Dispositions and Ontology

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> We must see that dispositions are actual, though their manifestations may not be.
>
> <div align="right">C. B. Martin
"Dispositions and Conditionals"</div>

1. Introduction

One might have assumed that the increase, in recent years, in the number of writers willing to defend the ontological status of dispositions is evidence that the reductionist positions have lost favor.[1] Instead, we see reductionism regarding the dispositional holding its own. The debate rages on, and not without good reason.[2] Reductionists often seem to occupy the dialectical high ground, especially when one considers how typically unwieldy or uninformative are the nonreductionist alternatives.

Nor is the debate a minor internecine skirmish, of significance only to a few practitioners of a small branch of metaphysics. Dispositional notions are commonplace in much of the current work in philosophy. One finds mention of capacities, abilities, potentialities, and dispositions in ethics, epistemology, and the philosophy of mind, as well as the philosophy of science. Indeed, these notions have come to play a more, not less, important role.

Making sense of the dispositional is a continuing challenge. What I have to say will do little to assuage our worries about

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meeting this challenge *per se*, although in the final section of the paper I shall offer a diagnosis of the present difficulties. I hope, instead, to show that a key reductionist position, David Armstrong's, does not really occupy the dialectical high ground here and to suggest, therefore, that we cannot blithely assume that dispositional notions can be understood in a manner which will do no violence to the current ontological tendencies.

The debate on dispositions is dominated by metaphysical realists. Thus, in order to be of interest to us here, a position must have sufficient *prima facie* "ontological bite." Specifically, it must accord with C. B. Martin's "Truthmaker Principle": the principle that, when a statement is true, there must be something that makes it true (cf. Armstrong, Martin, and Place 1996, 2, 15; Armstrong 1997, chapter 8). Armstrong's account meets this constraint, and I take it to be the most plausible of the reductionist accounts that do so.

2. The Dispositional

By 'disposition'[3] or 'capacity' or 'potentiality', I do *not* mean what might be called "mere" possibility; and I am taking no position with regard to *its* ontological status. Armstrong (1969) argues against the view that a thing could have a disposition that is not an actual, categorical, property of that thing:

> But it seems impossible that the world should contain anything over and above what is actual. For there is no mean between existence and non-existence. We can talk intelligibly, and sometimes truly, about possibilities, whether logical, or, as in this case, empirical. But this cannot entail that there are such entities as possibilities. If, *per impossibile*, a thing could have a potentiality over and above its categorical properties, the potentiality would be an actuality—and so not a potentiality.[4]

But there is a reply, suggested by the quotation from Martin above: To claim that a property is dispositional is not necessarily to deny its *actual* existence; rather, it is simply to claim that *even as instantiated* some properties do not always manifest themselves "categorically," do not manifest themselves in the ways in which the so-called categorical properties do.

The dispositional/categorical contrast may itself be seen as problematic. 'Dispositional' is typically taken to refer to a category complementary to that referred to by 'occurrent', 'categorical', or sometimes 'actual'; yet, as we have seen, those who want to support the ontological status of the dispositional have sometimes done so by claiming that dispositional properties may themselves be occurrent or actual. Grammatically categorical disposition statements—statements of a form such as "X is soluble"—can be used to predicate, of an object, properties that are, at least *prima facie*, not categorical. And

some seem to want to deny the contrast altogether. I shall assume for our purposes here that there is such a contrast, that it is conceptually, if not ontologically, well-founded,[5] and that, if we keep our wits about us, we can usually avoid any confusion that might be due to merely terminological or stylistic differences among our authors.

I assume then that the dispositional is a category that includes tendencies, capacities, liabilities, habits, and potentialities (Wright 1990, 39). Armstrong (1969) defends the view that dispositions are states with causal powers; indeed, dispositions and capacities are sometimes identified with causal powers (cf. Harré and Madden 1975, 86). At the very least, dispositions are qualifications for standing in dynamic relations that involve change to one or more of the things so related. I am concerned with the ontological status of the dispositional in general—that is, with the general question, "Is the dispositional categorially irreducible?" And I shall for the most part use the terms 'disposition', 'capacity', 'potentiality', and so forth interchangeably.

