

REVIEW

DAVID ARMSTRONG, CHARLIE MARTIN, and
ULLIN PLACE, edited by TIM CRANE

Dispositions: A Debate

London: Routledge, 1996, £48.00

ISBN: 0 415 14432 9

STEPHEN MUMFORD

Dispositions

Oxford: Oxford University Press, 1998, £35.00

ISBN: 0 19 823611 5

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- 1 *Armstrong's view*
 - 2 *Place's view*
 - 3 *Martin's view*
 - 4 *Mumford's view*
 - 5 *Concluding remarks*
-

In recent years, two books have been published concerned with the metaphysics of dispositions. One is a debate between Charlie Martin, David Armstrong, and the late Ullin Place. The other is by a rather newer but already important player in this field, Stephen Mumford. The former allows proponents of three distinct views to state their cases. The latter provides a fourth position to be taken into consideration as well as an excellent account of where philosophy at large has got to with this topic. Despite the fact that the dialogue form has almost completely died as a form for extended philosophical writing, it is none the less true that philosophy, in journals and in discussion, is still largely conducted in the manner of a debate, and so it is to be welcomed that this structure is reproduced in *Dispositions: A Debate*. I shall try to convey something of the flavour of the book by attempting to articulate some of the main theses presented and arguments deployed. I shall also treat Mumford's view in his *Dispositions* as a contribution to the same debate. Several different opinions are canvassed, the central ones being:

- Dispositional properties are identical and reducible to categorical ones (i.e. categorical monism).

- There are dispositional properties and relations which are not identical to categorical properties and relations, and vice versa (i.e. dualism).
- Categoricity and dispositionality are features both of which are possessed by all properties; to think of a property *as* dispositional (or categorical) is to think of it as a limiting case, where the categorical element (or the dispositional element accordingly) is taken to be zero.
- The dispositional and the categorical are conceptually distinct modes of presentation of the same properties (what Mumford calls neutral monism).

These, if I do them justice, are the basic views of Armstrong, Place, Martin, and Mumford respectively. The debate, however, ranges far and wide, and I shall touch on some of the issues below.

1 Armstrong's view

David Armstrong's position has the advantage of being the most clearly expressed and simple to understand. In bare outline it is this:

(A1) The truthmaker for dispositional statements is always a categorical property (or complex of categorical properties).

(A2) Dispositional properties are always reducible to categorical properties (or complexes of them).

(A3) Further, the reduction in (A1) amounts to a contingent identity between dispositional properties and complexes of categorical properties.

(A4) There are no irreducible dispositional properties.

(A5) Irreducible dispositions would involve an irreducible intentionality—powers point to manifestations that may never exist, which Armstrong regards as objectionable.

(A6) An object has the dispositions it has in virtue of its categorical properties *plus* the laws of nature.

(A7) Laws of nature are contingent relations of necessitation among universals.

(A8) All universals must be instantiated.

(A9) The only universals that exist are those that enter into laws of nature.

Armstrong's picture is this. The world contains particulars and various levels of universals. A law of nature is a second level relation (natural necessitation) among first level universals. It is not part of the essence of any universal that it enters into the law it does. In some other possible world, it may have entered into a different law. So, for instance, in another possible world positively charged objects might attract one another in virtue of their charge, while in this world the law governing charge makes them repel one another. These universals are thus categorical. Their mere existence (in some possible world) has no implications for, e.g., causation in that world; the causal consequences of instantiating a universal depend also on the laws of nature there are. This picture is a sufficient basis for an understanding of dispositions. A dispositional property term can be regarded as referring to a universal or complex of universals. What is characteristic of dispositional terms is that they refer to a property (complex of universals) *via* its causal role in this world. So if 'fragility' is a disposition term it can be understood, roughly, as 'that property which (in the actual world) is responsible for its being true of an object that when it is suitably struck it breaks.' So dispositions are really just (categorical) properties under another guise.

