does not depend upon all type-As being followed by type-Bs, but rather upon whether the causal powers of the particulars are manifested in the event.

That our intuitions really do swing in favour of singularism is, I think, well brought out by Foster's thought experiment (1985, p.256). Suppose there is a law which states that when any spherical lump of a certain kind of metal, call it K, reaches temperature t, then somewhere on the surface of K (which is not specifiable) a flash will appear half a second later. Imagine that two K-spheres are put sufficiently close together so that they overlap. Then both lumps are heated and reach the critical temperature at the same time. Half a second later, we see two simultaneous flashes occur within the region of overlap.



Possible Options:
a) S1 causes F1 and S2 causes F2
b) S1 causes F2 and S2 causes F1

In this case, Foster argues, it is intuitively plausible to suppose that each flash is caused by one of the spheres at temperature t. Unfortunately, the law and the non-causal description of all that happens does not suffice to determine which sphere caused which flash, because either flash could belong to either event. In other words, we cannot distinguish between either a) or b), because the non-causal description in terms of constant conjunctions and the law are neutral between the alternatives. Therefore, whichever pair of causal statements obtains, cannot be determined by, or reduced to, general facts about the situation.

A defender of the generalist approach could accept this conclusion. They could insist that there is no causal pairing beyond what can be said given the law and non-causal descriptions. Therefore, while we are entitled to say that the event of heating up the two K-spheres caused the two flashes in combination, we cannot say

that each flash is uniquely the effect of one heating of the K-sphere. I think, however, that most people find it plausible to think that one sphere causes one flash and the other sphere causes the other flash. Therefore, unless we have overwhelming reason to accept the generalist's approach, there seems no reason why we shouldn't remain faithful to our intuitions and accept the singularist's claim that singular causal facts do need not supervene upon general ones. This is a conclusion which (modified) causalism can endorse, because they can say that there is some singular fact about the matter as to which sphere caused which flash, since the tropes of one particular will be causally operative in producing one flash but not the other.

Having said all this, it does strike me as foolhardy to underestimate the importance of the generalist component in causation. I mentioned at the start (p.5) that there appears to be an undeniably close relationship between causation and law. Hume seems right to claim that if C causes E, then this will imply something about other type C and E situations. This is a very important principle in everyday life, because it enables us to make inferences about the unexperienced. If we do hold onto the claim that causal statements (at least usually) imply laws, then we can go someway towards justifying this significant practice.

Some of the singularist accounts on the market, I think, neglect this generalist component without any proper warrant. Anscombe, for example, writes that:

> If A comes from B, this does not imply that every A-like thing comes from some B-like thing or set-up or that every B-like thing or set-up has an A-like thing coming from it; or that given B, A has to come from it, or that given A, there had to be a B for it to come from. Any of these may be true, but if any is, that will be an additional fact, not comprised in A's coming from B. (1971, p.92)

This extract doesn't just make the intuitive singularist's claim that a causal relation is not validated by an appeal to causal laws. It goes further than this, for it draws the much stronger conclusion that no causal relation of A causing B ever implies either that there is some probability p that any A-like thing could come from some B-like thing, or that there is some probability p that a B-like thing could give rise to an A-like thing. This second, stronger, claim, moves a step beyond what is validated by an appeal to singularist intuitions. Hence, an account which reflects these intuitions, need not necessarily adopt this very anti-Humean thesis.

I think that modified causalism can do some justice to Hume's valuable insight, despite its emphasis on the singularist component. So far I have claimed that

causal relations express interactions between property instances. These are entities which are capable of being reduplicated (although they will not literally be identical) in different objects, because out of resembling tropes we construct properties. Resemblances between objects, therefore, indicate exactly alike or similar tropes. This means that if C causes E in situation S, and then a different event occurs in similar circumstances which is very like C, we would expect something akin to E to happen. For the resemblances between the two situations indicate that the underlying tropes are similar, and so, because tropes are identified by the causal powers they give rise to, we should expect that the effect on this other occasion will also be similar. Therefore, it is not correct to claim that singular causal facts have no bearing at all on general causal facts. Both laws and properties are grounded in the tropes of objects; hence it is inevitable that discovering facts about tropes will result in us also learning more general information about properties and laws.