3. Identificational Reductionism

Before we get to Armstrong, let us survey some of the dialectical landscape. Consider, first, the familiar position that we shall call *Identificational Reductionism* (IR), the view that dispositional properties can be identified with their categorical bases. IR has been defended by W. V. Quine (1974) and Armstrong (1993 and 1973), among others. But Armstrong is also my paradigm defender of *States-plus-Laws Reductionism* (SLR), the view that dispositional properties can be reduced to certain categorical properties of the object(s) in question plus the relevant laws of nature. This should not give us pause. IR and SLR are perhaps best understood to be species of the same genus; in each case, the relevant dispositions are seen as reducible to certain categorical states of affairs. Thus, on the Armstrongian version of SLR that I intend to argue against, laws of nature are themselves understood to be categorical states of affairs (Armstrong, Martin, and Place 1996, 43).

The general question I am raising is whether, in any plausibly adequate ontology, a *dispositional* modal element is effectively ineliminable. The IR defenders hope to eliminate exactly this element. Typically, the reduction is to proceed as, in effect, a kind of micro-reduction:[6] The idea is to identify the dispositional properties of a complex thing with various of the categorical properties of, and inter-relationships between, its microstructural parts (see, for example, Quine 1974, 10).

But attempting to identify one of the macro-level capacities or dispositions of a complex entity with (at least some aspect of) its underlying microstructure will not allow one to avoid an ontological commitment to capacities or dispositions.[7] The dis-

positional character of a macro-level disposition, as expressed by the relevant subjunctive conditionals, is a function of more than just the *categorical* features of the associated micro-structural parts; it is also a function of the *dispositions* of those parts to interact in certain ways. That is, it is also a function of how the various parts *would* behave *were* the relevant conditions to obtain (Franklin 1986; Thompson 1988, 67–8). Thus, in mentioning the microstructural characteristics of salt (NaCl) in order to account for its solubility, either one must tacitly appeal not merely to the categorical characteristics of its microstructure but also to the dispositions of, among other things, sodium and chloride ions to behave in certain ways or else one must shift to, for example, a states-plus-laws approach to the reduction.

4. Armstrong's States-Plus-Laws Reductionism and the Regularity Theory

Armstrong avoids the problems confronting IR: The IR theorist runs into difficulties arguing that all properties are, in effect, categorical, involving no dispositional elements. But, as Armstrong notes, there is a closely related reductionist alternative, that of admitting nothing but categorical properties *plus laws of nature* (Armstrong 1988, 84; cf. Armstrong, Martin, and Place 1996, 17, 41). Here the reduction—the elimination of dispositional elements in favor of categorical properties plus laws of nature—that Armstrong hopes to effect is itself straightforward enough: For example, the truth of the conditionals which express dispositions is grounded in the truthmakers of the relevant law-statements (cf. Armstrong 1997, 259 ff.). The problems arise with the associated account of the laws of nature, and this shall be our focus.

Although I find the SLR position to be initially plausible—and realist accounts of laws of nature similar to Armstrong's to be the only accounts of laws with sufficient *prima facie* ontological bite—we shall see that it cannot eliminate all dispositional modal elements from one's ontology: It has been argued[8] that, in the Armstrongian account of laws as relations holding between universals, there must be something in the universals themselves that is understood to be dispositional if the account of laws is to be viable. I shall attempt to develop this general point in a novel, but far-reaching, direction.

Armstrong (1983)[9] begins his discussion by arguing against various versions of the Regularity Theory of laws, each of which is motivated by an attempt to avoid some specific problem. All of the versions have in common one crucial element, namely, that laws are to be understood as involving nothing but regularities or uniformities in the behavior of things (11); each version then attempts to construe those regularities in a slightly different way. Armstrong discusses some of these

versions at length, considering both their faults and how one might attempt to remedy those faults. The main problems include the following.