It is worth remarking that there is some tension in what Armstrong says regarding the real truthmaker for a dispositional statement. Is the truthmaker for 'this vase is fragile' just the underlying categorical basis? Or does the truthmaker include the laws of nature as well? (A1) suggests that the truthmaker is just the causal basis—after all fragility is identical with its causal basis (A3). On the other hand (A6) suggests we need to bring the laws into the picture as well. With different laws the vase may have had the same categorical properties without being fragile. So it would seem that the vase and its categorical properties alone are not a (complete) truthmaker for the statement.

2 Place's view

According to Place:

(P1) Dispositional states and microstructural states are distinct.

(P2) Microstructural states stand in a causal relation to dispositional states, which in turn are causes of their effects. (Microstructure causes brittleness; brittleness, with striking, causes breaking.)

(P3) The possession of a dispositional property consists in the truth of certain subjunctive and counterfactual conditionals. The truthmaker for a dispositional statement is a counterfactual state of affairs. Counterfactual states of

affairs are actual states that correspond to the whole of a counterfactual statement, not its constituent parts.

(P4) Dispositions are emergent—where emergent properties are properties of wholes but not properties of their parts.

(P5) There is no real distinction between ‘categorical’ and ‘non-categorical’ properties.

(P6) Structural properties are not purely categorical.

(P7) Categorical properties are those the possession of which consists entirely in what is ‘here and now’, excluding what might have or has existed or will exist. This definition is what Place doubts anything satisfies.

(P8) Conceptualism about universals—the existence of universals is dependent on living beings being disposed to classify in certain ways.

The basics of Place’s view are easy enough to grasp. Some dispositions at least are emergent properties. They may have a causal basis in the structure of the parts of the entity possessing the disposition. But the dispositional property and its structural basis are distinct. The structural basis causes the disposition, which in turn causes the manifestation.

However, it would be wrong to think of the structural basis as purely categorical (P6). Indeed the structural basis will involve dispositions too. In Place’s example the horsepower of an engine is a dispositional property emerging from/caused by the structural properties of the cylinders, pistons etc. Some of those properties will be dispositional (such as the disposition of the sparking plug to ignite the fuel mixture, or the power of the cylinder casing to resist high pressure). It follows, on pain of infinite regress, that there must be some dispositions that are not emergent, which are not caused by any structure. But Place does not clearly acknowledge this. Place doubts the existence of purely categorical properties (P7), but clearly he thinks there are purely categorical structural features (which play a part in explaining emergent dispositions). Perhaps it is that for Place the purely categorical features are *relations*—e.g. spatial and temporal relations.

Place starts with two arguments for the view expressed in (P1)—and against Armstrong’s (A3). (i) The ordinary language argument: talk of an engine’s horsepower is not the same as talk of the cubic capacity of its cylinders. Furthermore, the horsepower is causally dependent on the former. Since, following Hume, causal relations hold only between distinct existences, the dispositional property (the horsepower) and the structure (cylinder

capacity) are distinct. (ii) The epistemological argument: we ascertain (micro)structure and disposition in different ways—by decomposition and testing respectively. This does not make sense if they are one and the same.

Armstrong points out that since, on his view, the identity in (A3) is contingent, the ordinary language and epistemological arguments have no force—a difference in ‘talk’ (sense/mode of presentation) is consistent with sameness of reference; there can be more than one epistemic route to one and the same property. The ordinary language argument would be on firmer ground if it noted that the same causal basis might underpin several dispositions. If there is identity between dispositional and causal basis then the apparently several dispositions served by the same causal basis are in fact identical.

The other element in Place’s ordinary language argument has two premises: first, the claim that the relation between the dispositional property and its structural basis is causal; secondly, Hume’s dictum that causal relations hold between distinct existences. From these Place infers that the disposition and basis are distinct. However, neither premise is evidently true. We do say that a glass’s constitution *makes* it fragile, but that locution is consistent with that relation (‘makes’) being non-causal (e.g. one of constitution or supervenience). Causal bases may explain dispositions but not by causing them—rather by causing their manifestations.