To summarise then, the model being offered by modified causalism is contrary to both the traditional Humean position and the non-Humean accounts (see, for example, Armstrong and Tooley). Instead of A, causalism offers us B:

Model B gives a much larger role to singular facts than model A. According to model B, what differentiates a token causal sequence from a non-causal sequence, are not general facts about the world, but rather intrinsic relations involving tropes. But the position is not analogous to some singularist accounts (see, for example, Anscombe and Ducasse), because there is a strong connection between the token causal relations and the general facts. I thus hope to have captured the singularist intuitions, without losing what seems true about the generalist approach.

That this account provides a plausible account of the relation between cause and effect can, I think, be brought out if we consider the preemption problem. This problem is created by situations where there are two causal lines, one that actually does the causing, and an alternative which would have done the causing had it not

been for the blocking effect of main line. So, for example, suppose that Smith kills Jones by shooting him. White, who was going to kill Jones, hears the shot and, after the investigation, realises that he does not need to shoot Jones after all. Without Smith's action, White would have caused the death of Jones, but his deadly deed is preempted by Smith's preemptive strike.

In recent years, much space has been given to the question as to whether the counterfactual theory of causation can deal with this phenomenon. But this is an issue which faces all theories of causation, not just the counterfactual theory, and, moreover, it seems to cause problems for many of them. So, for instance, if we adopt a generalist type approach and claim that token events are causally connected iff they are subsumable under some law, the preemption problem still remains because preempted causes can also be lawfully sufficient for the effect. The difficulty does not disappear if we adopt the singularist alternative either. Ducasse's account,[56] for instance, has no way of excluding the preempting cause from being part of the total cause of the effect, because he has no resources with which to disregard the irrelevant preceding changes.

We may wonder, what's so important about the preemption problem? After all, it's not as if these are common scenarios, so why should they play a crucial part in a formulation of an account of the causal relation? The reason for this is not because we are in dire need of an account of these situations, but rather because their out of the ordinary character provides a test for accounts of the causal relation. For if a theory commits us to the claim that the preempted event is a cause (as in the Humean-type case), or that the preempting event isn't a cause (as in the counterfactual case), then we seem to have uncovered something important, namely, that each account of the nature of the causal relation, fails to capture what actually does the causing.

The proposal offered by modified causalism has the necessary resources to distinguish between pre-empted causes and pre-empting causes. For they can argue that only one of the relations will be causally connected with the effect. We may be able to analyse this connection solely in terms of persisting or partially persisting

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[56] Ducasse writes that the change C causes the change K iff,
1) The change C occurred during a time and through a space terminating at the instant I at the surface S.
2) The change K occurred during a time and through a space beginning at the instant I at the surface S.
3) No change other than C occurred during the time and through the space of C, and no change other than K during the time and through the space of K (1926, p.127).

tropes (as Ehring does, 1997 ch. 5). Or, if no suitable candidate can be found, then we can appeal to the fact that an interaction has only occurred between the causally powerful tropes of the pre-empting cause and effect. Therefore, I think the account's success in preemption cases, gives us some reason to believe that tropes might be suitable candidates for the relata of the causal relation.

IV.vi. Summary

In this chapter, I have argued that a developed version of Shoemaker's thesis manages to combine causalism with the grounding intuition. The essence of the proposal put forward is this: either a causalist could take Shoemaker's statement of (strong) causalism (i.e. the claim that properties are causal powers) very literally, while still grounding properties in tropes, because causal powers warrant the same treatment. Or, they could interpret causalism in a way analogous to metaphysical functionalists (see p.24-8). In other words, they can argue that because causalism is a thesis about how we should define properties, the metaphysical situation is left undetermined. Causalists are then free to develop the account in the way suggested here. In other words, they can argue that although properties are defined by their causal roles, metaphysically speaking, they are sets of tropes with intrinsic causal powers.[57]

The proposal as it stands is very limited, hence, it is in need of development. I have not, for instance, made any suggestion concerning how causal powers might be argued to reduce to tropes.[58] With regard to the present dialectic, however, the absence of a fully worked out proposal is not too worrying. Why? Because so far I have argued that Armstrong's intuition is a variant of the one which motivates the singularist accounts of causation. I have tried to show that modified causalism can do

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[57] If they take this route, a causalist has two options: either they could adopt the functional state identity theorist's approach, and claim that the property of being knife-shaped, for instance, is a state which plays a certain abstract role. They could then add in the metaphysical assumptions suggested here, and argue that although properties are not metaphysically identified with tropes, nevertheless, these serve to ontologically ground or realise these states. Or they could take the more Lewisian line and say that while properties are defined by their causal roles, metaphysically speaking, they are one with tropes.