First, the Regularity Theory seems unable to differentiate laws of nature from mere accidental generalizations (chapter 2). In the case of both laws and accidental generalizations, the (actual) regularities involved are of an identical logical form. Second, the Regularity Theory cannot explain why laws of nature are able to support the relevant subjunctive and counterfactual conditionals (see chapter 4, pp. 46 ff.). For example, if it is a law that all Fs are Gs, we would typically hold that, contrary to actual fact, had a been an F it would also have been a G. Yet, the Regularity Theory understands the law that all Fs are Gs to mean only that all the things in the world that are F also happen to be G; it can say nothing about things that are not F but might have been F. Finally, the fact that all observed Fs are Gs hardly seems to be an explanatory principle (40–1). Indeed, the fact that all Fs are Gs would seem itself to need explanation. If so, and if a law is just an expression of a regularity, then appealing to a law of nature is explanatorily problematic, to say the least.

In contrast to the Regularity Theorist, Armstrong holds that laws of nature are to be understood as relations holding between universals (chapters 6–11).[10] Armstrong is an *actualist*, who accepts only actual particulars and actual properties—not powers, potentialities, or dispositions (8–9). He is also a *naturalist*, who holds that nothing exists except the single, spatiotemporal world (82). Armstrong claims that his naturalism is compatible with his realism about universals, provided that one agrees that any property must be a property of some real, existing, particular; that is, all properties and relations must be instantiated or exemplified.[11]

5. The Problem of Uninstantiated Laws

An obvious difficulty for such a position is that we are sometimes willing to hold that there exist certain laws of nature even though the relevant universals are not instantiated in any real particulars and thus (for Armstrong) the relevant relations cannot be holding between those universals—for example, functional laws, cases of uninstantiated laws presented by Michael Tooley, and probabilistic laws. Armstrong deals with these in chapters 7, 8, and 9, respectively; but I find his account of "uninstantiated laws" problematic. Let me illustrate the difficulty by discussing the interesting (Forge 1986, 584), important,[12] and more straightforward case of functional laws.

We typically hold that certain lawful relationships that obtain in the world are functional in character: for example, the relationship between force, mass, and acceleration described by Newton's Second Law, $F=ma$. We also hold that, in such

circumstances, not all values of (i.e., not all properties falling under) the relevant functional variables are necessarily instantiated (Ayer 1956, 157). Thus, there may be no real particular that has the given mass and acceleration expressed by some instance of the general functional law. Yet, we still accept the instances, as well as the general functional law itself. How are such expressions to be understood? What are the truthmakers of the relevant statements?

Armstrong claims that uninstantiated laws are to be understood counterfactually:

> Statements of uninstantiated law are really only statements about what laws would hold if, contrary to fact, certain universals were instantiated, that is, existed. I thus admit uninstantiated laws, but only as logically secondary cases of laws. (112)

For example, were a body to have a certain mass and acceleration, it would have a certain force, as prescribed by the relevant functional relationship. But how is the relevant counterfactual conditional to be understood here? As Armstrong says,

> The problem must remind us of the more ordinary problem of extrapolating from the actual set of Fs, each of which is a G, to the conclusion that, if particular *a* were an F, as it is not, then *a* would be a G. In the latter case, the counterfactual will be sustained if it is a *law* that Fs are Gs. Laws, we are further assuming, are relations between actually instantiated universals. (112)

By parity of reasoning, according to Armstrong, what is required to ground the truth of the counterfactual in the case of uninstantiated first-order functional laws is an ultimately instantiated higher-order law.

This higher-order law is then to be understood in terms of a relation holding between the relevant higher-order universals (113). In the example we have been discussing, these would be the properties BEING A FORCE, BEING A MASS, and BEING AN ACCELERATION.[13] Hence, the truth of a statement of uninstantiated first-order functional law is ultimately sustained by a relation holding between higher-order universals. And these higher-order universals *are* instantiated, according to Armstrong, instantiated in *other* first-order values of the relevant variables—that is, in the various (instantiated) first-order forces, masses, and accelerations.[14]

6. Problems with Armstrong's Solution

This then is Armstrong's solution to the problem of uninstantiated laws. But can he really avoid acknowledging the existence of something dispositional here?[15] I suggest that,

unless some dispositional element is built into the very notion of a higher-order universal, it is unclear how relations between higher-order universals are to sustain the relevant counter-factuals: The sense in which Armstrong really needs these higher-order universals to ground the truth of statements of uninstantiated law is not the sense in which the higher-order universals are actually instantiated in some first-order values but rather the sense in which they *could* be further instantiated in *still other* first-order values—other first-order values that, as a matter of fact, are instantiated nowhere and nowhen.