Place’s appeal to Hume’s claim that causal relations hold only between distinct existences, invokes a principle to which both Place and Armstrong (but not Martin) subscribe. The problem is stating the principle in a way that is not clearly false. Place expresses the Humean idea in a set of axioms from which it is deducible that ‘Statements asserting a causally necessary relation between particular situations are invariably contingent’ (Crane (*ed.*) [1996], p. 154). To deal with logically necessary statements of causal relation such as ‘the cause of X caused X’, a rider is added to the quoted conclusion: ‘unless the way used to describe them makes the denial of the statement self-contradictory’ (*Ibid.*, p. 154). But this rider threatens vacuity, since it is equivalent to ‘Statements asserting causal relations are either contingent or logically necessary.’ This rules out only non-logical, metaphysical necessity. Part of the problem here is spelling out what is meant by ‘distinct existences.’ Place’s criterion is that *a* and *b* have distinct existence iff under some description it is not self-contradictory to assert the existence of one while denying the existence of the other. Plainly this will not work, for even where $a=b$ we can find descriptions which allow for the consistent denial that $a=b$.

Furthermore, Place is committed to a conditional analysis of dispositional concepts (an analysis that Martin shows to be mistaken). The conditional analysis, (P3), means that the disposition and the appropriate stimulus together entail the manifestation, (Crane (*ed.*) [1996], p. 19), while (P2) says

that the disposition and stimulus cause the manifestation. This would appear to contradict his Humean commitments.

Place's position would be better for dropping the latter. Despite Armstrong's differences with Hume over the admissibility of natural necessity, it is he who has most in common with Hume. Both Armstrong and the Humean agree that it is purely contingent which properties enter into which laws, and correspondingly the causal powers of a property are also contingent. For both, in another possible world, the very same properties might have been arranged into different laws—or perhaps none at all. There is also a strong positivist leaning in Armstrong's (A5)—the rejection of irreducible intentionality. The objection here is one I have called 'too much potentiality'—irreducible dispositions would point to non-actual possibilia. Place's (P5) and (P8) seem to require this of dispositions. To my mind we should not allow these Humean and positivist thoughts to worry us. Not least because Armstrong's own position seem vulnerable to the same objection. He thinks that laws of nature entail counterfactuals, and so they at least point to unactualized possibilia. Laws of nature are for Armstrong genuine features of the actual world. So why is the 'too much potentiality' objection a problem for irreducible dispositions but not a problem for irreducible laws of nature?

3 Martin's view

Charlie Martin takes the most interesting and challenging of the different approaches in *Dispositions: a Debate*.

(Mn1) To speak of a qualitative [categorical] property is to take some real property as *only* at its bare potency-free purely qualitative limit (which it never is).

(Mn2) To speak of a dispositional property is to take some real property as *only* at its purely dispositional non-qualitative limit (which it never is).

(Mn3) No real property exists at either limit.

(Mn4) The concepts of disposition and manifestation are more basic than and can include the role played by cause and effect.

The immediate difficulty here is to spell out the idea of 'having categorical and dispositional sides.' Although Martin helpfully illustrates other points with examples, this one lacks such clarification. I think the following two examples may help. Place suggests that the sharpness of a knife might help show what Martin means. On the one hand there is a dispositional side, viz.

the capacity to cut or pierce things. On the other, there is a categorical side, viz. the spatial arrangement of atoms that gives the blade its fineness. If this is an appropriate example, then the view seems vulnerable to an objection from Armstrong. If these aspects are contingently related, why not decompose 'sharpness' into the two sides, regarded as separate properties? On the other hand, if they are necessarily related, it is tempting to regard the categorical side as the one that is doing all the work.

A different possible illustration might use a fundamental particle—let us call it the ζ -moron. The ζ -moron is genuinely fundamental—it has no structure, it cannot be decomposed into other particles. Let it also be that ζ -morons act in a certain manner specific to them (which I will call the Prwodz effect)—i.e. there is a basic, irreducible law of nature that governs their interactions. Consider the property of being a ζ -moron. On the one hand there is a dispositional element, the disposition of a ζ -moron to interact à la Prwodz effect. On the other hand, there is a categorical element—for instance, the blunt existence of a particle in a certain region of time and space (modulo Heisenberg).

