

Powers and Dispositions

If properties are treated as features of reality (rather than as the reference of predicates in sentences) there are questions about how to understand them. If the driving force of reality is the laws of nature, then matter is intrinsically passive, and different laws would lead to different behaviour. Thus the properties are the passive features of the reality which these laws control. An alternative view is that the properties are intrinsically powerful, and give rise to the behaviour which is described by the laws. In this view, matter is active, and its potential for action is as much a feature of reality as its material properties and actual behaviour. Reality is full of (or even made up of) potentials, dispositions and powers. These constitute many of the real properties, though there may also be 'categorical' properties, picking out the structural features of whatever possesses these powers.

This new vocabulary enters a crowded field of labels for the attributes of objects, and the two key issues are how we should understand the attributes we experience, and which attributes we should treat as most fundamental. In the case of powers, should we say that we experience the qualities and properties of things because of their underlying powers, or that we experience the powers of things because of the underlying properties? Is this a merely verbal problem, or an important question? Two important issues are whether activity is basic to reality, or emerges (or is imposed) at a higher level, and whether the possibilities and necessities implied by dispositions are built into actuality. One ancient view says that only what exists or occurs right now is real, so dispositions only exist when they are enacted; the rival view says you haven't understood reality if you don't know the potentials residing within it.

If the powers and dispositions of reality are taken as emergent, then the most important properties will be the 'categorical' ones, which are the possessors and sources of those powers. This sees reality mainly in structural terms, with activity coming either from laws, or from the 'energy' which is part of the structure. An electron, for example, would be seen as an object, to which properties are attributed, with its behaviour derived from large features of its surroundings. The other main view sees powers as basic, with reality composed of forces and energies, which give rise to the structures as part of their behaviour. An electron, on this view, is a bundle of activities, perhaps as part of larger powers such as fields. The powers are taken to be either active, leading to movement, or passive, giving rise to inertia and impenetrability. The powers that found reality are assumed to be few in number, as expounded by fundamental physics, and other powers are derived from them, in increasingly complex systems. The properties we experience are these complex powers and dispositions, used to describe the world and build our scientific theories. We assume that chemists can create new dispositional properties, but not new fundamental natural powers. All complex features are dispositional in character, and we understand the world by explaining their potentials.

Powers will exhibit huge variety (especially in their 'derived' form). Some, such as magnetic fields or gravity, are continuously active, while others, such as fire, usually need a stimulus. The main reasons for favouring powers over categorical properties as the basis of reality are that mere structures don't seem to explain the world's activities, especially since particles such as electrons seem to lack any internal structure, and that activity seems to be the essence of the world, and we may even experience basic powers directly in our own consciousness. However, not many supporters of basic powers think they could constitute all of reality, since our concept of normal reality is that powers are possessed *by* things, and don't exist in isolation. Certainly space and time look more like structural aspects of reality than like powers, and the mere shape or constitution of a thing doesn't seem to have causal powers.

If powers are fundamental, this implies that they are hidden beneath the surface, and are merely inferred from what can be observed. For this reason, more cautious philosophers offer a conditional analysis of dispositional properties. That is, they paraphrase 'the vase is fragile' as 'if the vase were dropped it would usually break', which replaces the unobservable property of fragility with the observable event of breakage. If the vase is never dropped then nothing is observed, but fragility has become a hypothetical prediction, instead of a property. Strict empiricists favour this view, but some tricky cases spoil the neat solution. A steel vase is not fragile, but if attached to a bomb it would probably break if dropped. If a fragile vase is encased in soft plastic, it would not break if it were dropped. A fragile vase in a car crash might not break if it released an airbag (known as a 'fink' – which kills the disposition whenever a triggering event occurs). Or what triggers the breakage might also trigger a high speed repair (an 'antidote'). In general it looks as if a thing could be fragile even if there were no prospect at all of it breaking (because of circumstances), since fragility seems to be an intrinsic feature, rather than an actual behaviour.

A sceptic about dispositions might respond by saying that a dispositional claim is empty if there is no chance of it being implemented. Or one might say that a fragile vase just has a structure similar to that of vases which have broken in the past. We might say that fragility is entirely relative, rather than intrinsic to vases, since a normal vase is not fragile above a soft carpet, and a steel vase is fragile under a steam hammer. We could then say that all the intrinsic truths about the vase are structural, and the dispositions of the vase are contextual; the potentiality is then entirely in situations, rather than in objects.

Opponents of the idea of powers in metaphysics focus on their obscurity and vagueness. Powers are offered as fundamental explanations, but there is an obvious temptation to invent an underlying power whenever faced with a mysterious phenomenon. What is the 'truthmaker' for a claim that some power exists? Powers also have to be self-explanatory, to avoid a regress of explanations.

Despite these problems, the picture of reality driven by powers and dispositions has obvious attractions. Modern science talks a lot about 'laws', especially when they are expressed mathematically, but maybe science really seeks the causes of the regular laws, which reside in the essential natures of the particles that make up the standard model of physics. If the identification of the family of powers that drive quarks, electrons and fields is the main goal of science, then a metaphysics based on powers can look very respectable. It may be, for example, that we are much more interested in the powers of the elements in the periodic table than we are in their structures.