Martin has argued that there must be something disposi-tional in Armstrong's universals if Armstrong's account of laws is to succeed. But Martin's focus has been on the *connection* between the universals that instantiate the laws.[16] Armstrong's discussion of functional laws nicely puts the focus on a somewhat different issue, namely, the dispositional character of the relevant higher-order universals considered in themselves.

Take the property BEING A MASS. This higher-order property is instantiated only to the extent that there is some real particular that has some first-order mass-property (e.g., A MASS OF 5 gm). But, again, the sense in which Armstrong needs BEING A MASS to be a higher-order *universal* is precisely the sense in which this property could be instantiated in other first-order masses, precisely the sense in which it has the *potential* to be so instantiated. For we accept that the general functional law holds even for the uninstantiated values because we believe that it would hold were BEING A MASS and the other relevant higher-order universals instantiated in first-order universals other than those in which they are in fact instantiated. And it is this feature of the higher-order laws and their instances that Armstrong's account fails to capture.

That determinable universals are to be understood as in a way potential, relative to the more determinate universals that fall under them, is of course a venerable position, to be found in the works of Aristotle, as well as in the works of more contem-porary logicians and metaphysicians.[17] But it is important to see what is and what is not being claimed. When I say that a higher-order universal needs to be understood as having the potential to be further instantiated, I am not necessarily suggesting that the universal itself has a disposition *as that is often understood*: that the property *would* be further instan-tiated if certain other things *were* the case.

Nor is the dispositional modal element involved *mere possibility*. It would be closer to the mark to say that the higher-order universal's existence consists, at least in part, in its *actual capacity* to be further instantiated and not in the mere possibility (cf. Armstrong 1997, 41) that it be so instantiated. Thus, the point is not the merely logical point that there might have been instances of these universals in addition to the actual

ones—it is the metaphysical point that, in order for these universals to play the role that they are to play in Armstrong's account, they must be *the sorts of entities that* admit of *being further instantiated.*[18]

Our interest here—and the interest of many who write on this topic[19]—is metaphysics, realist metaphysics and categorial ontology. To invoke the need for accepting a dispositional modal element in higher-order universals, to claim that Armstrong's account of functional laws must acknowledge determinables as having a kind of potentiality relative to their more determinate instances, is not to explicate the nature of dispositions. It is to argue that Armstrong has not succeeded in giving us a viable ontology that *excludes* the dispositional and at least to suggest that any sufficiently similar ontology will not be able to exclude it either. I diagnose the problem lying behind Armstrong's sort of view in section 7.

I have argued that, in appealing to higher-order universals to solve the difficulty with uninstantiated functional laws, Armstrong must ultimately acknowledge some type of, broadly speaking, dispositional modal element. That is, he must acknowledge that his higher-order universals themselves are characterized by such an element. But this difficulty is more far-reaching.

The relevant point is true with respect even to *first-order* universals. Relations between first-order universals should, of course, themselves be able to sustain counterfactuals; indeed, that claim is the crux of Armstrong's account of laws and a supposed major source of the superiority of his account over that of the Regularity Theorist. Thus, should not those first-order universals' being *universals*—and thus *their* being able to play a role in sustaining the appropriate counterfactuals—be understood, at least in part, in terms of their *potential* to be instantiated in particulars *other* than those in which they are in fact instantiated? If so, then any philosopher who is serious about admitting even first-order universals *in re* into his or her basic ontology, for the purpose of supporting an Armstrongian account of laws, had better be willing to allow in a dispositional modal element as well.