A key element of Martin's view is the idea that causation can be subsumed under the relation of disposition and manifestation. The following, I hope, will illustrate this. The anomalous motion of Uranus is caused by the existence of Neptune. What is happening in this case is that the force of gravitational attraction between the planets means that Uranus is moved out of the orbit it would otherwise have had. This gravitational attraction can be regarded as a manifestation of the disposition of Neptune to attract massy bodies—and of Uranus to be attracted. This also illustrates another important idea of Martin's—that of *reciprocal disposition partners*. Armstrong's account of the laws of nature focuses on laws which relate states of the same object, while Martin is rightly keen to point out that causation is typically a relation between distinct entities, as so it is best described in terms of a disposition of the one which is manifested in the other and a disposition of the other to respond to the first.

One way of seeing how Armstrong's and Martin's views on causation relate is as follows. Armstrong now thinks that all causation is the instantiation of a natural law. So for a simple case of fundamental causation: '*a*'s being F causes *a*'s being G' the truthmaker will be $\langle Fa, N(F \Rightarrow G) \rangle$, where $N(F \Rightarrow G)$ is the law which links being F with being G. (We do not need to add Ga , although we could, since the existence of Ga is entailed by the truthmaker.) Above, I said that from Armstrong's point of view $\langle Ua, N(U \& S \Rightarrow M) \rangle$ is the complete truthmaker for the existence of a disposition. This truthmaker covers the cases where the disposition exists whether or not it is being manifested. So for the case where the disposition is manifested, we need to add a truthmaker for the stimulus, i.e. $\langle Ua, Sa, N(U \& S \Rightarrow M) \rangle$. Which,

going back a few lines, we can see is just a case of causation. To that extent the debate between Armstrong and Martin is about the possibility of regarding dispositions as composite (i.e. $\langle Ua, N(U\&S\Rightarrow M) \rangle$ —a categorical state-of-affairs and law) versus the necessity of regarding dispositions as basic and undecomposable.

4 Mumford's view

Stephen Mumford's book *Dispositions* does much more than just expound his contribution to the wider debate on dispositions. Here is all you will need to know about that debate as it stands at the end of the twentieth century, clearly and intelligently explained. But Mumford's own view is, in outline:

(Md1) Dispositions have causal bases.

(Md2) Dispositions are always identical to their causal bases.

(Md3) Dispositions are causes of their manifestations.

(Md4) There is only one sort of property. The dispositional and the categorical are aspects of one and the same property (neutral monism).

(Md5) A dispositional view of the explanation of change is preferable to a laws view.

Consider some object a which is fragile and which possesses the property K , which is a causal basis for that fragility. Let us suppose that a breaks as a result of being struck. Mumford, following a discussion of Elizabeth Prior's (Prior [1985]), believes that the following three propositions are inconsistent:

- (i) K is the causal basis for a 's fragility;
- (ii) K is distinct from a 's fragility;
- (iii) a 's fragility caused it to break.

Unlike Prior, who rejects (iii), Mumford rejects (ii). Thus his commitment to (Md1) through (Md3) are all of a piece. Anyone who adopts an identity view must account for the multiple realizability of dispositions. The fact that one and the same disposition may have different causal bases suggests that the disposition cannot be identical to all of them, on pain of violating the transitivity of identity. Mumford seeks to work his way around this argument; for property monism all that is needed is for every instance (or token) of a disposition, there is an identity between that disposition instance and some instance of a property that is a categorical basis.

This requires that we make some real sense of the idea of an instance or token of a property, in such a way that there may be identities between such things. Mumford argues that in any case we need some such notion independently of the requirements of his identity thesis:

When we say that the weight of the apple caused the pointer on the scales to move, for example, we do not mean that a property of weight in general, construed as a universal, caused the moving of the pointer. Rather it was this particular weight of this particular apple that caused the pointer to move. Similarly, my hair does not possess the colour brown in general; for a universal as traditionally construed does not even have a location, rather it possesses one particular instantiation of the property which causes my hair to look brown. Unless we accept some notion of properties being instantiated in particulars, then it seems difficult to sustain the evident link between a thing's properties and the causal transactions into which it enters (Mumford [1998], pp. 16061).

