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## **Ellis on the limitations of dispositionalism**

**Joel Katzav**

I have argued that dispositionalism is incompatible with the Principle of Least Action (PLA) (Katzav 2004). In 'Katzav on the Limitations of Dispositionalism,' Brian Ellis responds, arguing that while naïve dispositionalism is incompatible with the PLA, sophisticated dispositionalism is not. Naive dispositionalism, according to Ellis, is the view that the world is ultimately something like a conglomerate of objects and their dispositions, and that, therefore, dispositions are the ultimate ontological units that explain events. Sophisticated dispositionalism, according to Ellis, supposes that,

how things are disposed to behave depends also on what kinds of things they are, what kinds of property they have, and how these kinds of things and properties are placed in the natural kinds hierarchies to which they belong (Ellis 2005).

Further, it supposes that at the top of each hierarchy of natural kinds there is a global kind. For example, '[t]he global natural kind in the category of substance is that of the physical system' (Ellis 2005). Ellis continues, claiming that the PLA is

of the essence of the global kind in the category of objects or substances. If this is so, then, of course, every continuing object must be Lagrangian, i.e. disposed to evolve in accordance with the principle of least action (Ellis 2005).

Ellis concludes that, therefore, a sophisticated dispositionalist can accommodate the PLA and its metaphysical necessity.

If I understand Ellis correctly, his view is that sophisticated dispositionalism is, while naïve dispositionalism is not, compatible with the PLA because sophisticated dispositionalism alone includes the thesis that an object's being the kind of object it is necessitates its possessing the dispositions it possesses. In slightly different terminology, the advantage of sophisticated dispositionalism supposedly lies in its implying that there are laws of nature that state that an object's being the kind of

object it is necessitates its possessing the dispositions it possesses. This response is somewhat puzzling since, by Ellis's own lights, it is not clear that sophisticated dispositionalism should really be thought of as going beyond naïve dispositionalism. Ellis has argued that fundamental objects such as electrons are the kinds of objects they are solely in virtue of their dispositions to behave, and that it follows from this that such objects' being the kinds of objects they are necessitates their possessing the dispositions they possess (1999: 27). Thus, according to Ellis, if the naïve dispositionalist accepts that there are fundamental objects, she is committed to what is tantamount to sophisticated dispositionalism.

In any case, my worries about the compatibility of the PLA with dispositionalism are worries about the compatibility of sophisticated dispositionalism with the PLA. In arguing against dispositionalism, I argued that if dispositionalism implies dispositional essentialism – i.e. if dispositionalism implies that the dispositions of an object are essential to its being the kind of objects it is – then dispositionalism is incompatible with the PLA (2004: 207–11). Now, in including the thesis that an object's being a physical object necessitates its being disposed to behave in accordance with the PLA, Ellis's sophisticated essentialism seems to be committed to dispositional essentialism. Moreover, Ellis says nothing about how dispositional essentialism can be reconciled with the PLA.

Ellis's additional claim that the PLA is metaphysically necessary only makes things worse. The PLA tells us that a system's actual equations of motion are such that the system has a quantity of action that is an extremum relative to other quantities of action it might have had. This presupposes that physical systems could have had quantities of action other than those that the PLA implies they actually have, and thus

that the PLA need not have applied to them. The PLA, accordingly, presupposes its own contingency.

In arguing against dispositionalism, I also argued that the type of explanation that dispositionalism affords is incompatible with the type of explanation that the PLA affords (2004: 211–13). Ellis, however, does not address this claim. Moreover, sophisticated dispositionalism does not seem to allow him to do so. According to sophisticated dispositionalism, an essential property of physical objects, namely their being physical, necessitates that they will be disposed to behave in the ways they are disposed to behave. Presumably, then, sophisticated dispositionalism goes along with the view that (certain aspects of) the essences of physical objects suffice to explain why such objects have the dispositions they have. For a variety of reasons, however, the PLA is incompatible with this somewhat Aristotelian view of explanation. Most obviously, the PLA presupposes that which dispositions an object possesses is a contingent matter, and therefore that dispositions neither flow from, nor are part of, objects' essences. Thus, the PLA presupposes that a physical objects' essence does not suffice to explain why it has the dispositions it has.

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