7. Pessimistic Denouement

But there is a problem with the strategy of simply admitting— even from the point of view of categorial ontology—dispositional modal elements into an account such as Armstrong's. Although these elements may be needed, it is not clear how they are to fit: Armstrong's world is a world of states of affairs. He (1997, 3) accepts, following John Anderson, the "propositional" view of reality, the view that "reality, while independent of the mind that knows it, has a 'propositional' structure." It is a world, not of things, but of *things-having-properties* and *things-related-to-*

other-things (Armstrong 1991, 190). The ontology we are talking about is, more or less, both static and atomistic. The dispositional *is* puzzling against the background of this ontology. Quine (1960, 223) notes that dispositions are "a better-behaved lot than the general run of subjunctive conditionals," but only if they are conceived merely as built-in, enduring *structural* traits—a position that we have found, in section 3, to be wanting.

The ontology is, however, not only Armstrong's ontology. It may be inadequate. But, abstracting from some of the details, this states-of-affairs ontology is really the only *comprehensive* ontology we currently have. This should not be surprising. In the 20th century, ontology and logic developed hand in hand: The late-19th-century work on the logic of relations (cf. Kneale and Kneale 1962, 427 ff.) influenced the formalisms introduced by Frege and Russell and led to the introduction of the ontological category of *relation*—which in turn led to the notion of *state of affairs* as that which is described by a statement of relational predication (Butchvarov 1979, 239). Since, from a formal point of view, even atomic statements of monadic predication can be regarded as relational, we are then led to accept states of affairs as those entities that are described by all statements.

The virtue of such an ontology is that it is reasonably clear—with Armstrong's well-developed version being perhaps the clearest exemplar of the position and, hence, our focus in the sections above—the vice is arguably an over-reliance on the explanatory power of the *part-whole analogy*. Panayot Butchvarov discusses what he calls the "method of analogy" at some length.[20] According to this method, one comes to understand something by seeking, seeing, and appraising similarities and differences—between the objects we are attempting to understand and those for which we have a more complete understanding.

The method is a genus, that is, a general method of achieving understanding, whose species differ in the various objects that they try to understand and the various comparisons that they take to be illuminating, with ontological analysis as traditionally practiced being one of those species. This kind of ontologist—in producing a categorial assay, an inventory of the kinds of things that there are and their structure—can be seen to take as generally illuminating the comparison of (1) the relationships holding between metaphysical types of entities with (2) the relationships holding between wholes and their parts. And thus we end up with the sort of "Tinkertoy" ontology that we have been discussing, an ontology that understands the world in terms of things and their properties standing in relations to things and their properties and within which dispositions are seen as, at best, a kind of second-class citizen.[21,22]

Notes

[1] See, for example, Weissman 1965, Mellor 1974, Fetzer 1977, a number of the papers in Tuomela 1978, Tiles 1985, and Thompson 1988.

[2] See, for example, Armstrong, Martin, and Place 1996, Müller 1997—and the articles following, especially, Harré 1997 and Cartwright 1997—Anderson 1997, Mumford 1998, Molnar 1999, and Mellor 2000.

[3] Armstrong (1997, 70) notes that the term 'disposition' is most naturally applied to the passive powers—rather than to the active powers—of a particular thing, although contemporary philosophical usage does not always abide by this. With Armstrong, I shall not restrict my application of the term to passive powers only.

[4] Armstrong 1969, 24. See, also, Armstrong, Martin and Place 1996, 91, where he is worried about positing a second, inferior, level of being: merely potential being.

[5] My assumption here should not be seen as begging the question against the reductionists—against whom I hope to argue. Cf. Mumford 1998, 20–1.

[6] See, for example, Broad's discussion (1976, 268–9) of *reducible* versus *emergent* collective dispositions. For an illuminating discussion of the issues involved specifically in cases of micro-reduction, see Beckermann 1992.

[7] This is not to say that such analyses are pointless. As Molnar (1999, 9) notes, if in this way large numbers of types of dispositions can be reduced to a few general and pervasive types, the analyses achieve a simplification and unification that greatly increases the explanatory power of the relevant microstructural theories.

[8] For example, Martin (Armstrong, Martin, and Place 1996, 77–8; cf. 127–9) argues that there must be something dispositional in Armstrong's universals if we are to be able to make sense of the "connection" said to obtain between the universals.