Mumford's last sentence is certainly true. Or, to put the point another way, an ontology of particulars and universals is not enough—we need something which tells us that some universals and particulars are linked and others not. But it is far from clear that such considerations must give us a notion of property instance which will do the work Mumford requires of it. That work involves allowing an identity between property-instantiations *without* that requiring identity between the properties themselves (so as to avoid trouble with the transitivity of identity). This looks a tall order. For instance, if we have an ontology of particulars, universals and facts (or states-of-affairs, in Armstrong's terminology), then the question of what it is that links a property and causal transactions is resolved. It will be facts that do the causal work—universals will not themselves be strictly causally efficacious; rather it will be the facts in which they participate. Does this help Mumford as regards property instances? He wants every disposition instantiation to be identical to a causal basis instantiation. On this view that would mean that the fact of *x*'s being fragile would be the same fact as *x*'s having such and such a structure. But it is difficult to see how one fact might be identical to another without the universals participating in the one fact being identical to those in the other fact, which is the conclusion Mumford must avoid. There is room for a lot more work here (rather more than it is fair to expect of Mumford in this context). But since Mumford rejects the currently existing answers that might seem to be of use to him (e.g. tropes), the jury must still be out on whether his version of the identity thesis can be maintained.

On the assumption that the jury would bring in a favourable verdict, Mumford has established property monism. Monists are wont to emphasize one side of the relevant identities as being more basic or fundamental than the other. Hence, like Armstrong, one may regard the categorical as prior to the

dispositional and hence think of dispositions as having been reduced to categorical properties via the identity. (Or one might prefer the reverse direction of reduction.) Mumford wants to resist such moves and has arguments against the various reasons one might supply for thinking that there is some asymmetry between the categorical and the dispositional. (Those supposed reasons for preferring the categorical side are: the set of categorical predicates has wider scope than the set of dispositional predicates; the dispositional may be variably realized by the categorical; categorical properties are first-order, dispositions second order; categorical properties are explanatorily more basic.) Instead, says Mumford, the dispositional and the categorical are just two modes of presentation of the same set of properties, a view he calls 'neutral monism'. Like Martin, Mumford regards the 'categorical' and the 'dispositional' as different ways of thinking about properties, not as different ways properties might be.

Mumford succeeds admirably in showing that existing arguments for asymmetry are weak. But it is difficult to be convinced that we should give up the search for a better argument. The main reason for doing so is a concern that neutrality of this sort provides an unstable foundation for metaphysical conclusions.

One important metaphysical use to which Mumford puts his work on dispositions is in the service of understanding, or rather avoiding, laws of nature. Mumford contrasts the 'laws view' of the world with a 'dispositions view'. On the former view, properties are themselves not enough to explain events, but laws (which are either regularities in the instantiations of properties, or relations among the properties themselves) are required as well. There are good reasons for finding the laws view unsatisfactory, and for preferring the dispositions view, according to which events are to be explained as the manifestations of dispositions. (Again there is a similarity with Martin, who explains of causation in terms of disposition manifestation.) Mumford develops an attractive homuncular functionalism. Dispositions are to be understood as functional specifications of properties. An object's macroscopic dispositions can be explained in terms of the structure of its parts, whose causal contribution is functionally characterized. (Think of Place's description of our explanation of an engine's horsepower in terms of its functionally/dispositionally characterized components—carburettor, valves, spark plugs, etc.) These dispositions (i.e. functionally characterized properties) of the parts will themselves be explicable in terms of the sub-parts of the parts and so on. At each descending level, the structures get simpler and the dispositions appealed to get simpler. Either this process continues infinitely, or it will stop with some entities whose dispositions are not further explicable. These would be ungrounded dispositions.