[58] The question as to how causal powers reduce to tropes far outreaches what I can look into here. Campbell offers one suggestion (see 1990 section 5.14). He claims that causal powers supervene on the tropes that ground them, arguing that "where one item supervenes upon another there is no real additional ontology. And the powers do not take us to really new items beyond the intrinsic characters we must recognise anyway" (1990, p.121-2). Unfortunately, Campbell does not provide us with anything more than the claim that the two categories supervene on each other. The account is thus inadequate, because appeals to "supervenience" (in the absence of any more explanation) serve as nothing more than a placeholder for the claim that there is some sort of meaningful relationship between the two categories in question.

full justice to this intuition. Therefore, if I have been successful, I have exhausted the power of Armstrong's objection against causalism. For either we claim that

a) Armstrong's intuition is an important one, but it is one which modified causalism can do full justice too.

Or we can claim that,

b) The intuitions upon which modified causalism is based need not be take seriously.

The second response serves to undercut Armstrong's objection as surely as the first, because his criticism is based upon the same intuitions which, I hope I have shown, modified causalism is. Therefore, even if we take the second line, Armstrong's objection no longer poses any threat to causalism.

I have made it clear that I find a) the more plausible response. Thus, I hope the wider argument in this section has provided some grounds for thinking that the modified causalist's proposal is promising. I have suggested that the developed account could have application beyond the defence of causalism. First, it could be thought to offer a cogent development of trope theory. For if we develop this approach in light of causalism, we gain a better grasp of how our notion of property is constructed. We can say that the resemblance relations which group tropes into properties, are based upon interactions between objects. To be a trope of the property redness (and not say a trope of weakness or hardness), means that the object stands in certain relations to other objects. Second, I have suggested that the proposal might have the potential for providing us with a plausible account of the causal relation.

Conclusion

At the start of this thesis, I said I would examine Shoemaker's thesis on properties. I have proceeded to do this with a favourable eye, because I think it has much to recommend it. I began by giving a clear indication of what the thesis is and is not about. This struck me as an important task, because most discussions of causalism give inadequate expositions of it. Shoemaker's own presentation of the account is vague, because of its failure to make some metaphysical assumptions explicit. Other discussions of causalism (see, for example, Armstrong 1996b and 1997, and Martin 1996) place it in the wrong context, namely, that of the dispositions debate. This misrepresents causalism by making it appear vulnerable to objections which are, in fact, irrelevant. Causalism, better understood, is a close relative of functionalist theories. The causalist's relational characterisation of properties is an instance of the 'basic network model'. This core thesis leaves open wider metaphysical questions concerning the nature of properties.

Shoemaker's epistemological arguments in favour of causalism, are not persuasive. Causalists are thus required to offer some other incentive for adopting their account. The failure of the traditional non-Humean approach to give adequate content to the idea of the necessity invoked in laws, provides us with such an incentive. Causalism supplies us with an excellent account of the sense in which we take the laws of nature to be necessary. This is an important advantage of the account.

I have shown that two of the central objections to causalism are not as damaging as they might initially appear. The objection based on causalism's rejection of CT, was shown to be less secure than is usually presumed, because CT itself is based on insubstantial grounds. Armstrong's objection, in contrast, seemed to offer a more persuasive reason for rejecting causalism. I argued that, whilst Shoemaker's formulation of causalism does not have the explicit resources to cope with the grounding intuition, there is a form of causalism which does. By adopting an ontology of tropes, we can preserve the causalist analysis and, at the same time, claim that the properties of an object are fixed by entities intrinsic to it.

The proposed development of causalism is offered in a speculative spirit. It still needs to be spelt out exactly how tropes can form the metaphysical basis both of properties and of causation. But, I hope the discussion has provided some indication of how such an account might proceed, and of why pursuing this project should prove

a worthwhile undertaking. I think that the form of causalism outlined, meshes not only with Armstrong's grounding intuition, but also with some appealing theses concerning the nature of the causal relation. This takes us a long way from Shoemaker's original formulation of causalism. It can, however, be seen as a development of his evocative slogan, "properties are causal powers".

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