[9] Throughout sections 4 and 5, the numbers standing alone in parentheses refer to the relevant pages of Armstrong 1983; chapter citations in parentheses also refer to this work.

[10] See, also, Armstrong 1982; Armstrong 1997, chapters 15 and 16. He discusses universals at length in the two volumes of Armstrong 1978; see, also, Armstrong 1989b. (It is in the second volume of Armstrong 1978 that he first proposes his account of laws.) For two similar accounts of laws of nature, each dating from roughly the same time, see Dretske 1977, Tooley 1977—also Tooley 1987, part 2.

[11] One could here question whether Armstrong's own view of laws is not a type of regularity theory, given that, for him, law-statements—whatever the generality of their terms—may ultimately only report the correlation of instantiated or exemplified properties or relations. Indeed, this seems to me to be yet another way in which to begin to express the point that I am trying to make against Armstrong in section 6 below.

[12] Cf. Armstrong 1997, 242:

> The laws that have the best present claim to be fundamental are laws
> that link together certain classes of universals, in particular certain
> determinate quantities falling under a common determinable, in some
> mathematical relation. They are functional laws. If we can give some

plausible account of functional laws, then and only then do we have a theory of lawhood that can be taken really seriously.

[13] Armstrong argues against such determin*able* properties (Armstrong 1978, volume 2, 117 ff.). But he suggests (1983) that perhaps determinables can be postulated *a posteriori*, where natural science demands them.

[14] Cf. the more recent comments in Armstrong 1997,

> The existence of the determinable universal is entailed by, and so supervenes upon, *the existence of each and every determinate universal* falling under it. (p. 247)

> And [the higher-order law] exists nowhere except in its instantiations. (p. 248)

Armstrong, in effect, requires no more than that each law, including each functional law, be instantiated once (Armstrong, Martin, and Place 1996, 103).

[15] Recall our mention of Armstrong's actualism. Clearly, he does intend for his solution to allow us to avoid an ontological commitment to dispositional elements.

[16] See note 8, above. On the related issue of whether the connection is contingent, see Fales 1993.

[17] See Aristotle 1966, 1024b8 and 1038a5; Wilson 1926, volume 1, 360; and Blanshard 1939, volume 1, 609, 620. One of the classic treatments of determinables is to be found in part 1 of Johnson 1964, chapter 11; a more recent treatment is Elder 1996.

[18] Cf. Armstrong 1989a, 64–5: In Armstrong's pictorial model of his combinatorial theory of possibility, more counters of a given color can be added to the board. Also, there is an indefinite supply of extra counters of each of the colors that is initially present on the board. The first fact represents a merely logical point; the second fact, in effect, represents a more substantial metaphysical point.

[19] It is clearly Armstrong's interest (see Armstrong 1999, 77).

[20] See parts 2 and 3 of Butchvarov 1974; also, Bradshaw 1998, part 1.

[21] In addition to the problem it has making room for dispositions, such a view confronts a problem that Julian Dodd (1999, 150 ff.) has recently dubbed the "unity problem."

> [T]he positing of a state of affairs has no explanatory power. Merely saying that *a*, *b*, and *R* are unified in a state of affairs does nothing to help us understand how *a* and *b* can instantiate *R*. This is for the simple reason that the supposed unity of states of affairs is itself obscure. The problem of the nature of instantiation cannot be solved by wheeling in states of affairs; such a move, we have seen, merely replaces one unity problem with another. (pp. 155–6)

Thus, as Peter Simons (1999, 121) notes, the idea of a state of affairs that Armstrong (1997) presents actually wobbles between different and incompatible pictures: that of a whole with parts and that of a way of being. None of this should be particularly surprising to anyone familiar with Bradley's criticisms of Russell (see Bradley 1910, 280 ff.; Russell 1910; Bradley 1911; Butchvarov 1974). But it is worth

recalling that this is another aspect of the fundamental difficulty confronting a Tinkertoy ontology of this sort.

[22] I would like to thank Charles Nussbaum and Kenneth W. Williford, Jr. for their helpful comments on an earlier version of this paper.

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