Mumford does a commendable job of promoting this view over the laws view, showing how it provides the generality we expect from laws, and arguing that to the degree that it conflicts with intuitions about the contingency of laws of nature, it is those intuitions which are at fault. This line is surely a strong one to develop, but I fear that appropriate developments would be in conflict with Mumford's neutrality between dispositional and categorical modes of presentation. We may ask whether properties ever have their causal roles necessarily. If only ever contingently, then we may ask what is it about this world which gives the property in question the causal role it happens to have? If the property is one whose dispositional characterization is an ungrounded one, then there is no answer to be found in terms of its further structure. One is tempted to look to Armstrong for the answer, viz. that what gives a property its causal role in some world is a law in that world. In which case, neutrality is violated in favour of the categorical, since dispositional predicates will be a merely contingent way of identifying properties dependent on the laws of nature they happen to be involved in. On the other hand, if we regard ungrounded properties as having their causal roles essentially, then neutrality seems violated in the opposite direction, since now we will have a reason for thinking the reverse, since everything could be explained in dispositional terms, but not every disposition has an explanation in categorical terms. (Mumford [1998], pp. 185–87) It seems therefore that neutrality depends on its being the case that objects have infinite levels of structure. This may be counter-intuitive, but, as Mumford remarks, scientific discoveries have turned out to be counter-intuitive before now. (In this case it is difficult to conceive of us discovering that nature has infinitely many levels, for as Mumford also points out science must always posit ungrounded dispositions, even if later it finds grounds for them. Perhaps some meta-induction on this process of discovery might favour the infinite view, but I do not think we are there yet.)

As Mumford makes clear, we need, in discussing dispositions, to distinguish between conceptual questions and ontological questions, even if such questions are not entirely independent. In particular, we can on the one hand ask whether there is a clear and workable distinction between dispositional and categorical property-concepts, and on the other ask whether the properties themselves divide into two kinds. Mumford's view, as we have seen, is that there is a distinction between the different kinds of concept, but there is no such distinction between different sorts of property.

In *Dispositions: A Debate* there is relatively little discussion of the conceptual issue. As mentioned above, Place accepts an analysis of dispositional concepts in terms of counterfactual/subjunctive conditionals, as does Armstrong. But this matter is by no means uncontroversial. Martin argues that dispositional statements do *not* entail counterfactuals, because of

the possibility of finkish dispositions, which are removed by their activating stimuli. (So finkish fragility is fragility that is removed by striking or dropping—which means that the fragile object does not break when dropped.) Although David Lewis ([1997]) has argued that the simple conditional analysis can be repaired, there is reason to think that there is typically a concealed appeal to a certain set of circumstances. Such circumstances may something like ‘ideal’, ‘appropriate’, or ‘normal’; but whichever it is, the set does not typically allow itself to be definitively circumscribed. Mumford develops a ‘conditional conditional’ account. So we might understand ‘ x is fragile;’ as ‘ x has a disposition to break when struck’ and then analyse the latter as: $C_i \rightarrow (Sx \rightarrow Bx)$, where C_i = conditions are ideal, $Sx = x$ is struck and $Bx = x$ breaks. (Of course, this is logically equivalent to making ideal conditions part of the stimulus. In effect, this is getting close to Lewis’ view, which is that there are a lot more conditions required in the stimulus of a disposition than we typically mention. It is a question of pragmatics what we mention or may leave unstated.)

5 Concluding remarks

There is much more in both books than I have so far mentioned. Mumford’s *Dispositions* is packed full of argument and analyses of all the issues concerning dispositions and the major contributions in the existing literature. This will certainly top the list of such contributions for some time to come. It is the book I would recommend to anyone wanting to get up-to-speed on this important topic. Its style is clear and pleasing. And Mumford’s own views are an important contribution to the area.

Tim Crane is to be thanked for undertaking the difficult task of presenting differing views in the form of a debate; I hope others will follow his example. Those who do so would be advised first not to imitate the irritating convention of this book whereby each participant writes of himself and his own views in the third person, never in the first person; and secondly, if possible, to eliminate unilluminating misreadings by the participants of one another’s positions. There is much that is useful and absorbing in this book.

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